

Memo

То:	Mike Walker, C.E.T.	From:	Alyssa Gladish, E.I.T.
	Development Review Officer		Project Manager, Community
	Town of Carleton Place, Ontario		Development Stantec Ottawa, Ontario
Project/File:	160402061	Date:	December 13, 2024

Reference: 124 Moore Street - Carleton Place - Stormwater Management Design Brief Revision 1

Stantec Consulting Ltd. has been retained by Spurline Dental to prepare this Stormwater Management (SWM) design brief in support of a Development Permit (DP) application for the proposed addition to the commercial development (Dental Office) at 124 Moore Street in the Town of Carleton Place.

Background

The 0.16 ha site is situated on the southwest side of Moore Street, near the Rochester Street, Santiago Street, and Miguel Street Intersections with Moore Street (Franktown Road to the southeast). As shown in Figure 1.0. The site is bound to the northeast by Moore Street, and a lane to the south. The surrounding developments are residential to the north and southeast, and commercial to the east and south.



Figure 1 – Site Location

Reference: 124 Moore Street - Carleton Place - Stormwater Management Design Brief Revision 1

The DP application is for a 108.6 m², 1-storey addition on the west side of the existing 1-storey commercial building. The Site Plan includes a re-designed paved parking lot with concrete curbs and soft landscaped areas. Refer to the attached **Site Plan** prepared by Stewart +TSAI Architects Inc. (Revision 03, Issued for Review and Coordination October 30, 2024) for details.

Stormwater Management

The Town of Carleton Place requires stormwater management quantity control for this development. The 5year and 100-year post-development release rates from the site are to be limited to the 5-year and 100-year predevelopment release rates; respectively.

Existing Conditions

The site consists of an existing building with a mix of gravel and asphalt parking areas. The existing drainage patterns are shown in the attached **Existing Drainage Plan (EXSD-1)** drawing. The site drains predominantly from south to north to the Moore Street municipal right of way (ROW), as shown by the existing storm drainage catchment SITE 1. The entire site drains uncontrolled. The pre-development 5-year runoff coefficient (C) is determined to be 0.65 for the 0.16 ha site.

The peak pre-development flow rates shown in **Table 1** have been calculated using the rational method as follows:

Where:

Q = peak flow rate, L/s

C = runoff coefficient

i = rainfall intensity, mm/hr (as per the City of Ottawa IDF curves)

A = drainage area, ha

Design Storm	Pre-Development Flow Rate (L/s) for C=0.65, A=0.16 ha, t_c =10 min
5-year	30.3
100-year	64.8

Table 1: Peak Pre-Development Flow Rates

Note that the SITE 1 C-value is increased by 25% for the post-development 100-year event as per the MTO Hydrotechnical Design Chart 1.07, January 2023.

Reference: 124 Moore Street - Carleton Place - Stormwater Management Design Brief Revision 1

Post-Development Conditions

The post-development drainage is shown in the attached **Site Drainage Plan (SD-1)** drawing, where the site is split into three drainage areas, UNC-1, UNC-2, and C100A. Properties of the drainage areas are summarized in the attached **Storm Drainage Area Summary Sheet**.

- UNC-1 drains uncontrolled to the south and ultimately outlets to a grassed swale in the municipal Park Lot 18 and Park Lot 19.
- UNC-2 drains uncontrolled to the north and outlets directly to the Moore Street ROW.
- C100A drains to a grassed swale and into catchbasin C100A-1 where onsite storage is achieved through surface ponding. C100A-1 outlets to the existing 300mm municipal storm sewer in the Moore Street ROW.

Compared to the pre-development conditions, the post-development site has a greater paved parking area (some gravel parking areas to be paved), increased roof areas, and increased soft landscaped areas. The roof area of the existing building drains from front to back (north to south) while the roof area of the building addition is expected to be peaked, draining drain half to the south and half to the north with roof downspouts. The exact locations of the downspouts are to be confirmed in the architectural drawings. Refer to the **Grading Plan (GP-1)** drawing for post-development grades, slopes, and drainage patterns.

