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November 08, 2024

Project Number: 959(03)

David Schaeffer Engineering Ltd
120 Iber Road, Unit 103
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Attention: Braden Kaminski, P.Eng

**Subject: Cardinal Creek Village South –
Preliminary Stormwater Management Plan and Stormwater
Management Facility Design**

Introduction

As requested by your office, JFSA Canada Inc. (JFSA) has evaluated, based on the provided information as described below; (i) the adequacy of the proposed minor system with respect to hydraulic grade line (HGL) analysis; and (ii) the storage required in the SWM facilities to meet quality and quantity control requirements for the proposed development at Cardinal Creek Village South. Note that this is an update of the December 21, 2021, version of this memo to reflect changes to DSEL's preliminary servicing and grading design. This includes changes to the draft plan of the subdivision, drainage areas, pipe data, and the pond stage-storage curve. Furthermore, the percent increase of the Rational Method flows used in the preliminary HGL analysis was applied and model simulations were completed reflecting the increase in runoff captured into the minor system during the 100-year storm to address a City of Ottawa review comment.

The proposed Cardinal Creek Village South site has a development area of approximately **45.82 ha**. **11.35 ha** of the proposed development as well as **0.68 ha** of external drainage area are tributary to the existing SWM Pond 1 and the stormwater management system for Cardinal Creek Village Phase 4. **32.54 ha** of the site will discharge to SWM Pond 2, which will provide quality control, erosion control and quantity control up to the 100-year level of service, before discharging to the South Tributary of Cardinal Creek. **1.93 ha** consisting primarily of rear yards will drain uncontrolled to the South Tributary of Cardinal Creek. Refer to **Figure 10** for the proposed drainage areas of the subject site.

Stormwater Management Facility (Pond 2)

As noted above, SWM Pond 2 will provide quality control for **32.54 ha** of the site with an average imperviousness of **66%**. Pond 2 also requires erosion control, provided based on the detention of the 25 mm storm runoff for a drawdown time of approximately **96 hours**. The effectiveness of this erosion control was confirmed by a continuous erosion analysis, as documented in the JFSA's June 21, 2013 "**Cardinal Creek Village / Continuous Erosion Analysis**" memo. It is important to note that the erosion thresholds identified in the June 2013 memo have been updated during the preparation of this report based on field work conducted by Geo Morphix Ltd. The continuous SWMHYMO erosion model was re-run based on the drainage area changes to Pond 2 and the updated erosion thresholds provided by Geo Morphix. Also, due to coordination that occurred during updates to the FSR design, the total proposed drainage area to Pond 2 used in the continuous erosion model updates (**33.20 ha**) was larger than the total proposed drainage area that will actually drain to Pond 2 (**32.54 ha**) as per DSEL's latest design, which is conservative considering that the pond size has not changed based on the drainage area reduction and the pond release rates to the South Tributary are now slightly less than the ones assumed in the updated continuous erosion model. The hydrographs generated by the updated continuous erosion model were provided to Geo Morphix and they subsequently prepared a preliminary erosion analysis. Based on Geo Morphix's preliminary erosion analysis results, it is anticipated that the proposed post-development scenario is acceptable from an erosion perspective. A detailed erosion analysis will be prepared in the detailed design stage of Cardinal Creek Village South.

Pond 2, discharging to the South Tributary of Cardinal Creek, also requires 2- to 100-year post-to pre-development quantity control. Target release rates for Pond 2, as per the approved July 2013 "**Master Servicing Study for Cardinal Creek Village**" (MSS report) prepared by DSEL, were calculated based on existing flows simulated with AECOM's 2013 Cardinal Creek XPSWMM model for the 24-hour SCS Type II design storms, pro-rated by the existing drainage area from the subject site to the South Tributary of Cardinal Creek. This source is appropriate as it supersedes the AECOM August 2009 "**Greater Cardinal Creek Subwatershed Study - Existing Conditions**" study. These existing flows are specifically detailed in the JFSA's June 21, 2013 "**Cardinal Creek Village/Preliminary Stormwater Management Plan and Stormwater Management Facility Design**" included as **Appendix K** of the MSS report and reproduced in **Table A-2** of **Attachment A**.

The proposed drainage area to Pond 2 was simulated using SWMHYMO modelling software to assess its performance and ensure the design requirements were met. The SWMHYMO model and associated files are included in **Attachment A**.

A summary of the proposed SWM facility operating conditions is presented in **Tables A-1** to **A-5** of **Attachment A**, including a comparison of the existing and proposed conditions flows from the subject site to the South Tributary of Cardinal Creek. All quantity control requirements were met by the proposed outlet controls, while still providing a 0.3 m freeboard between the maximum water level in the pond and the top of bank elevation, and a maximum 100-year active storage depth of 2.0 m.

Pond 2 is equipped with one sediment forebay connected to the main cell of the pond by a standard forebay berm. Refer to **Attachment B** for preliminary calculations for the required sediment forebay dimensions for this SWM facility. Pond 2 will also be equipped with a bottom-draw outlet pipe to reduce the temperatures of the outflow to the South Tributary of Cardinal Creek.

Preliminary HGL Analysis

A preliminary hydraulic grade line analysis for the proposed Cardinal Creek Village South development was completed using PCSWMM modelling software. Pipe data, storm sewer layout and Rational Method flows in the storm sewer are as provided by DSEL. The Rational Method flows were calculated based on the 2-, 5- or 10-year level of service requirements, and the minor system flows used in the hydraulic grade line calculations were estimated as **35%** greater than the Rational Method flows, to account for the additional flows captured by catchbasin grates, lead pipes and/or inlet control devices under the higher surface water depths during the 100-year storm. The proposed storm sewer infrastructure data was provided by DSEL and incorporated into a PCSWMM model, and flows derived by DSEL's Rational Method calculations were then applied to each Maintenance Hole (MH) in the model as steady flows (using the baseline inflow option). Exit losses were applied to all storm sewer pipes in the system based on the angle of the downstream connection.

The maximum HGL obtained at each MH has been extracted and provided in **Table C1 in Attachment C**. In absence of USF elevations for the site at this stage, the maximum HGL was compared to elevations 1.90 m below the road elevation as an assumed USF elevation. This will be updated in the detailed design stage once USF elevations are available.

An average freeboard of **2.68 m** from the top of MH was observed throughout the proposed development for the 100-year return period. With a minimum freeboard of **2.02m** at **MH-61**. As such it can be concluded that the proposed storm sewer infrastructure is sufficiently sized, to safely convey minor system flows from the development under various extreme conditions. A detailed HGL analysis will be prepared in the detailed design stage. The PCSWMM model and associated modelling files are provided electronically.

Drainage Area to Cardinal Creek Village Phase 4

As noted above, a total of **12.03 ha** (**11.35 ha** area from the northwest portion of Cardinal Creek Village South, as well as **0.68 ha** of external drainage area) is tributary to the north and is to be captured by the Phase 4 storm sewer network and drain to Pond 1. This area has an average imperviousness of **64%** according to **Figure 10**. As per the JFSA January 2020 SWM report for these lands, it was previously assumed that **15.59 ha** with an average imperviousness of **26%** would drain to the existing Cardinal Creek Village development/Pond 1.

While the proposed drainage area is less than the previously assumed drainage area, the proposed average imperviousness is more than the previously assumed average imperviousness. A preliminary analysis of the receiving storm sewer and Pond 1 within the existing Cardinal Creek Village development has been undertaken to verify the impacts on the storm sewer network and Pond 1 operation. Based on this preliminary analysis, it was found that under ultimate conditions, the receiving storm sewer network has sufficient capacity to accommodate the proposed drainage area of **12.03 ha** with an average imperviousness of **64%** with minimal impacts on the 100-yr HGL across the existing development. Additionally, based on the available design pond information, the proposed Pond 1 permanent pool, quality control and extended detention storage volumes are sufficient to provide quality treatment for the existing and proposed developments under ultimate conditions. Although Pond 1 outflows increase when compared to the previous outflows, this preliminary analysis found that the capacity of the existing culvert under Highway 174 would not be exceeded during the 100-year event.

Note that the analysis of Pond 1 under 100% blockage of the outlet controls, as well as the two sensitivity tests shown in the JFSA's December 2018 "**Design Brief for the Interim Stormwater Management Pond 1 for Phases 1 to 5 in Cardinal Creek Village**" are being re-evaluated based on the changes in drainage area and imperviousness to SWM Pond 1 as detailed above. These evaluations are expected to be supplemented with as-built information of Pond 1 when it becomes available. A detailed analysis of the HGL within the existing Cardinal Creek development, Pond 1 operation and peak flows to the existing culvert under Highway 174 will be prepared at the detailed design stage of the Cardinal Creek Village South development, to confirm if the existing storm sewer network, Pond 1 and culvert are sufficiently sized.

Uncontrolled Drainage Area to Cardinal Creek South Tributary

As noted above, **1.93 ha** of rear yard drainage areas with an average imperviousness of **29%** from Cardinal Creek Village South will drain uncontrolled to the southern tributary of Cardinal Creek. This area is to provide the southern tributary with clean runoff to mimic pre-development conditions. This area has been included in the SWMHYMO model and as seen in **Table A-2 of Attachment A**, the total outflow from Cardinal Creek Village South development including this uncontrolled drainage area does not exceed the target release rates/existing outflows. A full analysis of the peak flows to the tributary will be assessed at the detailed design stage.

Cox County Road Culvert

A **74.30 ha** area has been identified as the drainage area to a **900mm** concrete culvert underneath Cox Country Rd. A SWMHYMO model of the drainage area was built to simulate peak flows at the culvert in question to assess if the existing culvert's size is sufficient. A peak flow of **1.324 m³/s** was established by the model for the 25-year design event, the required level of service for this road.

A HY-8 model was assembled to assess the operating characteristics under the 25-year design event. Based on existing conditions, the 25-year water level was calculated to be **88.46 m**, which provides **0.81 m** of freeboard for this event. Based on the results of this analysis, this crossing has sufficient capacity to convey **2.28 m³/s** before overtopping; the 100-year flow for this location is **1.904 m³/s** and, as such, this culvert has greater than a 100-year level of service. See **Attachment D** for the full analysis of this crossing.

Conclusion

The memorandum confirms the following design conditions:

- Pond 2 is sufficiently sized to meet the existing release rates and erosion control requirements.
- The preliminary HGL analysis confirms the proposed storm sewer network connected to Pond 2 is sufficiently sized.
- A total of **12.03 ha** of drainage area with an average imperviousness of **64%** within the northwest portion of the proposed development will be treated by Pond 1.
- The **1.93 ha** of uncontrolled rear yard drainage areas with an average imperviousness of **29%** will discharge directly to the South Tributary of Cardinal Creek.
- The existing culvert at Cox County Rd is sufficiently sized.
- Pond 2's bottom-draw outlet pipe will reduce outflow temperatures to Cardinal Creek.

Yours truly,
JFSA Canada Inc.



Jonathon Burnett, B.Eng, P.Eng
Senior Water Resources Engineer



Paulo Pickart, B.Eng, P.Eng
Water Resources Project Engineer
(November 08, 2024 updates only)



cc: J.F Sabourin, M.Eng, P.Eng
Director of Water Resources Projects

Figures

Figure 12: Post-Development Drainage Area Plan (DSEL)

Attachments

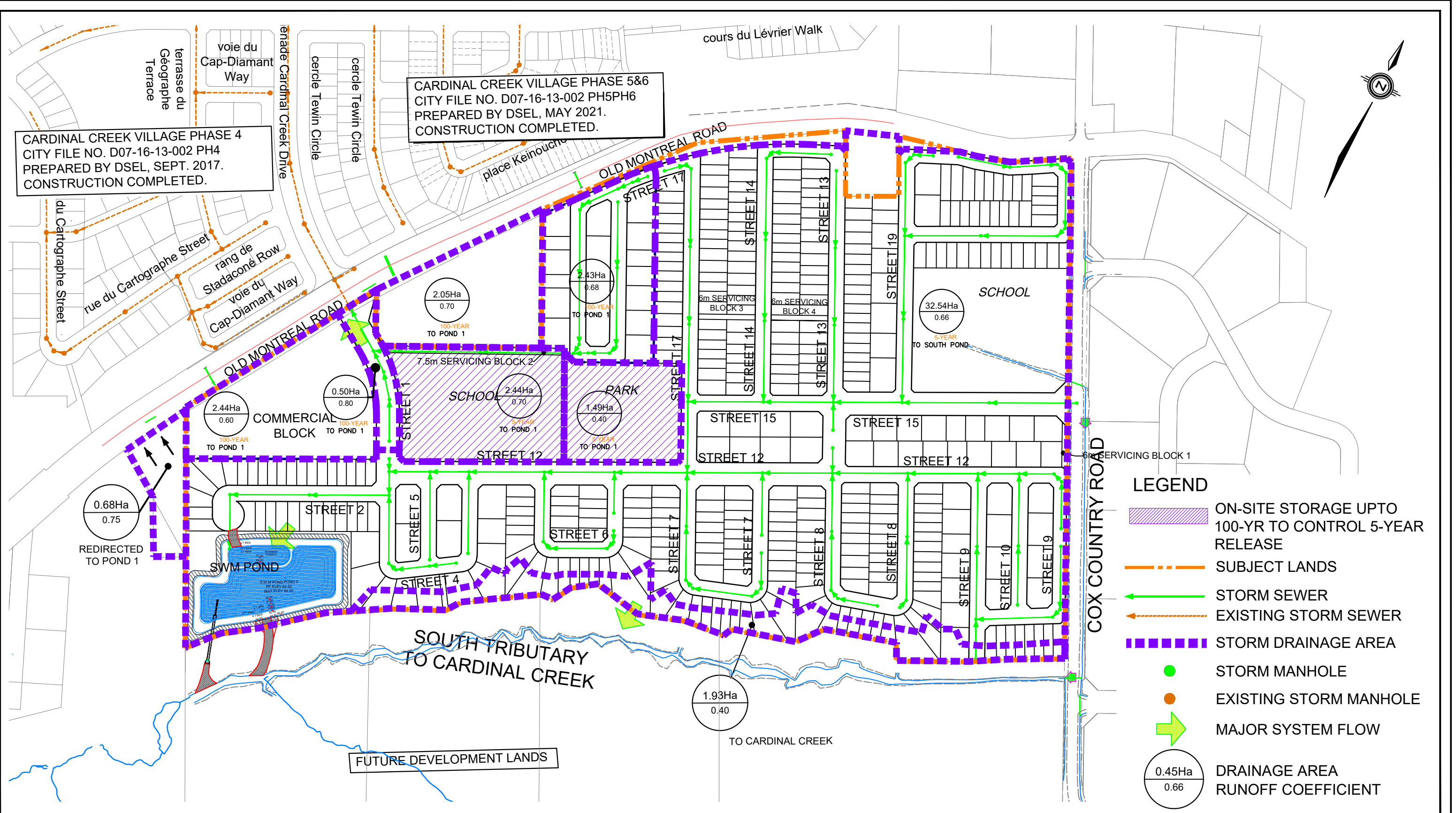
- Attachment A: Pond 2 Preliminary Summary Tables and Modelling Files
- Attachment B: Pond 2 Preliminary Forebay Calculations
- Attachment C: Storm Design Sheets (DSEL) & Preliminary HGL Analysis Results
- Attachment D: Cox Country Road Culvert Analysis

Modelling Files

PCSWMM: CCVS_v02.2 (Provided Electronically)

CARDINAL CREEK VILLAGE PHASE 5&6
 CITY FILE NO. D07-16-13-002 PH5PH6
 PREPARED BY DSEL, MAY 2021.
 CONSTRUCTION COMPLETED.

CARDINAL CREEK VILLAGE PHASE 4
 CITY FILE NO. D07-16-13-002 PH4
 PREPARED BY DSEL, SEPT. 2017.
 CONSTRUCTION COMPLETED.



- LEGEND**
- ON-SITE STORAGE UPTO 100-YR TO CONTROL 5-YEAR RELEASE
 - SUBJECT LANDS
 - STORM SEWER
 - EXISTING STORM SEWER
 - STORM DRAINAGE AREA
 - STORM MANHOLE
 - EXISTING STORM MANHOLE
 - MAJOR SYSTEM FLOW
 - DRAINAGE AREA RUNOFF COEFFICIENT

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**POND DRAINAGE PLAN
 CARDINAL CREEK VILLAGE SOUTH**

PROJECT No.:	19-1153
SCALE:	1:4000
DATE:	NOVEMBER 2024
FIGURE:	10



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Attachment A

Pond 2 Preliminary Summary Tables and Modelling Files

Pond 2 - Preliminary Stage-Storage

Elevation	Volume (m3)	Volume above PP @ 95% (m3)	Area (m2)	Area @ 95% (m2)	Demarcation
80.00	0.000		2916.60	2770.77	Pond Bottom
80.05	147.502		2983.50	2834.33	
80.10	298.360		3050.79	2898.25	
80.15	452.594		3118.57	2962.64	
80.20	610.226		3186.72	3027.38	
80.25	771.277		3255.30	3092.54	
80.30	935.763		3324.16	3157.95	
80.35	1103.702		3393.40	3223.73	
80.40	1275.114		3463.07	3289.92	
80.45	1450.018		3533.10	3356.45	
80.50	1628.432		3603.45	3423.28	
80.55	1810.374		3674.21	3490.50	
80.60	1995.863		3745.37	3558.10	
80.65	2184.919		3816.88	3626.04	
80.70	2377.563		3888.86	3694.42	
80.75	2573.813		3961.16	3763.10	
80.80	2773.686		4033.73	3832.04	
80.85	2977.198		4106.79	3901.45	
80.90	3184.374		4180.23	3971.22	
80.95	3395.230		4254.02	4041.32	
81.00	3609.844		4330.52	4113.99	
81.05	3841.193		4675.12	4441.36	
81.10	4077.369		4771.90	4533.31	
81.15	4318.405		4869.55	4626.07	
81.20	4564.339		4967.82	4719.43	
81.25	4815.206		5066.85	4813.51	
81.30	5071.043		5166.62	4908.29	
81.35	5331.886		5267.11	5003.75	
81.40	5597.770		5368.27	5099.86	
81.45	5868.732		5470.21	5196.70	
81.50	6144.809		5572.87	5294.23	
81.55	6426.037		5676.23	5392.42	
81.60	6712.452		5780.37	5491.35	
81.65	7004.090		5885.18	5590.92	
81.70	7300.985		5990.62	5691.09	
81.75	7603.173		6096.90	5792.06	
81.80	7910.692		6203.86	5893.67	
81.85	8223.576		6311.52	5995.94	
81.90	8541.864		6419.99	6098.99	
81.95	8865.595		6529.24	6202.78	
82.00	9194.801		6639.00	6307.05	
82.05	9529.517		6749.64	6412.16	
82.10	9869.781		6860.90	6517.86	
82.15	10215.627		6972.96	6624.31	
82.20	10567.210		7090.33	6735.81	

Pond 2 - Preliminary Stage-Storage

Elevation	Volume (m3)	Volume above PP @ 95% (m3)	Area (m2)	Area @ 95% (m2)	Demarcation
82.25	10928.793		7373.01	7004.36	Permanent Pool
82.30	11304.672		7662.14	7279.03	
82.35	11695.130		7956.19	7558.38	
82.40	12100.421		8255.44	7842.67	
82.45	12520.799		8559.66	8131.68	
82.50	12956.631	12308.799	8873.63	8429.95	
82.55	13403.325	424.359	8994.13	8544.42	
82.60	13856.140	854.534	9118.45	8662.53	
82.65	14315.186	1290.627	9243.42	8781.25	
82.70	14780.507	1732.682	9369.41	8900.94	
82.75	15252.143	2180.736	9496.04	9021.24	
82.80	15730.258	2634.946	9628.56	9147.13	
82.85	16219.262	3099.499	9931.60	9435.02	
82.90	16718.184	3573.475	10025.25	9523.99	
82.95	17221.797	4051.908	10119.27	9613.31	
83.00	17730.121	4534.816	10213.70	9703.02	
83.05	18243.177	5022.219	10308.54	9793.11	
83.10	18760.985	5514.136	10403.77	9883.58	
83.15	19283.564	6010.586	10499.40	9974.43	
83.20	19810.937	6511.591	10595.52	10065.74	
83.25	20343.123	7017.167	10691.91	10157.31	
83.30	20880.140	7527.334	10788.78	10249.34	
83.35	21422.010	8042.110	10886.01	10341.71	
83.40	21968.752	8561.515	10983.67	10434.49	
83.45	22520.387	9085.568	11081.72	10527.63	
83.50	23076.933	9614.287	11180.16	10621.15	
83.55	23638.414	10147.694	11279.06	10715.11	
83.60	24204.845	10685.803	11378.20	10809.29	
83.65	24776.249	11228.637	11477.93	10904.03	
83.70	25352.648	11776.216	11578.03	10999.13	
83.75	25934.061	12328.559	11678.50	11094.58	
83.80	26520.508	12885.683	11779.37	11190.40	
83.85	27112.009	13447.609	11880.66	11286.63	
83.90	27708.583	14014.354	11982.30	11383.19	
83.95	28310.250	14585.938	12084.38	11480.16	
84.00	28917.031	15162.380	12186.88	11577.54	
84.05	29528.949	15743.702	12289.83	11675.34	
84.10	30146.021	16329.921	12393.05	11773.40	
84.15	30768.268	16921.055	12496.82	11871.98	
84.20	31395.709	17517.124	12600.83	11970.79	
84.25	32028.364	18118.146	12705.40	12070.13	
84.30	32666.257	18724.145	12810.30	12169.79	
84.35	33309.404	19335.134	12915.56	12269.78	
84.40	33957.825	19951.134	13021.28	12370.22	
84.45	34611.542	20572.165	13127.42	12471.05	

Pond 2 - Preliminary Stage-Storage

Elevation	Volume (m3)	Volume above PP @ 95% (m3)	Area (m2)	Area @ 95% (m2)	Demarcation
84.50	35270.636	21198.305	13236.33	12574.51	
84.55	35935.050	21829.498	13340.20	12673.19	
84.60	36604.704	22465.669	13445.96	12773.66	
84.65	37279.657	23106.875	13552.17	12874.56	
84.70	37959.936	23753.140	13658.97	12976.02	
84.75	38645.563	24404.485	13766.13	13077.82	
84.80	39336.622	25060.991	13876.21	13182.40	
84.85	40064.725	25752.689	15247.92	14485.52	
84.90	40863.266	26511.303	16693.72	15859.03	

Table A-1: Summary of Total Proposed Drainage Area

To SWM Facility	Area (ha)	Imperv. (%)	Area x Imp.	Required Storage ⁽¹⁾ (m ³)		
				Perm. Pool	Qual. Control	Eros. Control
Pond 2	32.54	66	2147.6	5727	1302	4696

⁽¹⁾ Quality control and permanent pool requirements based on MOE guidelines for enhanced quality control for wet ponds.

Erosion control based on 25 mm storm runoff volume for Pond 2, confirmed by 2013 continuous erosion analysis.

Table A-2: Simulated Release Rates and Volumes for Proposed SWM Facility 2 to South Tributary of Cardinal Creek ⁽¹⁾

Pond Component	Existing Outflow (m ³ /s)	SWM Facility 2 (32.54 ha)			CCVS Total Outflow ⁽⁴⁾ (m ³ /s)
		Pond Outflow (m ³ /s)	Prelim. Pond Level ⁽³⁾	Pond Storage (m ³)	
Permanent Pool ⁽²⁾	N/A	N/A	82.50	12309	N/A
Extended Detention ⁽²⁾	N/A	0.036	83.20	6512	N/A
2yr/24hr SCS	0.253	0.062	83.35	7977	0.151
5yr/24hr SCS	0.432	0.106	83.65	10790	0.260
10yr/24hr SCS	0.565	0.124	83.80	12800	0.335
25yr/24hr SCS	0.741	0.143	84.05	15330	0.443
50yr/24hr SCS	0.883	0.155	84.20	17260	0.523
100yr/24hr SCS	1.043	0.167	84.35	19330	0.596
July 1st, 1979	N/A	0.177	84.50	21100	N/A
August 4th, 1988	N/A	0.165	84.35	18890	N/A
August 8, 1996	N/A	0.157	84.20	17460	N/A

⁽¹⁾ Existing conditions flows as generated on subcatchments to south tributary as per Greater Cardinal Creek Subwatershed Study Existing Conditions XPSWMM hydrology model provided by AECOM on December 21, 2012, and pro-rated by drainage area (228.87 ha total, 31.20 ha through subject site). Post- to pre-development quantity control required for the 2- to 100-year design storms.

⁽²⁾ Extended detention based on 25 mm storm runoff volume with a drawdown time of 96 hours. Volumes are active storage only for all components except the permanent pool.

⁽³⁾ Preliminary elevations reported have been rounded up to the nearest 5cm.

⁽⁴⁾ Total Cardinal Creek Village South development outflow to South Tributary of Cardinal Creek, including 1.93 ha of uncontrolled rear yard drainage area.

Table A-3: Extended Detention Parameters for SWM Facility 2

Permanent Pool Parameters		Quality Orifice Parameters	
Area (C3)	8429.95 m ²	Diameter	0.145 m
Volume	12308.80 m ³		
PP Elev	82.500 m	Area	0.017 m ²
QC Elev	82.700 m	Invert	82.500 m
h (m)	0.200 m	C _o	0.62

- Notes:
- C3 is the intercept from the area-depth linear regression.
 - PP Elev indicates the elevation of the permanent pool.
 - QC Elev indicates the elevation of the storage volume required by MOE for quality control.
 - h is the maximum water elevation above the orifice (m).