Onsite Stormwater Detention

To restrict the post-development stormwater runoff to the pre-development conditions, outflow from catchbasin C100A-1 is to be restricted by an inlet control device (ICD) to achieve onsite stormwater detention within the grass swale and catch basin. The ICD circular orifice has been sized using a modified rational method (MRM) analysis and the orifice equation for High Flow (HF) ICDs. Refer to the attached **Modified Rational Method Design Sheet** for calculation details.

The properties of the onsite storage area are shown in drawing **SD-1** and are summarized as follows:

- Surface ponding area: 31.5m²
- Maximum depth of storage: 0.26m
- Surface storage volume: 4.4m³
- 1200mm diameter catchbasin storage volume: 1.4m³
- Spillover elevation: 138.14m

The following assumptions were made in the MRM analysis:

- The release rate from catchbasin C100A-1 (*Qrelease*) was determined to be the lesser of the peak release rate from the ICD or the actual release rate of the site (*Qactual*).
- Stormwater runoff rates exceeding the peak orifice release rate was assumed to spill uncontrolled from C100A into the Moore Street ROW. This is represented in the MRM sheet as *Qspill*.

Reference: 124 Moore Street - Carleton Place - Stormwater Management Design Brief Revision 1

- The downstream water level was set by the properties of the 300 mm diameter receiving municipal storm sewer. Based on our conversation December 5, 2024, this pipe is an upstream run of pipe and is typically dry. Hence, the downstream water level was assumed to be below the proposed invert of the catch basin (136.68).
- Due to the upstream location of the storm sewer, the Town does not anticipate surcharge from the municipal storm sewer into the onsite catchbasin.
- An OPSD 705.010 Type B standard 1200 mm diameter catch basin was assumed for the elevation of the catchbasin rim relative to the invert of the ICD and outgoing pipe.

Inlet Control Device

To achieve the stormwater detention and release rate targets for this site, a 79 mm diameter circular orifice HF ICD is required. With a maximum hydraulic head of 1.46m, the orifice has a peak outflow rate of 15.0 L/s. The ICD schedule is shown in Table 2.

CB	Diameter	ICD Type	Invert	5-Year Head	5-Year Peak	100-Year	100-Year Peak
Name	(mm)		(m)	(m)	Flow (L/s)	Head (m)	Flow (L/s)
C100A-1	79	High Flow (HF) Circular Orifice	136.68	1.46	15.0	1.46	15.0

Table 2: ICD Schedule

Overall Site Stormwater Management

Considering the controlled and uncontrolled post-development storm drainage areas for this site and the total available 5.6m³ of onsite storage, the post-development drainage peak release rates and storage volumes are summarized in Table 3. The results demonstrate that the stormwater management plan for the site achieved the design criteria for post-development to pre-development discharge rate control.

Table 3: Peak Post-Development Stormwater Runoff Discharge Rate and Storage Volume Summary

Subcatchment Area	5-Year Discharge (L/s)	5-Year Storage (m ³)	100-Year Discharge (L/s)	100-Year Storage (m³)
C100A	15.0	3.0	15.0	5.8
Subtotal Controlled	15.0	3.0	15.0	5.8
UNC-1	11.0	-	23.5	-
UNC-2	3.1	-	6.6	-
C100A (spillover)	0.0	-	18.3	-
Subtotal Uncontrolled	14.0	-	48.3	-
Total	29.1	3.0	63.3	5.8
Target	30.3	-	64.8	-

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Reference: 124 Moore Street - Carleton Place - Stormwater Management Design Brief Revision 1

Closing

The stormwater management strategy presented in this memo demonstrates that the stormwater design criteria have been met. The proposed development of the 124 Moore Street addition and site improvements will not impact the municipal storm sewer or downstream system by restricting the 5-year and 100-year post-development runoff release rates to the 5-year and 100-year pre-development runoff release rates, respectively. We believe this demonstrates adequate stormwater servicing to support the Development Application Approval. If you have any questions or concerns, please contact the undersigned.

Sincerely,

Stantec Consulting Ltd.