Table A-4: Extended Detention Drawdown Time for SWM Facility 2

Elev. (m)	Active Storage			C2 (m ² /m)	Drawdown Time (h)	Drawdown Time (days)	Flow (m ³ /s)	Demarcation Point
	V (m ³)	A (m ²)	depth (m)					
82.50	0.00	8429.95	0.00				0.000	PP Elev
82.55	424.36	8544.42	0.05	2290	23.16	0.97	0.004	
82.60	854.53	8662.53	0.10	2326	32.91	1.37	0.008	
82.65	1290.63	8781.25	0.15	2342	40.49	1.69	0.013	
82.70	1732.68	8900.94	0.20	2355	46.97	1.96	0.016	QC Elev
82.75	2180.74	9021.24	0.25	2365	52.76	2.20	0.019	
82.80	2634.95	9147.13	0.30	2391	58.07	2.42	0.022	
82.85	3099.50	9435.02	0.35	2872	63.41	2.64	0.024	
82.90	3573.48	9523.99	0.40	2735	68.02	2.83	0.026	
82.95	4051.91	9613.31	0.45	2630	72.39	3.02	0.028	
83.00	4534.82	9703.02	0.50	2546	76.56	3.19	0.030	
83.05	5022.22	9793.11	0.55	2478	80.57	3.36	0.031	
83.10	5514.14	9883.58	0.60	2423	84.43	3.52	0.033	
83.15	6010.59	9974.43	0.65	2376	88.17	3.67	0.034	
83.20	6511.59	10065.74	0.70	2337	91.81	3.83	0.036	Ext. Det.
83.25	7017.17	10157.31	0.75	2303	95.41	3.98	0.042	
83.30	7527.33	10249.34	0.80	2274	98.43	4.10	0.052	
83.35	8042.11	10341.71	0.85	2249	100.92	4.20	0.063	
83.40	8561.51	10434.49	0.90	2227	102.97	4.29	0.078	
83.45	9085.57	10527.63	0.95	2208	104.75	4.36	0.086	
83.50	9614.29	10621.15	1.00	2191	106.40	4.43	0.093	
83.55	10147.69	10715.11	1.05	2176	107.95	4.50	0.099	
83.60	10685.80	10809.29	1.10	2163	109.42	4.56	0.105	
83.65	11228.64	10904.03	1.15	2151	110.82	4.62	0.110	
83.70	11776.22	10999.13	1.20	2141	112.17	4.67	0.115	
83.75	12328.56	11094.58	1.25	2132	113.48	4.73	0.120	
83.80	12885.68	11190.40	1.30	2123	114.74	4.78	0.125	
83.85	13447.61	11286.63	1.35	2116	115.97	4.83	0.129	
83.90	14014.35	11383.19	1.40	2109	117.17	4.88	0.134	
83.95	14585.94	11480.16	1.45	2104	118.33	4.93	0.138	
84.00	15162.38	11577.54	1.50	2098	119.48	4.98	0.142	
84.05	15743.70	11675.34	1.55	2094	120.60	5.03	0.146	
84.10	16329.92	11773.40	1.60	2090	121.71	5.07	0.150	
84.15	16921.06	11871.98	1.65	2086	122.79	5.12	0.153	
84.20	17517.12	11970.79	1.70	2083	123.86	5.16	0.157	
84.25	18118.15	12070.13	1.75	2080	124.91	5.20	0.160	
84.30	18724.14	12169.79	1.80	2078	125.95	5.25	0.164	
84.35	19335.13	12269.78	1.85	2076	126.97	5.29	0.167	100-year
84.40	19951.13	12370.22	1.90	2074	127.99	5.33	0.171	
84.45	20572.17	12471.05	1.95	2072	128.99	5.37	0.174	

Table A-4: Extended Detention Drawdown Time for SWM Facility 2

Elev. (m)	Active Storage			C2 (m ² /m)	Drawdown Time (h)	Drawdown Time (days)	Flow (m ³ /s)	Demarcation Point
	V (m ³)	A (m ²)	depth (m)					
84.50	21198.30	12574.51	2.00	2072	129.98	5.42	0.177	
84.55	21829.50	12673.19	2.05	2070	130.96	5.46	0.180	
84.60	22465.67	12773.66	2.10	2068	131.94	5.50	0.183	
84.65	23106.87	12874.56	2.15	2067	132.59	5.52	0.363	
84.70	23753.14	12976.02	2.20	2066	132.93	5.54	0.688	
84.75	24404.49	13077.82	2.25	2066	133.13	5.55	1.107	
84.80	25060.99	13182.40	2.30	2066	133.27	5.55	1.602	
84.85	25752.69	14485.52	2.35	2577	133.37	5.56	2.163	
84.90	26511.30	15859.03	2.40	3095	112.47	4.69	2.781	

Notes:

- C2 is the slope coefficient from the area-depth linear regression.
- PP Elev indicates the elevation of the permanent pool.
- QC Elev indicates the elevation of the storage volume required by MOE for quality control.
- Ext. Det. indicates the elevation of extended detention provided based on the detention of the 25 mm storm for a 96 hour drawdown time.
- Drawdown time is calculated based on Equation 4.11 of the MOE Guidelines up to the extended detention WSE. Above the extended detention WSE, the drawdown time is calculated based on the difference in incremental volumes divided by the average pond outflow, with the resulting time added to the previous drawdown time.

Table A-5: Stage-Storage-Outflow Curve for SWM Facility 2

			Quality Control 1		Quantity Control 1		Emergency Spillway				
			Vertical Orifice		Vertical Rect. Orifice		Broad Crested Weir				
			Dia (m)	0.145	Width (m)	0.250	L (m)	10.000			
			Area (m ²)		Area (m ²)		C _w				
			Invert (m)	82.50	Invert (m)	83.20	Invert (m)	1.580			
			C _o	0.62	C _o	0.62	n contr.	84.60			
			Q @ D	0.012	C _w	1.800					
Elevation	Active Sto.	Demarkation	Head	Outflow	Depth	Outflow	Head	Outflow	Outflow	Storage	
(m)	(m ³)	Points	(m)	(m ³ /s)	(m)	(m ³ /s)	(m)	(m ³ /s)	(m ³ /s)	(ha·m)	
82.50	0	PP Elev	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
82.55	424		0.050	0.004	0.000	0.000	0.000	0.000	0.004	0.042	
82.60	855		0.100	0.008	0.000	0.000	0.000	0.000	0.008	0.085	
82.65	1291		0.150	0.013	0.000	0.000	0.000	0.000	0.013	0.129	
82.70	1733	QC Elev	0.200	0.016	0.000	0.000	0.000	0.000	0.016	0.173	
82.75	2181		0.250	0.019	0.000	0.000	0.000	0.000	0.019	0.218	
82.80	2635		0.300	0.022	0.000	0.000	0.000	0.000	0.022	0.263	
82.85	3099		0.350	0.024	0.000	0.000	0.000	0.000	0.024	0.310	
82.90	3573		0.400	0.026	0.000	0.000	0.000	0.000	0.026	0.357	
82.95	4052		0.450	0.028	0.000	0.000	0.000	0.000	0.028	0.405	
83.00	4535		0.500	0.030	0.000	0.000	0.000	0.000	0.030	0.453	
83.05	5022		0.550	0.031	0.000	0.000	0.000	0.000	0.031	0.502	
83.10	5514		0.600	0.033	0.000	0.000	0.000	0.000	0.033	0.551	
83.15	6011		0.650	0.034	0.000	0.000	0.000	0.000	0.034	0.601	
83.20	6512	Ext. Det.	0.700	0.036	0.000	0.000	0.000	0.000	0.036	0.651	
83.25	7017		0.750	0.037	0.050	0.005	0.000	0.000	0.042	0.702	
83.30	7527		0.800	0.039	0.100	0.013	0.000	0.000	0.052	0.753	
83.35	8042		0.850	0.040	0.150	0.023	0.000	0.000	0.063	0.804	
83.40	8562		0.900	0.041	0.200	0.036	0.000	0.000	0.078	0.856	
83.45	9086		0.950	0.042	0.250	0.043	0.000	0.000	0.086	0.909	
83.50	9614		1.000	0.044	0.300	0.049	0.000	0.000	0.093	0.961	
83.55	10148		1.050	0.045	0.350	0.054	0.000	0.000	0.099	1.015	
83.60	10686		1.100	0.046	0.400	0.059	0.000	0.000	0.105	1.069	
83.65	11229		1.150	0.047	0.450	0.063	0.000	0.000	0.110	1.123	
83.70	11776		1.200	0.048	0.500	0.067	0.000	0.000	0.115	1.178	
83.75	12329		1.250	0.049	0.550	0.071	0.000	0.000	0.120	1.233	
83.80	12886		1.300	0.050	0.600	0.075	0.000	0.000	0.125	1.289	
83.85	13448		1.350	0.051	0.650	0.078	0.000	0.000	0.129	1.345	
83.90	14014		1.400	0.052	0.700	0.081	0.000	0.000	0.134	1.401	
83.95	14586		1.450	0.053	0.750	0.085	0.000	0.000	0.138	1.459	
84.00	15162		1.500	0.054	0.800	0.088	0.000	0.000	0.142	1.516	
84.05	15744		1.550	0.055	0.850	0.091	0.000	0.000	0.146	1.574	
84.10	16330		1.600	0.056	0.900	0.094	0.000	0.000	0.150	1.633	
84.15	16921		1.650	0.057	0.950	0.096	0.000	0.000	0.153	1.692	
84.20	17517		1.700	0.058	1.000	0.099	0.000	0.000	0.157	1.752	

Table A-5: Stage-Storage-Outflow Curve for SWM Facility 2

			Quality Control 1		Quantity Control 1		Emergency Spillway				
			Vertical Orifice		Vertical Rect. Orifice		Broad Crested Weir				
			Dia (m)	0.145	Width (m)	0.250	L (m)	10.000			
					Height (m)	0.150					
			Area (m ²)	0.017	Area (m ²)	0.038					
			Invert (m)	82.50	Invert (m)	83.20	C _w	1.580			
			C _o	0.62	C _o	0.62	Invert (m)	84.60			
			Q @ D	0.012	C _w	1.800	n contr.	2			
Elevation	Active Sto.	Demarkation	Head	Outflow	Depth	Outflow	Head	Outflow	Outflow	Storage	
(m)	(m ³)	Points	(m)	(m ³ /s)	(m)	(m ³ /s)	(m)	(m ³ /s)	(m ³ /s)	(ha·m)	
84.25	18118	100-year	1.750	0.059	1.050	0.102	0.000	0.000	0.160	1.812	
84.30	18724		1.800	0.060	1.100	0.104	0.000	0.000	0.164	1.872	
84.35	19335		1.850	0.060	1.150	0.107	0.000	0.000	0.167	1.934	
84.40	19951		1.900	0.061	1.200	0.109	0.000	0.000	0.171	1.995	
84.45	20572		1.950	0.062	1.250	0.112	0.000	0.000	0.174	2.057	
84.50	21198		2.000	0.063	1.300	0.114	0.000	0.000	0.177	2.120	
84.55	21829		2.050	0.064	1.350	0.116	0.000	0.000	0.180	2.183	
84.60	22466	Ovf Elev	2.100	0.065	1.400	0.119	0.000	0.000	0.183	2.247	
84.65	23107		2.150	0.065	1.450	0.121	0.050	0.176	0.363	2.311	
84.70	23753		2.200	0.066	1.500	0.123	0.100	0.499	0.688	2.375	
84.75	24404		2.250	0.067	1.550	0.125	0.150	0.915	1.107	2.440	
84.80	25061		2.300	0.068	1.600	0.127	0.200	1.408	1.602	2.506	
84.85	25753		2.350	0.068	1.650	0.129	0.250	1.965	2.163	2.575	
84.90	26511		2.400	0.069	1.700	0.131	0.300	2.581	2.781	2.651	