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Attachments:

- 01 Site Plan
- 02 Storm Drainage Area Summary Sheet
- 03 Modified Rational Method Design Sheet
- 04 Storm Sewer Design Sheet
- 05 Grading Plan (GP-1)
- 06 Existing Drainage Plan (EXSD-1)
- 07 Site Drainage Plan (SD-1)



Karin Smadella P.Eng. Principal, Operations Leader, Community Development Phone: (613) 724-4371 karin.smadella@stantec.com



File No:	160402061	Rev: 1
Project:	124 Moore Street Addition	Checked By: KS
Date Created:	05-Nov-24	Date Checked: 13-Dec-24
Created By:	ALG	Revised By: ALG
		Revision Date: 13-Dec-24

SWM Approach: Post-development to Pre-development flows (5yr to 5yr and 100yr to 100yr)

Post-Development Site Conditions:

Overall Runoff Coefficient for Site and Sub-Catchment Areas

		Rui	off Coefficient Table)				
Sub-catchm Area	nent		Area (ha)	c	Runoff Coefficient			Overall Runoff
Catchment Type	ID / Description		"A"		"C"	"A :	x C"	Coefficient
Controlled - Tributary	C100A	Hard	0.073		0.9	0.065		
		Soft	0.018		0.2	0.004		
	Su	ıbtotal		0.091			0.069	0.76
Uncontrolled - Non-Tributary	UNC-2	Hard	0.011		0.9	0.010		
		Soft	0.004		0.2	0.001		
	Subtotal						0.011	0.71
Uncontrolled - Non-Tributary	LINC-1	Hard	0.038		0.9	0.035		
Choon a choire a mont modulary	0110 1	Soft	0.000		0.2	0.003		
	Su	ubtotal	0.010	0.055	0.2	0.000	0.038	0.69
Total				0.161			0.118	
Overall Runoff Coefficient= C:								0.73
Total Boof Aroon			0.000 h	•				
Total Tributary Surface Areas (Cont	rolled and Lincontrolled	4)	0.000 1	a a				
Total Tributary Area to Outlet		u)	0.091 h	a				
			0.001					
Total Uncontrolled Areas (Non-Tribu	itary)		0.070 h	a				
Tatal Site		0.404 h						
i otal Site			0.161 h	a				