- Notes :
- PP Elev indicates the elevation of the permanent pool.
 - QC Elev indicates the elevation of the storage volume required by MOE for quality control.
 - Ext. Det. indicates the elevation of extended detention provided based on the detention of the 25 mm storm.
 - Ovf Elev indicates the elevation of the emergency overflow provided above the 100-year water level.

```

00001 20 Metric units / ID Numbers OFF
00002 *****
00003 *# SWMHYMO Ver:5.5/Feb 2015 / INPUT DATA FILE
00004 *#-----
00005 *# Project Name : [Cardinal Creek Village South]
00006 *# Project Number: [939(03)]
00007 *# Date : [02/04/10/29]
00008 *# Modeler : [PF]
00009 *# Company : [J.F. Sabourin and Associates]
00010 *# License # : [234537]
00011 *#-----
00012 *# 25 mm Storm based on 2-Year, 3-Hour Chicago Storm
00013 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[001]
00014 *# ["25MMCH.stm"] <-storm filename, one per line for NSTORM time
00015 *#-----
00016 *# READ STORM STORM_FILENAME="storm.001"
00017 *#-----
00018 *# DEFAULT VALUES ICASEd=[1], read and print values
00019 *# DEFVAL_FILENAME="Ottawa.val"
00020 *#-----
00021 *#-----
00022 *# PROPOSED CONDITIONS
00023 *#-----
00024 *# Lumped drainage to Cardinal Creek Village South Pond 2
00025 CALIB STANCRV NRUN["CCV"], DTS[1](min), AREA[32.54](ha), XIMP=[0.56], TIMP=[0.66], DMF=[0](cms),
00026 LOSS=[1] Horton Eq: Fc=[76.2](mm/hr), Fc=[13.2](mm/hr), DCAY=[4.14](hr), Fc=[0.00](mm),
00027 Previous areas: IArea=[4.57](ha), SLP=[2.0](%), LGS=[40](m), NMT=[0.25], SCV=[0](min),
00028 Impervious areas: IImp=[1.57](mm), SLP=[0.9](%), LGS=[466](m), NMI=[0.013], SCV=[0](min),
00029 RAINFALL[ , , -1](mm/hr)
00030 *#-----
00031 *#-----
00032 *# Estimated Pond Volume for SWM Facility
00033 ROUTE RESERVOIR NHYDout["Pout"], NHYDin["CCV"],
00034 NR=[1](min),
00035 TABLE of ( OUTFLOW-STORAGE ) values
00036 (cms - (ha-m)
00037 [ 0 0 ]
00038 [ 0.004 , 0.042 ]
00039 [ 0.008 , 0.085 ]
00040 [ 0.013 , 0.129 ]
00041 [ 0.016 , 0.173 ]
00042 [ 0.019 , 0.218 ]
00043 [ 0.022 , 0.263 ]
00044 [ 0.024 , 0.31 ]
00045 [ 0.026 , 0.357 ]
00046 [ 0.028 , 0.405 ]
00047 [ 0.03 , 0.453 ]
00048 [ 0.031 , 0.502 ]
00049 [ 0.033 , 0.551 ]
00050 [ 0.034 , 0.601 ]
00051 [ 0.036 , 0.651 ]
00052 [ 0.042 , 0.702 ]
00053 [ 0.052 , 0.753 ]
00054 [ 0.063 , 0.804 ]
00055 [ 0.078 , 0.856 ]
00056 [ 0.086 , 0.909 ]
00057 [ 0.099 , 0.961 ]
00058 [ 0.099 , 1.015 ]
00059 [ 0.105 , 1.069 ]
00060 [ 0.11 , 1.123 ]
00061 [ 0.115 , 1.178 ]
00062 [ 0.12 , 1.233 ]
00063 [ 0.125 , 1.289 ]
00064 [ 0.129 , 1.345 ]
00065 [ 0.134 , 1.401 ]
00066 [ 0.138 , 1.459 ]
00067 [ 0.142 , 1.516 ]
00068 [ 0.146 , 1.574 ]
00069 [ 0.15 , 1.633 ]
00070 [ 0.153 , 1.692 ]
00071 [ 0.157 , 1.752 ]
00072 [ 0.16 , 1.812 ]
00073 [ 0.164 , 1.872 ]
00074 [ 0.167 , 1.934 ]
00075 [ 0.171 , 1.995 ]
00076 [ 0.174 , 2.057 ]
00077 [ 0.177 , 2.12 ]
00078 [ 0.18 , 2.183 ]
00079 [ 0.183 , 2.247 ]
00080 [ 0.186 , 2.311 ]
00081 [ 0.188 , 2.375 ]
00082 [ 0.191 , 2.44 ]
00083 [ 0.192 , 2.506 ]
00084 [ 0.193 , 2.575 ]
00085 [ 0.194 , 2.641 ]
00086 [ -1 , -1 ] (max twenty pts)
00087 *#-----
00088 *# NHYDout["Pout"]
00089 *# Uncontrolled rear yard drainage area to South Tributary
00090 CALIB STANCRV NRUN["CCV"], DTS[1](min), AREA[1.93](ha), XIMP=[0.19], TIMP=[0.29], DMF=[0](cms),
00091 LOSS=[1] Horton Eq: Fc=[76.2](mm/hr), Fc=[13.2](mm/hr), DCAY=[4.14](hr), Fc=[0.00](mm),
00092 Previous areas: IArea=[4.57](ha), SLP=[2.0](%), LGS=[40](m), NMT=[0.25], SCV=[0](min),
00093 Impervious areas: IImp=[1.57](mm), SLP=[0.9](%), LGS=[113](m), NMI=[0.013], SCV=[0](min),
00094 RAINFALL[ , , -1](mm/hr)
00095 *#-----
00096 *# Total Pond 2 Outflow to South Tributary
00097 ADD RID NHYDout["Pout-T"], NRUN to add["Pout" "Pout"]
00098 *#-----
00099 *# Total CCV South Outflow to South Tributary (Controlled = Uncontrolled)
00100 ADD RID NHYDout["CCV-T"], NRUN to add["Pout" "Pout" "CCVout"]
00101 *#-----
00102 *#-----
00103 *# STORMS
00104 *#-----
00105 *# 25 mm Storm based on 2-Year, 3-Hour Chicago Storm
00106 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[001]
00107 *# ["25MMCH.stm"] <-storm filename, one per line for NSTORM time
00108 *#-----
00109 *# 2-Year, 3-Hour Chicago Storm
00110 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[002]
00111 *# ["02YCH.stm"] <-storm filename, one per line for NSTORM time
00112 *#-----
00113 *# 5-Year, 3-Hour Chicago Storm
00114 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[005]
00115 *# ["05YCH.stm"] <-storm filename, one per line for NSTORM time
00116 *#-----
00117 *# 10-Year, 3-Hour Chicago Storm
00118 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[010]
00119 *# ["10YCH.stm"] <-storm filename, one per line for NSTORM time
00120 *#-----
00121 *# 25-Year, 3-Hour Chicago Storm
00122 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[025]
00123 *# ["25YCH.stm"] <-storm filename, one per line for NSTORM time
00124 *#-----
00125 *# 50-Year, 3-Hour Chicago Storm
00126 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[050]
00127 *# ["50YCH.stm"] <-storm filename, one per line for NSTORM time
00128 *#-----
00129 *# 100-Year, 3-Hour Chicago Storm
00130 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[099]
00131 *# ["100YCH.stm"] <-storm filename, one per line for NSTORM time
00132 *#-----
00133 *# 2-Year, 24-Hour SCS Storm
00134 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[102]
00135 *# ["SC2402X.stm"] <-storm filename, one per line for NSTORM time
00136 *#-----
00137 *# 5-Year, 24-Hour SCS Storm
00138 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[105]
00139 *# ["SC2405X.stm"] <-storm filename, one per line for NSTORM time
00140 *#-----
00141 *# 10-Year, 24-Hour SCS Storm
00142 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[110]
00143 *# ["SC2410X.stm"] <-storm filename, one per line for NSTORM time
00144 *#-----
00145 *# 25-Year, 24-Hour SCS Storm
00146 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[125]
00147 *# ["SC2425X.stm"] <-storm filename, one per line for NSTORM time
00148 *#-----
00149 *# 50-Year, 24-Hour SCS Storm
00150 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[150]
00151 *# ["SC2450X.stm"] <-storm filename, one per line for NSTORM time
00152 *#-----
00153 *# 100-Year, 24-Hour SCS Storm
00154 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[199]
00155 *# ["SC24100X.stm"] <-storm filename, one per line for NSTORM time
00156 *#-----
00157 *# July 1st, 1979 Storm - Ottawa International Airport
00158 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[979]
00159 *# ["19790701.stm"] <-storm filename, one per line for NSTORM time
00160 *#-----
00161 *# August 4th, 1988 Storm - Ottawa International Airport
00162 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[988]
00163 *# ["19880804.stm"] <-storm filename, one per line for NSTORM time
00164 *#-----
00165 *# August 8th, 1996 Storm - Ottawa International Airport
00166 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[996]
00167 *# ["19960808.stm"] <-storm filename, one per line for NSTORM time
00168 *#-----
00169 *# 100-Year, 3-Hour Chicago Storm + 20
00170 *# START TERMO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[999]
00171 *# ["100YCH.stm"] <-storm filename, one per line for NSTORM time
00172 *#-----
00173 *#-----
00174 *# FINISH

```



```

00361 [Previous area: IApex= 4.67;SLFPr=2.00;LGP= 40.0;MNF=250;SCF= 0]
00362 [Impervious area: IApex= 1.57;SLFPr= .90;LGP= 466.0;MNF= 0.13;SCF= 0]
00363 # Estimated Pond Volumes for SWM Facility
00364 RD015:CO0005-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00365 ROUTE RESERVOIR -> 1.0 01:CVT 32.54 7.492 Mo date 1.03 42.74 n/a .000
00366 out <= 1.0 01:FOU 32.54 .126 Mo date 3.06 42.74 n/a .000
00367 overlow <= 1.0 03:POV 0.00 .000 Mo date 0.00 .00 n/a .000
00368 (MxTotVols=10666+0.0 n3, TotDvVols=0.000E+00 n3, N-OvF= 0, TotDvDvF= 0.hrs)
00369 # Uncontrolled rear yard drainage area to South Tributary
00370 RD015:CO0006-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00371 CALIS STANBYD 1.93 2.68 Mo date 1.02 22.02 445 .000
00372 [XIMP:19;TIMP:29]
00373 [Horton parameters: Fw= 76.20;Fc= 13.20;DCAY=4.14; F= .00]
00374 [Previous area: IApex= 4.67;SLFPr=2.00;LGP= 40.0;MNF=250;SCF= 0]
00375 [Impervious area: IApex= 1.57;SLFPr= .90;LGP= 113.0;MNF= 0.13;SCF= 0]
00376 # Total Pond 2 Outflow to South Tributary
00377 RD015:CO0007-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00378 ADD HYD + 1.0 02:FOU 32.54 .105 Mo date 3.06 34.93 n/a .000
00379 + 1.0 02:POV 0.00 .000 Mo date 0.00 .00 n/a .000
00380 SUM= 1.0 01:CVT 32.54 .126 Mo date 3.06 42.74 n/a .000
00381 # Total CVV South Outflow to South Tributary (Controlled + Uncontrolled)
00382 RD015:CO0008-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00383 ADD HYD + 1.0 02:FOU 32.54 .105 Mo date 3.06 34.93 n/a .000
00384 + 1.0 02:POV 0.00 .000 Mo date 0.00 .00 n/a .000
00385 SUM= 1.0 01:CVT 32.54 .126 Mo date 3.06 34.93 n/a .000
00386 SUM= 1.0 01:CVV-T 34.47 .292 Mo date 1.02 34.21 n/a .000
00387 *****
00388 # STORMS
00389 *****
00390 ** END OF RUN : 20
00391
00392 *****
00393
00394
00395
00396
00397
00398 RUN#COMMAND#
00399 RD025:CO0001-----
00400 [TZERO = .00 hrs on 0]
00401 [METOUT= 2 (1=Imperial, 2=metric output)]
00402 [NFORM= 1]
00403 [NRUN = 002]
00404
00405 *****
00406 # SWMHYD Ver:5.5/Feb 2015 / INPUT DATA FILE
00407
00408 # Project Name : [Cardinal Creek Village South]
00409 # Project Number: [959/031]
00410 # Date : [2024/10/29]
00411 # Modeller : [JP]
00412 # Company : J.F. Sabourin and Associates
00413 # License # : 2549237
00414
00415 RD025:CO0002-----
00416 READ STORM
00417 File name = storm.001
00418 Comment = CHICAGO STORM 25 Year, 3 Hours
00419 [SDT=10.00;SDUR= 3.00;PTOT= 58.23]
00420
00421 DEFAULT VALUES
00422 File name = C:\Temp\SWM\HYMO\Fond 2\Ottawa.val
00423 ICASEDV = 1 (read and print data)
00424 FileTitle File comment: [Parameters for City of Ottawa Projects]
00425 THE FOLLOWING PARAMETERS ARE USED IN THE DESIGN STANBYD COM
00426 Horton's infiltration equation parameters:
00427 [Fw= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 4.14 /hr] [F= .00 mm]
00428 Parameters for IMPERVIOUS surfaces in STANBYD:
00429 [Iapex= 4.67 mm] [LGP=40.00 mm] [MNF= 250]
00430 Parameters for PERVIOUS surfaces in STANBYD:
00431 [Ialmp= 1.57 mm] [CL1= 1.50] [MNI= .013]
00432 Parameters used in NABSYD:
00433 [Ia= 4.67 mm] [N= 3.00]
00434 Average monthly Pan Evaporation data in (mm)
00435 JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
00436 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00
00437 Average monthly Potential Evapotranspiration in (mm)
00438 JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
00439 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00
00440 *****
00441 # PROPOSED CONDITIONS
00442 *****
00443 # Lumped drainage to Cardinal Creek Village South Pond 2
00444 RD025:CO0004-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00445 CALIS STANBYD 1.93 7.492 Mo date 1.03 42.74 n/a .000
00446 [XIMP:56;TIMP:66]
00447 [Horton parameters: Fw= 76.20;Fc= 13.20;DCAY=4.14; F= .00]
00448 [Previous area: IApex= 4.67;SLFPr=2.00;LGP= 40.0;MNF=250;SCF= 0]
00449 [Impervious area: IApex= 1.57;SLFPr= .90;LGP= 466.0;MNF= 0.13;SCF= 0]
00450 # Estimated Pond Volumes for SWM Facility
00451 RD015:CO0005-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00452 ROUTE RESERVOIR -> 1.0 02:CVT 32.54 7.492 Mo date 1.03 42.74 n/a .000
00453 out <= 1.0 01:FOU 32.54 .126 Mo date 3.06 42.74 n/a .000
00454 overlow <= 1.0 03:POV 0.00 .000 Mo date 0.00 .00 n/a .000
00455 (MxTotVols=10666+0.0 n3, TotDvVols=0.000E+00 n3, N-OvF= 0, TotDvDvF= 0.hrs)
00456 # Uncontrolled rear yard drainage area to South Tributary
00457 RD015:CO0006-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00458 CALIS STANBYD 1.93 3.62 Mo date 1.01 29.01 498 .000
00459 [XIMP:19;TIMP:29]
00460 [Horton parameters: Fw= 76.20;Fc= 13.20;DCAY=4.14; F= .00]
00461 [Previous area: IApex= 4.67;SLFPr=2.00;LGP= 40.0;MNF=250;SCF= 0]
00462 [Impervious area: IApex= 1.57;SLFPr= .90;LGP= 113.0;MNF= 0.13;SCF= 0]
00463 # Total Pond 2 Outflow to South Tributary
00464 RD025:CO0007-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00465 ADD HYD + 1.0 02:FOU 32.54 .126 Mo date 3.06 42.74 n/a .000
00466 + 1.0 02:POV 0.00 .000 Mo date 0.00 .00 n/a .000
00467 SUM= 1.0 01:CVT 32.54 .126 Mo date 3.06 42.74 n/a .000
00468 # Total CVV South Outflow to South Tributary (Controlled + Uncontrolled)
00469 RD025:CO0008-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00470 ADD HYD + 1.0 02:FOU 32.54 .126 Mo date 3.06 42.74 n/a .000
00471 + 1.0 02:POV 0.00 .000 Mo date 0.00 .00 n/a .000
00472 SUM= 1.0 01:CVT 32.54 .126 Mo date 3.06 42.74 n/a .000
00473 SUM= 1.0 01:CVV-T 34.47 .388 Mo date 1.01 41.97 n/a .000
00474 *****
00475 # STORMS
00476 *****
00477 ** END OF RUN : 49
00478
00479 *****
00480
00481
00482
00483
00484
00485 RUN#COMMAND#
00486 RD050:CO0001-----
00487 [TZERO = .00 hrs on 0]
00488 [METOUT= 2 (1=Imperial, 2=metric output)]
00489 [NFORM= 1]
00490 [NRUN = 0050]
00491
00492 *****
00493 # SWMHYD Ver:5.5/Feb 2015 / INPUT DATA FILE
00494
00495 # Project Name : [Cardinal Creek Village South]
00496 # Project Number: [959/031]
00497 # Date : [2024/10/29]
00498 # Modeller : [JP]
00499 # Company : J.F. Sabourin and Associates
00500 # License # : 2549237
00501 *****
00502 RD050:CO0002-----
00503 READ STORM
00504 File name = storm.001
00505 Comment = CHICAGO STORM 50 Year, 3 Hours
00506 [SDT=10.00;SDUR= 3.00;PTOT= 64.81]
00507
00508 DEFAULT VALUES
00509 File name = C:\Temp\SWM\HYMO\Fond 2\Ottawa.val
00510 ICASEDV = 1 (read and print data)
00511 FileTitle File comment: [Parameters for City of Ottawa Projects]
00512 THE FOLLOWING PARAMETERS ARE USED IN THE DESIGN STANBYD COM
00513 Horton's infiltration equation parameters:
00514 [Fw= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 4.14 /hr] [F= .00 mm]
00515 Parameters for IMPERVIOUS surfaces in STANBYD:
00516 [Iapex= 4.67 mm] [LGP=40.00 mm] [MNF= 250]
00517 Parameters for PERVIOUS surfaces in STANBYD:
00518 [Ialmp= 1.57 mm] [CL1= 1.50] [MNI= .013]
00519 Parameters used in NABSYD:
00520 [Ia= 4.67 mm] [N= 3.00]
00521 Average monthly Pan Evaporation data in (mm)
00522 JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
00523 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00
00524 Average monthly Potential Evapotranspiration in (mm)
00525 JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
00526 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00
00527 *****
00528 # PROPOSED CONDITIONS
00529 *****
00530 # Lumped drainage to Cardinal Creek Village South Pond 2
00531 RD015:CO0004-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00532 CALIS STANBYD 1.93 8.760 Mo date 1.02 48.84 n/a .000
00533 [XIMP:56;TIMP:66]
00534 [Horton parameters: Fw= 76.20;Fc= 13.20;DCAY=4.14; F= .00]
00535 [Previous area: IApex= 4.67;SLFPr=2.00;LGP= 40.0;MNF=250;SCF= 0]
00536 [Impervious area: IApex= 1.57;SLFPr= .90;LGP= 466.0;MNF= 0.13;SCF= 0]
00537 # Estimated Pond Volumes for SWM Facility
00538 RD015:CO0005-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00539 ROUTE RESERVOIR -> 1.0 02:CVT 32.54 7.490 Mo date 1.02 48.84 n/a .000
00540 out <= 1.0 01:FOU 32.54 .140 Mo date 3.03 48.84 n/a .000

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00541 overlow <= 1.0 03:POV 0.00 .000 Mo date 0.00 .00 n/a .000
00542 (MxTotVols=10666+0.0 n3, TotDvVols=0.000E+00 n3, N-OvF= 0, TotDvDvF= 0.hrs)
00543 # Uncontrolled rear yard drainage area to South Tributary
00544 RD015:CO0006-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00545 CALIS STANBYD 1.93 4.48 Mo date 1.01 34.26 329 .000
00546 [XIMP:19;TIMP:29]
00547 [Horton parameters: Fw= 76.20;Fc= 13.20;DCAY=4.14; F= .00]
00548 [Previous area: IApex= 4.67;SLFPr=2.00;LGP= 40.0;MNF=250;SCF= 0]
00549 [Impervious area: IApex= 1.57;SLFPr= .90;LGP= 113.0;MNF= 0.13;SCF= 0]
00550 # Total Pond 2 Outflow to South Tributary
00551 RD015:CO0007-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00552 ADD HYD + 1.0 02:FOU 32.54 .140 Mo date 3.03 48.84 n/a .000
00553 + 1.0 02:POV 0.00 .000 Mo date 0.00 .00 n/a .000
00554 SUM= 1.0 01:FOU-T 32.54 .140 Mo date 3.03 48.84 n/a .000
00555 # Total CVV South Outflow to South Tributary (Controlled + Uncontrolled)
00556 RD015:CO0008-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00557 ADD HYD + 1.0 02:FOU 32.54 .140 Mo date 3.03 48.84 n/a .000
00558 + 1.0 02:POV 0.00 .000 Mo date 0.00 .00 n/a .000
00559 SUM= 1.0 01:CVT 32.54 .148 Mo date 1.01 34.26 n/a .000
00560 SUM= 1.0 01:CVV-T 34.47 .478 Mo date 1.01 48.02 n/a .000
00561 *****
00562 # STORMS
00563 *****
00564 ** END OF RUN : 98
00565
00566 *****
00567
00568
00569
00570
00571
00572 RUN#COMMAND#
00573 RD099:CO0001-----
00574 START
00575 [TZERO = .00 hrs on 0]
00576 [METOUT= 2 (1=Imperial, 2=metric output)]
00577 [NFORM= 1]
00578 [NRUN = 0099]
00579
00580 *****
00581 # SWMHYD Ver:5.5/Feb 2015 / INPUT DATA FILE
00582
00583 # Project Name : [Cardinal Creek Village South]
00584 # Project Number: [959/031]
00585 # Date : [2024/10/29]
00586 # Modeller : [JP]
00587 # Company : J.F. Sabourin and Associates
00588 # License # : 2549237
00589 *****
00590 RD099:CO0002-----
00591 READ STORM
00592 File name = storm.001
00593 Comment = CHICAGO STORM 100 Year, 3 Hours
00594 [SDT=10.00;SDUR= 3.00;PTOT= 71.66]
00595
00596 DEFAULT VALUES
00597 File name = C:\Temp\SWM\HYMO\Fond 2\Ottawa.val
00598 ICASEDV = 1 (read and print data)
00599 FileTitle File comment: [Parameters for City of Ottawa Projects]
00600 THE FOLLOWING PARAMETERS ARE USED IN THE DESIGN STANBYD COM
00601 Horton's infiltration equation parameters:
00602 [Fw= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 4.14 /hr] [F= .00 mm]
00603 Parameters for IMPERVIOUS surfaces in STANBYD:
00604 [Iapex= 4.67 mm] [LGP=40.00 mm] [MNF= 250]
00605 Parameters for PERVIOUS surfaces in STANBYD:
00606 [Ialmp= 1.57 mm] [CL1= 1.50] [MNI= .013]
00607 Parameters used in NABSYD:
00608 [Ia= 4.67 mm] [N= 3.00]
00609 Average monthly Pan Evaporation data in (mm)
00610 JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
00611 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00
00612 Average monthly Potential Evapotranspiration in (mm)
00613 JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
00614 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00
00615 *****
00616 # PROPOSED CONDITIONS
00617 *****
00618 # Lumped drainage to Cardinal Creek Village South Pond 2
00619 RD099:CO0004-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00620 CALIS STANBYD 1.93 9.948 Mo date 1.02 55.14 769 .000
00621 [XIMP:56;TIMP:66]
00622 [Horton parameters: Fw= 76.20;Fc= 13.20;DCAY=4.14; F= .00]
00623 [Previous area: IApex= 4.67;SLFPr=2.00;LGP= 40.0;MNF=250;SCF= 0]
00624 [Impervious area: IApex= 1.57;SLFPr= .90;LGP= 466.0;MNF= 0.13;SCF= 0]
00625 # Estimated Pond Volumes for SWM Facility
00626 RD015:CO0005-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00627 ROUTE RESERVOIR -> 1.0 02:CVT 32.54 9.948 Mo date 1.02 55.14 n/a .000
00628 out <= 1.0 01:FOU 32.54 .153 Mo date 3.05 55.14 n/a .000
00629 overlow <= 1.0 03:POV 0.00 .000 Mo date 0.00 .00 n/a .000
00630 (MxTotVols=10666+0.0 n3, TotDvVols=0.000E+00 n3, N-OvF= 0, TotDvDvF= 0.hrs)
00631 # Uncontrolled rear yard drainage area to South Tributary
00632 RD015:CO0006-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00633 CALIS STANBYD 1.93 5.23 Mo date 1.01 40.08 559 .000
00634 [XIMP:19;TIMP:29]
00635 [Horton parameters: Fw= 76.20;Fc= 13.20;DCAY=4.14; F= .00]
00636 [Previous area: IApex= 4.67;SLFPr=2.00;LGP= 40.0;MNF=250;SCF= 0]
00637 [Impervious area: IApex= 1.57;SLFPr= .90;LGP= 113.0;MNF= 0.13;SCF= 0]
00638 # Total Pond 2 Outflow to South Tributary
00639 RD099:CO0007-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00640 ADD HYD + 1.0 02:FOU 32.54 .153 Mo date 3.05 55.14 n/a .000
00641 + 1.0 02:POV 0.00 .000 Mo date 0.00 .00 n/a .000
00642 SUM= 1.0 01:FOU-T 32.54 .153 Mo date 3.05 55.14 n/a .000
00643 # Total CVV South Outflow to South Tributary (Controlled + Uncontrolled)
00644 RD099:CO0008-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00645 ADD HYD + 1.0 02:FOU 32.54 .153 Mo date 3.05 55.14 n/a .000
00646 + 1.0 02:POV 0.00 .000 Mo date 0.00 .00 n/a .000
00647 SUM= 1.0 02:CVT 32.54 .153 Mo date 1.01 40.08 n/a .000
00648 SUM= 1.0 01:CVV-T 34.47 .478 Mo date 1.01 54.30 n/a .000
00649 *****
00650 # STORMS
00651 *****
00652 ** END OF RUN : 101
00653
00654 *****
00655
00656
00657
00658
00659
00660 RD02:CO0001-----
00661 START
00662 [TZERO = .00 hrs on 0]
00663 [METOUT= 2 (1=Imperial, 2=metric output)]
00664 [NFORM= 2]
00665 [NRUN = 0102]
00666
00667 *****
00668 # SWMHYD Ver:5.5/Feb 2015 / INPUT DATA FILE
00669
00670 # Project Name : [Cardinal Creek Village South]
00671 # Project Number: [959/031]
00672 # Date : [2024/10/29]
00673 # Modeller : [JP]
00674 # Company : J.F. Sabourin and Associates
00675 # License # : 2549237
00676 *****
00677 RD02:CO0002-----
00678 READ STORM
00679 File name = storm.001
00680 Comment = 2 years SES Type 2 Storm 24 hours step 10 min, City of Ottawa
00681 [SDT=10.00;SDUR= 24.00;PTOT= 48.40]
00682
00683 DEFAULT VALUES
00684 File name = C:\Temp\SWM\HYMO\Fond 2\Ottawa.val
00685 ICASEDV = 1 (read and print data)
00686 FileTitle File comment: [Parameters for City of Ottawa Projects]
00687 THE FOLLOWING PARAMETERS ARE USED IN THE DESIGN STANBYD COM
00688 Horton's infiltration equation parameters:
00689 [Fw= 76.20 mm/hr] [Fc=13.20 mm/hr] [DCAY= 4.14 /hr] [F= .00 mm]
00690 Parameters for IMPERVIOUS surfaces in STANBYD:
00691 [Iapex= 4.67 mm] [LGP=40.00 mm] [MNF= 250]
00692 Parameters for PERVIOUS surfaces in STANBYD:
00693 [Ialmp= 1.57 mm] [CL1= 1.50] [MNI= .013]
00694 Parameters used in NABSYD:
00695 [Ia= 4.67 mm] [N= 3.00]
00696 Average monthly Pan Evaporation data in (mm)
00697 JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
00698 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00
00699 Average monthly Potential Evapotranspiration in (mm)
00700 JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
00701 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00
00702 *****
00703 # PROPOSED CONDITIONS
00704 *****
00705 # Lumped drainage to Cardinal Creek Village South Pond 2
00706 RD015:CO0004-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00707 CALIS STANBYD 1.93 2.885 Mo date 12:03 31.02 640 .000
00708 [XIMP:19;TIMP:29]
00709 [Horton parameters: Fw= 76.20;Fc= 13.20;DCAY=4.14; F= .00]
00710 [Previous area: IApex= 4.67;SLFPr=2.00;LGP= 40.0;MNF=250;SCF= 0]
00711 # Estimated Pond Volumes for SWM Facility
00712 RD015:CO0005-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00713 ROUTE RESERVOIR -> 1.0 02:CVT 32.54 2.885 Mo date 12:03 31.02 n/a .000
00714 out <= 1.0 01:FOU 32.54 .162 Mo date 16:08 31.01 n/a .000
00715 overlow <= 1.0 03:POV 0.00 .000 Mo date 0.00 .00 n/a .000
00716 (MxTotVols=7977+0.0 n3, TotDvVols=0.000E+00 n3, N-OvF= 0, TotDvDvF= 0.hrs)
00717 # Uncontrolled rear yard drainage area to South Tributary
00718 RD015:CO0006-----DtmIn-ID:HNVD-----AREAh-QFEARcs-TPeakDate_hhm-----RvM-R-C-----DMFms
00719 CALIS STANBYD 1.93 .124 Mo date 12:01 16.80 347 .000
00720 [XIMP:19;TIMP:29]

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007213 (Horton parameters: Fw=76.20;Frc=13.20;DCAV4=1.14; Fw=.00)
007214 [Previous area: IApers=4.67;SLFPr=90.10;LIP= 40.0;MNF=250;SICPr=.0]
007215 [Impervious area: IAlpms=1.57;SLFPr= 90.10;LIP=113.0;MNF=.01;SICPr=.0]
007216 # Total Pond 2 Outflow to South Tributary
007217 R0125:CO0001-----DtmIn-ID:INHDV-----AREAHa-QFEARms-TPeakDate_hhm-----RvMm-R.C-----DMFms
007218 ADD HYD + 1.0 02:FOV 32.54 .062 Mo_date 16:08 31.01 n/a .000
007219 SUM= 1.0 01:FOU-T 32.54 .062 Mo_date 16:08 31.01 n/a .000
007220 # Total CVV South Outflow to South Tributary (Controlled + Uncontrolled)
007221 R0125:CO0002-----DtmIn-ID:INHDV-----AREAHa-QFEARms-TPeakDate_hhm-----RvMm-R.C-----DMFms
007222 ADD HYD + 1.0 02:FOV 32.54 .062 Mo_date 16:08 31.01 n/a .000
007223 SUM= 1.0 02:CVVunc 1.93 .124 Mo_date 12:01 16.80 n/a .000
007224 # Total CVV South Outflow to South Tributary (Controlled + Uncontrolled)
007225 ADD HYD + 1.0 02:FOV 32.54 .062 Mo_date 16:08 31.01 n/a .000
007226 SUM= 1.0 01:CVU-T 34.47 .155 Mo_date 12:01 30.22 n/a .000
007227 ***** STORMS *****
007228 ** END OF RUN : 104
007229
007230
007231
007232
007233
007234
007235
007236 # STORMS
007237 ***** STORMS *****
007238 ** END OF RUN : 104
007239
007240
007241
007242
007243
007244
007245
007246
007247
007248
007249
007250
007251
007252
007253
007254 # SWMHYMO Ver:5.5/Feb 2015 / INPUT DATA FILE
007255 ***** STORMS *****
007256 # Project Name : [Cardinal Creek Village South]
007257 # Project Number : [959(03)]
007258 # Date : [2024/10/29]
007259 # Modeler : [J.F. Sabourin and Associates]
007260 # Company : [J.F. Sabourin and Associates]
007261 # License # : [2549237]
007262 ***** STORMS *****
007263 R0105:CO0002-----DtmIn-ID:INHDV-----AREAHa-QFEARms-TPeakDate_hhm-----RvMm-R.C-----DMFms
007264 READ STORM
007265 File name = storm.001
007266 Comment = 5 years SCS Type 2 Storm 24 Hours step 10 min, City of Ottawa
007267 [SPT=10.00;SDUR= 24.00;PTOT= 86.89]
007268 R0105:CO0003-----DtmIn-ID:INHDV-----AREAHa-QFEARms-TPeakDate_hhm-----RvMm-R.C-----DMFms
007269 DEFAULT VALUES
007270 File name = C:\Temp\SWMHYMO\Fond 2\Ottawa.val
007271 ICASEV = 1 (read and print data)
007272 FileTitle File comment: [Parameters for City of Ottawa Projects]
007273 THE FOLLOWING PARAMETERS ARE USED IN THE DESIGN STANDARD COM
007274 Horton's infiltration equation parameters:
007275 [Fw=76.20 mm/hr] [Frc=13.20 mm/hr] [DCAV4=1.14 /hr] [Fw=.00 mm]
007276 Parameters for PERVIOUS surfaces in STANHDV:
007277 [IApers= 4.67 mm] [LQF=40.00 mm] [MNF=.250]
007278 Parameters for IMPERVIOUS surfaces in STANHDV:
007279 [IAlpms= 1.57 mm] [CLIS=1.50] [MNF=.013]
007280 Parameters used in NASHVD:
007281 [Ia= 4.67 mm] [N= 3.0]
007282 Average monthly Fan Evaporation data in (mm)
007283 JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
007284 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00
007285 Average monthly Potential Evapotranspiration in (mm)
007286 JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
007287 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00
007288 ***** STORMS *****
007289 # PROPOSED CONDITIONS
007290 [XINF=56;TIMP=.66]
007291 # Lumped drainage to Cardinal Creek Village South Pond 2
007292 R0125:CO0004-----DtmIn-ID:INHDV-----AREAHa-QFEARms-TPeakDate_hhm-----RvMm-R.C-----DMFms
007293 CALIS STANHDV 1.0 01:CVU 32.54 .062 Mo_date 12:02 42.89 .669 .000
007294 [XIMP=56;TIMP=.66]
007295 (Horton parameters: Fw=76.20;Frc=13.20;DCAV4=1.14; Fw=.00)
007296 [Previous area: IApers=4.67;SLFPr=90.10;LIP= 40.0;MNF=250;SICPr=.0]
007297 [Impervious area: IAlpms=1.57;SLFPr= 90.10;LIP=113.0;MNF=.01;SICPr=.0]
007298 # Estimated Pond Volumes for SMM Facility
007299 R0105:CO0005-----DtmIn-ID:INHDV-----AREAHa-QFEARms-TPeakDate_hhm-----RvMm-R.C-----DMFms
007300 ROUTE RESERVOIR -> 1.0 02:CVU 32.90 4.357 Mo_date 12:02 42.89 n/a .000
007301 out <= 1.0 01:FOU 32.54 .106 Mo_date 14:15 42.89 n/a .000
007302 overflow <= 1.0 02:CVU 32.54 .106 Mo_date 14:15 42.89 n/a .000
007303 [MxTotVol=10796.01 m3, TotVolVols=0.0000E+00 m3, Nv=0% 0, TotDurVols= 0 hrs]
007304 # Uncontrolled rear yard drainage area to South Tributary
007305 R0105:CO0006-----DtmIn-ID:INHDV-----AREAHa-QFEARms-TPeakDate_hhm-----RvMm-R.C-----DMFms
007306 CALIS STANHDV 1.0 01:CVUunc 1.93 .226 Mo_date 12:01 25.03 .390 .000
007307 [XIMP=19;TIMP=.29]
007308 (Horton parameters: Fw=76.20;Frc=13.20;DCAV4=1.14; Fw=.00)
007309 [Previous area: IApers=4.67;SLFPr=90.10;LIP= 40.0;MNF=250;SICPr=.0]
007310 [Impervious area: IAlpms=1.57;SLFPr= 90.10;LIP=113.0;MNF=.01;SICPr=.0]
007311 # Total Pond 2 Outflow to South Tributary
007312 R0105:CO0007-----DtmIn-ID:INHDV-----AREAHa-QFEARms-TPeakDate_hhm-----RvMm-R.C-----DMFms
007313 ADD HYD + 1.0 02:FOV 32.54 .106 Mo_date 14:15 42.89 n/a .000
007314 SUM= 1.0 02:FOU-T 32.54 .106 Mo_date 14:15 42.89 n/a .000
007315 # Total CVV South Outflow to South Tributary (Controlled + Uncontrolled)
007316 R0105:CO0008-----DtmIn-ID:INHDV-----AREAHa-QFEARms-TPeakDate_hhm-----RvMm-R.C-----DMFms
007317 ADD HYD + 1.0 02:FOV 32.54 .106 Mo_date 14:15 42.89 n/a .000
007318 SUM= 1.0 02:CVVunc 1.93 .226 Mo_date 12:01 25.03 n/a .000
007319 # Total CVV South Outflow to South Tributary (Controlled + Uncontrolled)
007320 ADD HYD + 1.0 02:FOV 32.54 .106 Mo_date 14:15 42.89 n/a .000
007321 SUM= 1.0 01:CVU-T 34.47 .240 Mo_date 12:01 41.89 n/a .000
007322 ***** STORMS *****
007323 ** END OF RUN : 100
007324
007325
007326
007327
007328
007329
007330
007331
007332
007333
007334
007335
007336 # STORMS
007337 ***** STORMS *****
007338 ** END OF RUN : 100
007339
007340
007341
007342
007343
007344
007345
007346
007347
007348
007349
007350
007351
007352
007353
007354 # SWMHYMO Ver:5.5/Feb 2015 / INPUT DATA FILE
007355 ***** STORMS *****
007356 # Project Name : [Cardinal Creek Village South]
007357 # Project Number : [959(03)]
007358 # Date : [2024/10/29]
007359 # Modeler : [J.F. Sabourin and Associates]
007360 # Company : [J.F. Sabourin and Associates]
007361 # License # : [2549237]
007362 ***** STORMS *****
007363 R0110:CO0002-----DtmIn-ID:INHDV-----AREAHa-QFEARms-TPeakDate_hhm-----RvMm-R.C-----DMFms
007364 READ STORM
007365 File name = storm.001
007366 Comment = 10 years SCS Type 2 Storm 24 Hours step 10 min, City of Ottawa
007367 [SPT=10.00;SDUR= 24.00;PTOT= 74.35]
007368 R0110:CO0003-----DtmIn-ID:INHDV-----AREAHa-QFEARms-TPeakDate_hhm-----RvMm-R.C-----DMFms
007369 DEFAULT VALUES
007370 File name = C:\Temp\SWMHYMO\Fond 2\Ottawa.val
007371 ICASEV = 1 (read and print data)
007372 FileTitle File comment: [Parameters for City of Ottawa Projects]
007373 THE FOLLOWING PARAMETERS ARE USED IN THE DESIGN STANDARD COM
007374 Horton's infiltration equation parameters:
007375 [Fw=76.20 mm/hr] [Frc=13.20 mm/hr] [DCAV4=1.14 /hr] [Fw=.00 mm]
007376 Parameters for PERVIOUS surfaces in STANHDV:
007377 [IApers= 4.67 mm] [LQF=40.00 mm] [MNF=.250]
007378 Parameters for IMPERVIOUS surfaces in STANHDV:
007379 [IAlpms= 1.57 mm] [CLIS=1.50] [MNF=.013]
007380 Parameters used in NASHVD:
007381 [Ia= 4.67 mm] [N= 3.0]
007382 Average monthly Fan Evaporation data in (mm)
007383 JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
007384 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00
007385 Average monthly Potential Evapotranspiration in (mm)
007386 JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
007387 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00
007388 ***** STORMS *****
007389 # PROPOSED CONDITIONS
007390 [XINF=56;TIMP=.66]
007391 # Lumped drainage to Cardinal Creek Village South Pond 2
007392 R0125:CO0004-----DtmIn-ID:INHDV-----AREAHa-QFEARms-TPeakDate_hhm-----RvMm-R.C-----DMFms
007393 CALIS STANHDV 1.0 01:CVU 32.54 7.399 Mo_date 12:02 67.83 .703 .000
007394 [XIMP=56;TIMP=.66]
007395 (Horton parameters: Fw=76.20;Frc=13.20;DCAV4=1.14; Fw=.00)
007396 [Previous area: IApers=4.67;SLFPr=90.10;LIP= 40.0;MNF=250;SICPr=.0]
007397 [Impervious area: IAlpms=1.57;SLFPr= 90.10;LIP=113.0;MNF=.01;SICPr=.0]
007398 # Estimated Pond Volumes for SMM Facility
007399 R0105:CO0005-----DtmIn-ID:INHDV-----AREAHa-QFEARms-TPeakDate_hhm-----RvMm-R.C-----DMFms
007400 ROUTE RESERVOIR -> 1.0 02:CVU 32.54 5.124 Mo_date 12:02 50.74 n/a .000
007401 out <= 1.0 01:FOU 32.54 .124 Mo_date 14:13 50.74 n/a .000
007402 overflow <= 1.0 02:CVU 32.54 .124 Mo_date 14:13 50.74 n/a .000
007403 [MxTotVol=10796.01 m3, TotVolVols=0.0000E+00 m3, Nv=0% 0, TotDurVols= 0 hrs]
007404 # Uncontrolled rear yard drainage area to South Tributary
007405 R0105:CO0006-----DtmIn-ID:INHDV-----AREAHa-QFEARms-TPeakDate_hhm-----RvMm-R.C-----DMFms
007406 CALIS STANHDV 1.0 01:CVUunc 1.93 .294 Mo_date 12:01 30.79 .414 .000
007407 [XIMP=19;TIMP=.29]
007408 (Horton parameters: Fw=76.20;Frc=13.20;DCAV4=1.14; Fw=.00)
007409 [Previous area: IApers=4.67;SLFPr=90.10;LIP= 40.0;MNF=250;SICPr=.0]
007410 [Impervious area: IAlpms=1.57;SLFPr= 90.10;LIP=113.0;MNF=.01;SICPr=.0]
007411 # Total Pond 2 Outflow to South Tributary
007412 R0105:CO0007-----DtmIn-ID:INHDV-----AREAHa-QFEARms-TPeakDate_hhm-----RvMm-R.C-----DMFms
007413 ADD HYD + 1.0 02:FOV 32.54 .124 Mo_date 14:13 50.73 n/a .000
007414 SUM= 1.0 02:FOU-T 32.54 .124 Mo_date 14:13 50.73 n/a .000
007415 # Total CVV South Outflow to South Tributary (Controlled + Uncontrolled)
007416 R0105:CO0008-----DtmIn-ID:INHDV-----AREAHa-QFEARms-TPeakDate_hhm-----RvMm-R.C-----DMFms
007417 ADD HYD + 1.0 02:FOV 32.54 .155 Mo_date 14:15 67.83 n/a .000
007418 SUM= 1.0 02:CVVunc 1.93 .431 Mo_date 12:02 30.79 n/a .000
007419 # Total CVV South Outflow to South Tributary (Controlled + Uncontrolled)
007420 ADD HYD + 1.0 02:FOV 32.54 .155 Mo_date 14:15 67.83 n/a .000
007421 SUM= 1.0 02:FOU-T 32.54 .124 Mo_date 14:13 50.73 n/a .000