Stormwater Management Calculations

5 yr Intens City of Ott	ity [i: awa	= a/(t + b) ^c	a = b = c =	998.071 6.053 0.814	t (min) 5 10 15 20 25 30 35 40 45 50 55 60 tion of Site	l (mm/hr) 141.18 104.19 83.56 70.25 60.90 53.93 48.52 44.18 40.63 37.65 35.12 32.94		100 yr Intei City of Otta	nsity [wa 0 YEAR Pr	= a/(t + b) ^c	a = b = c =	1735.688 6.014 0.820	t (min) 5 10 20 25 30 35 40 45 50 55 60 Portion of Site	l (mm/hr) 242.70 178.56 142.89 119.95 103.85 91.87 82.58 75.15 69.05 63.95 59.62 55.89						
Subdrainage Area:	Predevelopme	ent Tributary	Area to Outlet					Subdrainage Area: Predevelopment Tributary Area to Outlet Area (ha): 0.161												
C:	0.65							C:	0.81											
Typical Tim	ne of Concentra	ation						Estimated 1	ime of Conc	entration after	Development									
tc (min) 10	I (5 yr) (mm/hr) 104.19	Qtarget (L/s) 30.26						tc (min) 10	l (100 yr) (mm/hr) 178.56	Q100yr (L/s) 64.82	-									
5 YEAR I	Modified Rat	ional Metho	od for Entire	e Site			1	100 YEAR	Modified F	Rational Met	thod for Enti	re Site								
Subdrainage Area: Area (ha): C:	C100A 0.09 0.76				Control	led - Tributary		Subdrainage Area: Area (ha): C:	C100A 0.09 0.95				Contro	olled - Tributary						
tc (min)	I (5 yr)	Qactual	Qrelease	Qstored	Vstored			tc (min)	I (100 yr)	Qactual	Qrelease	Qstored	Vstored	Qspill (L/c)						
10	104.19 83.56	20.00	15.01	5.00	3.00 0,93	I		10 20	178.56	42.85	15.01	9.60	5.76	18.25						
20 25	70.25	13.49 11.69	13.49 11.69	0.00	0.00			30 40	91.87 75.15	22.05	15.01 15.01	3.20	5.76 5.76	3.84 0.63						
30 35	53.93 48.52	10.35 9.31	10.35 9.31	0.00	0.00			50 60	63.95 55.89	15.35 13.41	15.01 13.41	0.34	1.02	0.00						
40 45	44.18	8.48	8.48	0.00	0.00			70	49.79	11.95	11.95	0.00	0.00	0.00						
50 55	37.65 35.12	7.23	7.23	0.00	0.00			90 100	41.11	9.87 9.10	9.87 9.10	0.00	0.00	0.00						
60 65	32.94 31.04	6.32 5.96	6.32 5.96	0.00	0.00			110	35.20 32.89	8.45 7.89	8.45 7.89	0.00	0.00	0.00						
Storage: Surface St	torage in and	Above CB						Storage: Surface St	orage In and	Above CB										
ICD: Orifice Equation: Orifice Diameter: Invert Elevation T/G Elevation Max Ponding Depth Downstream W/L	HF ICD (Circu : CdA(2gh)^0.3 79.00 m 136.68 m 137.88 m 0.26 m 136.68 m	ılar Orifice) 5 m	Where C =	0.572				ICD: Orifice Equation: Orifice Diameter: Invert Elevation T/G Elevation Max Ponding Depth Downstream W/L	HF ICD (Circ CdA(2gh)^C 79.00 r 136.68 r 137.88 r 0.26 r 136.68 r	eular Orifice) .5 nm n n n n	Where C =	0.572								
	Stage	Head (m)	Discharge	Vreq	Vavail (cu.m)	Volume			Stage	Head (m)	Discharge	Vreq (cu.m)	Vavail (cu.m)	Volume						
5-year Water Level	138.14	1.46	15.01	3.00	5.76	OK		100-year Water Level	138.14	1.46	15.01	5.76	5.76	OK						
Subdrainage Area: Area (ha): C:	UNC-2 0.01 0.71			Ur	ncontrolled -	Non-Tributary		Subdrainage Area: Area (ha): C:	UNC-2 0.01 0.89				Uncontrolled	- Non-Tributary						
tc (min)	l (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)					tc (min)	l (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)]								
10 15	104.19 83.56	3.07 2.46	3.07 2.46	-				10 20	178.56 119.95	6.57 4.41	6.57 4.41	-								
20 25	70.25 60.90	2.07 1.79	2.07 1.79					30 40	91.87 75.15	3.38 2.76	3.38 2.76									
30 35	53.93 48.52	1.59 1.43	1.59 1.43					50 60	63.95 55.89	2.35 2.06	2.35 2.06									
40 45	44.18 40.63	1.30 1.20	1.30 1.20					70 80	49.79 44.99	1.83 1.65	1.83 1.65									
50 55	37.65 35.12	1.11 1.03	1.11 1.03					90 100	41.11 37.90	1.51 1.39	1.51 1.39									
60 65	32.94 31.04	0.97 0.91	0.97 0.91					110 120	35.20 32.89	1.29 1.21	1.29 1.21									
Subdrainage Area: Area (ha): C:	UNC-1 0.05 0.69			Ur	ncontrolled -	Non-Tributary		Subdrainage Area: Area (ha): C:	UNC-1 0.05 0.86				Uncontrolled	- Non-Tributary						
tc	l (5 yr)	Qactual	Qrelease]				tc	l (100 yr)	Qactual	Qrelease]								
10	104.19	10.98	10.98	L				10	178.56	23.53	23.53	1								
15 20	83.56 70.25	8.81 7.41	8.81 7.41					20 30	91.87	15.81	15.81									
25 30	53.93	6.42 5.69	6.42 5.69					40 50	75.15 63.95	9.90	9.90 8.43									
35 40	48.52 44.18	5.11 4.66	5.11 4.66					60 70	55.89 49.79	7.37 6.56	7.37 6.56									
45 50	40.63 37.65	4.28 3.97	4.28 3.97					80 90	44.99 41.11	5.93 5.42	5.93 5.42									
55 60	35.12 32.94	3.70 3.47	3.70 3.47					100 110	37.90 35.20	4.99 4.64	4.99 4.64									
65	31.04	3.27	3.27					120	32.89	4.33	4.33									