```



```

01441#
01442# RUN# COMMAND#
01443# R0999:CO0001-----
01444# START
01445# ITERR= .00 hrs on 0]
01446# METOUT= 2 (1=imperial, 2=metric output)
01447# INTFORM= 1 ]
01448# (NSUN = 0999 ]
01449# *****
01450# SWMHYMO Ver:5.5/Feb 2015 / INPUT DATA FILE
01451# *****
01452# Project Name : [Cardinal Creek Village South]
01453# Project Number: [959(03)]
01454# Date : [2024/10/29]
01455# Modeler : [PJ]
01456# Company : J.P. Sabourin and Associates
01457# License # : 254927
01458# *****
01459# R0999:CO0002-----
01460# READ STORM
01461# Filename = storm.001
01462# Comment = CHICAGO STORM 100 Year, 3 Hours
01463# [SDT=10.00;SDUR= 3.00;PPOF= 86.00]
01464# R0999:CO0003-----
01465# DEFAULT VALUES
01466# Filename = C:\Temp\SWMHYMO\Fond 2\Ottawa.val
01467# ICSElev = 1 (read and print data)
01468# FileTitle= File comment: [Parameters for City of Ottawa Projects]
01469# THE FOLLOWING PARAMETERS ARE USED IN THE DESIGN STANDARD COM
01470# Horton's infiltration equation parameters:
01471# [Fos 76.20 mm/hr] [Fos13.20 mm/hr] [DCAY= 4.14 /hr] [P= .00 mm]
01472# Parameters for PERVIOUS surfaces in STANHYD:
01473# [Iapex= 4.67 mm] [LGP=40.00 m] [MNF= .250]
01474# Parameters for IMPERVIOUS surfaces in STANHYD:
01475# [Ialmp= 1.57 mm] [Cfil= 1.00] [DNIS = .03]
01476# Parameters used in NASHYD:
01477# [Ia= 4.67 mm] [N= 2.00]
01478# Average monthly Pan Evaporation data in (mm)
01479# JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
01480# .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00
01481# Average monthly Potential Evapotranspiration in (mm)
01482# JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
01483# .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00
01484# *****
01485# PROPOSED CONDITIONS
01486# *****
01487# Lumped drainage to Cardinal Creek Village South Pond 2
01488# R0999:CO0004-----Dtbln-ID:SHYD-----AREAb-QPEARgms-TpeakDate_hh:mm-----RvMm-R.C-----DWFCms
01489# CALLS STANHYD 1.0 01:CCVS 32.54 12.795 No_date 1:02 68.72 .799 .000
01490# [XIMP=.6;TIMP=.66]
01491# [Horton parameters: Fm= 76.20;Fm= 13.20;DCAY=4.14; P= .00]
01492# [Impervious area: Iapex= 4.67;SLP=2.00;LGP= 40.;MNF=.250;SCF= .0]
01493# [Impervious area: Ialmp= 1.57;SLP= .90;LGI= 466.;MNI=.013;SCI= .0]
01494# # Estimated Pond Volumes for SWM Facility
01495# R0999:CO0005-----Dtbln-ID:SHYD-----AREAb-QPEARgms-TpeakDate_hh:mm-----RvMm-R.C-----DWFCms
01496# ROUTE RESERVOIR -> 1.0 02:CCVS 32.54 12.795 No_date 1:02 68.72 n/a .000
01497# out <= 1.0 01:Pout 32.54 .176 No_date 3:05 68.71 n/a .000
01498# overflow <= 1.0 03:Povf .00 .000 No_date 0:00 .00 n/a .000
01499# [Mxctofsed=.210SE=0. m3, TotOvfVol=.0000E+00 m3, N-Ovf= 0, TotDurOvf= 0.hrs]
01500# # Uncontrolled rear yard drainage area to South Tributary
01501# R0999:CO0006-----Dtbln-ID:SHYD-----AREAb-QPEARgms-TpeakDate_hh:mm-----RvMm-R.C-----DWFCms
01502# CALLS STANHYD 1.0 01:CCVSunc 1.93 .711 No_date 1:01 52.48 .610 .000
01503# [XIMP=.19;TIMP=.29]
01504# [Horton parameters: Fm= 76.20;Fm= 13.20;DCAY=4.14; P= .00]
01505# [Impervious area: Iapex= 4.67;SLP=2.00;LGP= 40.;MNF=.250;SCF= .0]
01506# [Impervious area: Ialmp= 1.57;SLP= .90;LGI= 113.;MNI=.013;SCI= .0]
01507# # Total Pond 2 Outflow to South Tributary
01508# R0999:CO0007-----Dtbln-ID:SHYD-----AREAb-QPEARgms-TpeakDate_hh:mm-----RvMm-R.C-----DWFCms
01509# ADD HYD 1.0 02:Pout 32.54 .176 No_date 3:05 68.71 n/a .000
01510# + 1.0 02:Pout .00 .000 No_date 0:00 .00 n/a .000
01511# SUM= 1.0 01:Pout-T 32.54 .176 No_date 3:05 68.71 n/a .000
01512# # Total CCV South Outflow to South Tributary (Controlled + Uncontrolled)
01513# R0999:CO0008-----Dtbln-ID:SHYD-----AREAb-QPEARgms-TpeakDate_hh:mm-----RvMm-R.C-----DWFCms
01514# ADD HYD 1.0 02:Pout 32.54 .176 No_date 3:05 68.71 n/a .000
01515# + 1.0 02:Povf .00 .000 No_date 0:00 .00 n/a .000
01516# + 1.0 02:CCVSunc 1.93 .711 No_date 1:01 52.48 n/a .000
01517# SUM= 1.0 01:CCVS-T 34.47 .747 No_date 1:01 67.80 n/a .000
01518# *****
01519# STORMS
01520# *****
01521# R0999:CO0002-----
01522# FINISH
01523# *****
01524# WARNINGS / ERRORS / NOTES
01525# *****
01526# Simulation ended on 2024-10-29 at 17:07:41
01527# *****
01528#
01529#

```



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Attachment B

Pond 2 Preliminary Forebay Calculations

CALCULATION SHEET B-1: FOREBAY SIZING FOR SWM FACILITY

CARDINAL CREEK VILLAGE SOUTH SWM Pond 2 City of Ottawa Calculation of Forebay Size

© DSEL

Settling Criteria

From the SWMP Manual, the required length for settling is as follows:

$$L_{\min} = \left(\frac{r Q_p}{V_s} \right)^{0.5} \quad \text{where:} \quad \begin{array}{l} r = \text{length to width ratio, at the invert of the inlet pipe.} \\ Q_p = \text{peak outflow during design quality storm} \\ V_s = \text{settling velocity} \end{array}$$

$$\text{Input:} \quad \begin{array}{ll} r = & 3.35 \quad (67 \text{ m} / 20 \text{ m}) \\ Q_p = & 0.036 \text{ m}^3/\text{s} \quad (\text{at elevation } 83.2 \text{ m}) \\ V_s = & 0.0003 \text{ m/s} \end{array}$$

$$L_{\min} = 20.03 \text{ m}$$

The peak flow rate from the pond during the quality storm is taken as the flow that would occur just below the quantity controls (Refer to Attachment A)

Dispersion Criteria

From the SWMP Manual, the required length for dispersion is as follows:

$$L_{\min} = \frac{8Q}{d V_f} \quad \text{where:} \quad \begin{array}{l} Q = \text{Inlet flowrate (10-Year, 24-Hour SCS Storm)} \\ d = \text{depth of permanent pool (forebay)} \\ V_f = \text{desired final velocity} \end{array}$$

$$\text{Input:} \quad \begin{array}{ll} Q = & 5.324 \text{ m}^3/\text{s} \\ d = & 1.50 \text{ m} \\ V_f = & 0.5 \text{ m/s} \end{array}$$

$$L_{\min} = 56.79 \text{ m}$$

The minimum forebay length is determined by the larger of the settling or dispersion criteria.

Minimum Length of Forebay Required 56.79 m
Length of Forebay Provided **67.00 m** (at elevation 82.5 m)

Average Forebay Velocity

From the SWMP Manual, the maximum allowable average velocity is 0.15 m/s:

$$V_{\text{avg}} = \frac{Q}{d W_{\text{avg}}} \quad \text{where:} \quad \begin{array}{l} Q = \text{Inlet flowrate (10-Year, 24-Hour SCS Storm)} \\ d = \text{depth of pond during peak 10-year inflow (12h:02min)} \\ W_{\text{avg}} = \text{average width of forebay} \end{array}$$

$$\text{Input:} \quad \begin{array}{ll} Q = & 5.324 \text{ m}^3/\text{s} \\ d = & 2.80 \text{ m} \\ W_{\text{avg}} = & 13 \text{ m} \quad (5 \text{ m bottom, } 20 \text{ m permanent pool}) \end{array}$$

$$V = 0.15 \text{ m/s} \leq 0.15 \text{ m/s}$$



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Attachment C

Storm Design Sheets (DSEL)
Preliminary HGL Analysis Results

**Table C1: Cardinal Creek Village South
Preliminary 100-year HGL Analysis**

SWM Pond	MH-ID	Invert Elevation (m)	Top of MH (m)	Max HGL (m)	Top of MH Freeboard (m)
Pond 1	MH-100	88.00	91.15	88.04	3.11
	MH-101	87.44	90.43	87.50	2.93
	MH-102	86.78	90.07	86.96	3.11
	MH-103	86.66	89.65	86.94	2.71
	MH-104	86.62	89.64	86.95	2.69
	MH-105	86.02	89.53	86.70	2.83
	MH-106	85.64	89.40	86.15	3.25
	MH-107	87.09	90.05	87.32	2.73
	MH-108	86.60	89.67	87.05	2.62
	MH-109	86.39	89.49	86.79	2.70
	MH-110	86.34	89.46	86.70	2.76
	MH-111	86.25	89.40	86.46	2.94
	MH-113	83.27	88.91	83.78	5.13
	MH-114	81.17	85.51	81.86	3.65
	MH-115	80.03	83.63	81.09	2.54
	MH-116	84.31	88.08	84.44	3.64
	MH-117	82.32	85.95	82.48	3.47
	MH-118	80.32	84.37	80.87	3.50
	MH-119	77.60	83.08	78.61	4.47
	MH-2000	77.20	80.90	78.40	2.50
Pond 2	MH-1	91.99	94.94	92.25	2.69
	MH-2	91.84	94.85	92.13	2.72
	MH-3	91.62	94.64	91.87	2.77
	MH-4	91.47	94.49	91.65	2.84
	MH-5	90.03	93.16	90.43	2.73
	MH-6	89.84	93.14	90.36	2.78
	MH-7	89.64	93.02	90.22	2.80
	MH-8	92.02	94.97	92.09	2.88
	MH-9	91.83	94.84	91.90	2.94
	MH-10	91.59	94.60	91.74	2.86
	MH-11	89.11	92.83	89.42	3.41
	MH-12	87.53	90.81	88.54	2.27
	MH-13	87.99	90.94	88.56	2.38
	MH-14	87.35	90.82	88.45	2.37
	MH-15	87.14	90.66	88.27	2.40
	MH-16	92.50	95.46	92.71	2.75
	MH-17	89.95	93.10	90.23	2.87
	MH-18	86.96	90.59	88.23	2.36
	MH-19	87.37	90.33	87.86	2.47
	MH-20	86.19	89.94	87.86	2.08
	MH-21	92.53	95.48	92.62	2.86
	MH-22	91.61	94.62	91.71	2.91
	MH-23	91.43	94.41	91.64	2.77
	MH-24	89.39	92.36	89.70	2.66