Project #160402061, 124 Moore Street Addition Modified Rational Method Calculations for Storage

Stormwater Management Calculations

Project #160402061, 124 Moore Street Addition Modified Rational Method Calculations for Storage

SUMMARY TO OUTLET		Vrequired Va	vailable*		SUMMARY TO OUTLET		Vrequired	Vav	vailable*
Tributary Area	0.091 ha			1	Tributary Area	0.091 ha			
Total 5yr Flow to Sewer	15.0 L/s	3.0	5.8 m ³	Ok	Total 100yr Flow to Sewer	15.0 L/s		5.8	5.8 m ³
Non-Tributary Area Total 5yr Flow Uncontrolled	0.070 ha 14.0 L/s				Non-Tributary Area Total 100yr Flow Uncontrolled	0.070 ha 48.3 L/s			
Total Area Total 5yr Flow Target	0.161 ha 29.1 L/s 30.3 L/s				Total Area Total 100yr Flow Target	0.161 ha 63.3 L/s 64.8 L/s			

-	•		100.01					STORM	I SEWE	R		DESIGN I	PARAME1	ERS																										
10	Stantoc		JOB NA	INC.				DESIGN	N SHEE	т		I = a / (t+b	a / (H+b) ^c (As per City of Ottawa Guidelines, 2012)																											
		DATE:		2024-	12-13	I		(City of	f Ottawa)				1:2 yr	1:5 yr	1:10 yr	1:100 yr																								
		REVISION:					a			a =	732.951	998.071	1174.184	1735.688	MANNING	'S n =	0.013		BEDDING (LASS =	в																			
		DESIGNED B	Y:	Al	.G	FILE NUN	IBER:	16040206	11			b =	6.199	6.053	6.014	6.014	MINIMUM	COVER:	2.00	m																				
		CHECKED BY		s	в		c					c =	0.810	0.814	0.816	0.820	TIME OF I	INTRY	10	min																				
	LOCATION													DRAINAGE AREA PIPE SEY						PIPE SEL	ECTION																			
	AREA ID	FROM	TO	AREA	AREA	AREA	AREA	AREA	c	c	c	c	AxC	ACCUM	AxC	ACCUM.	AxC	ACCUM.	AxC	ACCUM.	T of C	I _{2.NEM}	ILCORE AND INCOME	INCOME.	Inde views	Q _{CONTROL}	ACCUM.	Q _{ACT}	LENGTH	PIPE WIDTH	PIPE	PIPE	MATERIAL	CLASS	SLOPE	Q _{CAP}	% FULL	VEL.	VEL.	TIME OF
	NUMBER	MIL	M.H.	(2-YEAR)	(S-YEAR)	(10-YEAR)	(100-YEAR)	(ROOF)	(2-YEAR)	(S-YEAR)	(10-YEAR)	(100-YEAR)	(2-YEAR)	AxC (21R)	(5-YEAR)	AIC (SYR)	(10-YEAR)	AxC (10YR)	(100-YEAR)	AxC (100YR)							Q _{CONTROL}	(CIA/360)		OR DIAMETER	HEIGHT	SHAPE				(FULL)		(FULL)	(ACT)	FLOW
				(ha)	(ha)	(ha)	(ha)	(ha)	(-)	(-)	(-)	(•)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(min)	(mmh)	(mm/h)	(mmb)	(mmh)	(L/k)	(L/s)	(L/s)	(m)	(mm)	(mm)	(•)	(-)	(-)	%	(L/k)	(•)	(m/s)	(mix)	(min)
																																		_			_			
	C100A	CB C100A-1	SEWER	0.00	0.10	0.00	0.00	0.00	0.00	0.76	0.00	0.00	0.000	0.000	0.074	0.074	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	15.0	15.0	15.0	6.3	200	200	CIRCULAR	PVC		2.65	54.2	27.68%	1.71	1.21	0.09