**Table C1: Cardinal Creek Village South
Preliminary 100-year HGL Analysis**

SWM Pond	MH-ID	Invert Elevation (m)	Top of MH (m)	Max HGL (m)	Top of MH Freeboard (m)
Pond 2	MH-25	87.04	90.33	88.31	2.02
	MH-26	85.93	89.79	87.69	2.10
	MH-27	88.45	91.40	88.57	2.83
	MH-28	88.34	91.36	88.57	2.79
	MH-29	88.26	91.35	88.56	2.79
	MH-30	87.80	90.79	88.19	2.60
	MH-31	86.63	89.98	87.33	2.65
	MH-32	85.49	89.66	87.17	2.49
	MH-33	87.33	90.28	87.92	2.36
	MH-34	87.15	90.17	87.89	2.28
	MH-35	87.10	90.16	87.89	2.27
	MH-36	87.15	90.10	87.73	2.37
	MH-37	86.85	90.03	87.73	2.30
	MH-38	86.61	89.91	87.55	2.36
	MH-39	87.13	90.08	87.69	2.39
	MH-40	86.98	89.98	87.66	2.32
	MH-41	87.33	90.28	87.53	2.75
	MH-42	87.19	90.20	87.50	2.70
	MH-43	87.13	90.12	87.49	2.63
	MH-44	86.74	89.86	87.47	2.39
	MH-45	86.30	89.79	87.34	2.45
	MH-46	86.94	89.89	87.51	2.38
	MH-47	86.89	89.88	87.51	2.37
	MH-48	86.56	89.77	87.32	2.45
	MH-49	85.99	89.67	87.17	2.50
	MH-50	86.95	89.90	87.49	2.41
	MH-51	86.83	89.83	87.48	2.35
	MH-52	86.77	89.82	87.47	2.35
	MH-53	86.53	89.72	87.28	2.44
	MH-54	87.28	90.24	87.34	2.90
	MH-55	85.84	89.54	87.02	2.52
	MH-56	87.05	90.00	87.25	2.76
	MH-57	85.62	89.42	86.78	2.64
	MH-58	87.04	89.99	87.23	2.76
	MH-59	86.68	89.70	86.97	2.73
	MH-60	86.58	89.61	86.89	2.72
	MH-61	85.57	88.77	86.75	2.02
	MH-62	85.39	88.75	86.69	2.06
	MH-63	85.23	88.66	86.60	2.06
	MH-64	84.31	88.57	86.47	2.10
	MH-65	85.86	88.81	86.24	2.57
	MH-66	84.13	88.45	86.21	2.24
	MH-67	85.84	88.80	86.30	2.50
	MH-68	85.71	88.69	86.30	2.39

**Table C1: Cardinal Creek Village South
Preliminary 100-year HGL Analysis**

SWM Pond	MH-ID	Invert Elevation (m)	Top of MH (m)	Max HGL (m)	Top of MH Freeboard (m)
Pond 2	MH-69	85.61	88.61	86.29	2.32
	MH-70	85.45	88.46	86.15	2.31
	MH-71	85.28	88.44	86.11	2.33
	MH-72	83.80	88.33	85.94	2.39
	MH-73	85.52	88.47	85.94	2.53
	MH-74	83.57	88.20	85.75	2.45
	MH-75	85.35	88.31	85.73	2.59
	MH-76	83.44	88.14	85.65	2.49
	MH-77	85.42	88.37	85.51	2.86
	MH-78	83.11	88.11	85.23	2.88
	MH-79	85.50	88.45	85.62	2.83
	MH-80	85.36	88.34	85.60	2.74
	MH-81	85.22	88.27	85.56	2.71
	MH-82	85.13	88.26	85.54	2.72
	MH-83	82.99	88.00	84.98	3.02
	MH-84	82.74	87.87	84.83	3.04
	MH-85	82.46	87.72	84.46	3.26
HW1	82.31	-	84.35	-	
				Min	2.02
				Max	5.13
				Average	2.68

Notes:

- (1) Analysis assumes the use of ICDs throughout the development, therefore the Rational Method flows as per DSEL's storm design sheets were increased by 35% to account for additional flows captured into the minor system during the 100-year event.
- (2) Analysis assumes a preliminary 100-year water level of 84.35m in Pond 2.
- (3) Free outlet condition assumed at MH-2000 outfall, as the preliminary 100-yr HGL in this MH is below the invert of the inlet pipe (100-yr HGL of 75.652m based on the Nov. 2024 preliminary Pond 1 modelling update).
- (4) Model Name: CCVS_v02.2.inp.



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Attachment D

Cox Country Road Culvert Analysis

Area ID	Area (ha)	Soil Description	Soil Group	Land Use Description	CN	CN*	Tp (h)
eCCR	74.3	F1, G4, R3	B / BC / D	50% B = 70% Woods, 30% Farm; 40% BC = 15% Imp, 25% Woods, 60% Urban Lawn; 10% D = 15% Imp, 15% Woods, 70% Urban Lawn	71.525	61	1.29

As per Ontario Soil Map 58 and the MTO Manual:

Short ID	Soil Description	Soil Group
F1	Farmington, fine sandy loam or sandy loam or loam, good drainage	B
G4	Grenville, sandy loam or loam or silt loam, mix of good and imperfect drainage	BC
R1	Rideau, silty clay or clay, imperfect drainage	D
R3	Rideau, silty clay or clay, poor drainage	D
X1	Escarpment, marine clay or heavy clay	D
X3	Escarpment, limestone or dolomite or sandstone scarps	D

Calculation of Time to Peak (Tp)

	EXISTING CONDITIONS	
	UNITS Metric	eCCR metric
Area	(ha)	74.3
Hydrologic Soil Group ¹		B / BC / D
CN ²		72
C (as per Rational Method) ³		0.25
Length of Channel ⁴	(m)	1997
Elevation of Channel Outlet	(m)	87.31
Elevation of Channel Headwater	(m)	111.5
Average Slope of Channel	(m/m)	0.0121
Time to Peak (=2/3 Tc)		
Kirpich	(min)	25
FAA	(min)	77
SCS	(min)	111
Brainby Williams	(min)	48

1.29

NOTES:

- 1- As per Ontario Soil Map
- 2- See CN C spreadsheet for detail
- 3- See CN C spreadsheet for detail
- 4- As measured on topographic map provided by DSEL



Tc Equations applicability

Kirpich	Best for rural watersheds with slopes ranging from 3% to 10%
FAA	Best for flat drainage areas (was developed for air field drainage) but used frequently for urban watersheds
SCS	Best for Agricultural SW in general and urban SW < 2000 acres
BW	One of the best method for predicting Tc. Especially for good for small culvert design

Tc Equations and inputs (imperial unless otherwise noted)

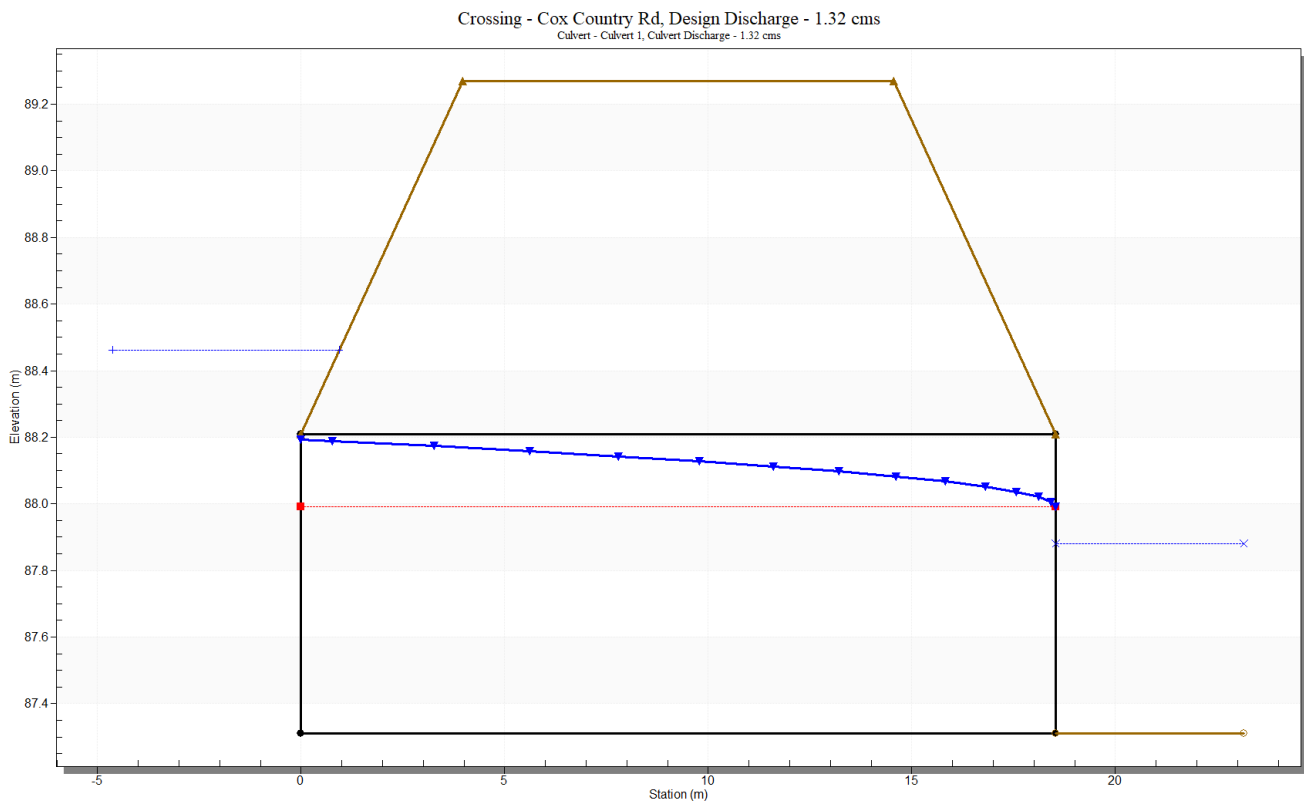
		Result	input L as
Kirpich	$T_c = 0.0078 L^{0.77} S^{-0.385}$	(min)	(ft)
FAA	$T_c = (1.8(1.1-C)L^{0.50}) / (S^{0.333})$	(min)	(ft)
SCS Lag	$T_c = (100L^{0.8}((1000/CN)-9)^{0.7}) / (1900 S^{0.5})$	(min)	(ft)
BW (metr)	$T_c = (0.605L) / (S^{0.2} A^{0.1})$	(hrs)	(km)

HY-8 Analysis Results

Crossing Summary Table

Culvert Crossing: Cox Country Rd

Headwater Elevation (m)	Total Discharge (cms)	Culvert 1 Discharge (cms)	Roadway Discharge (cms)	Iterations
87.31	0.00	0.00	0.00	1
87.63	0.13	0.13	0.00	1
87.76	0.26	0.26	0.00	1
87.87	0.40	0.40	0.00	1
87.96	0.53	0.53	0.00	1
88.05	0.66	0.66	0.00	1
88.13	0.79	0.79	0.00	1
88.21	0.93	0.93	0.00	1
88.29	1.06	1.06	0.00	1
88.37	1.19	1.19	0.00	1
88.46	1.32	1.32	0.00	1
89.27	2.28	2.28	0.00	Overtopping



```

00001 20 Metric units / ID Numbers OFF
00002 *#-----
00003 *# SWMHYMO Ver:1.02/Gm 2001 SEB76 / INPUT DATA FILE
00004 *#-----
00005 *# Project Name (Cardinal Creek Village)
00006 *# Project Number: [959-11]
00007 *# Date : 2021/07/07
00008 *# Modeler : Laura Fajkins, P.Eng.
00009 *# Company : J.F. Sabourin and Associates
00010 *# License # : 238254
00011 *#-----
00012 *# 25-Year, 3-Hour Chicago Storm
00013 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[025]
00014 *# ["025YCH.sta"] <-storm filename, one per line for NSTORM time
00015 *#-----
00016 *# READ STORM STORM_FILENAME=["storm.001"]
00017 *#-----
00018 *# DEFAULT VALUES ICASEde=[1], read and print values
00019 *# DEFPAL_FILENAME=["Octava.val"]
00020 *#-----
00021 *# CN -> CM based on Ontario Soil Map 58, Nov 1985 MTO Manual Chart H2-6A,
00022 *# Lidar data, May 2000 SWMHYMO USER's Manual, air photos, assume good condition
00023 *#
00024 *# Time to Peak = 2/3 of FFA Tc
00025 *#-----
00026 *# EXISTING CONDITIONS - Drainage to South Tributary East of Cox County Road
00027 *#-----
00028 *# Existing Drainage from Subject Site to Ottawa River
00029 *# DESIGN WASHVD WSHVD["SCCR"], TP=[1]min, ARRA=[14.2]in),
00030 *# DWF=[0]cms), CN/C=[61], TP=[1.29]hrs,
00031 *# RAINFALL=[ , , , ]mm/hr, END=-1
00032 *#-----
00033 *#
00034 *#-----
00035 *# STORMS
00036 *#-----
00037 *# 25 mm Storm based on 2-Year, 3-Hour Chicago Storm
00038 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[001]
00039 *# ["002YCH.sta"] <-storm filename, one per line for NSTORM time
00040 *#
00041 *# 2-Year, 3-Hour Chicago Storm
00042 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[002]
00043 *# ["002YCH.sta"] <-storm filename, one per line for NSTORM time
00044 *#
00045 *# 5-Year, 3-Hour Chicago Storm
00046 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[005]
00047 *# ["005YCH.sta"] <-storm filename, one per line for NSTORM time
00048 *#
00049 *# 10-Year, 3-Hour Chicago Storm
00050 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[010]
00051 *# ["010YCH.sta"] <-storm filename, one per line for NSTORM time
00052 *#
00053 *# 25-Year, 3-Hour Chicago Storm
00054 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[025]
00055 *# ["025YCH.sta"] <-storm filename, one per line for NSTORM time
00056 *#
00057 *# 50-Year, 3-Hour Chicago Storm
00058 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[050]
00059 *# ["050YCH.sta"] <-storm filename, one per line for NSTORM time
00060 *#
00061 *# 100-Year, 3-Hour Chicago Storm
00062 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[099]
00063 *# ["100YCH.sta"] <-storm filename, one per line for NSTORM time
00064 *#
00065 *# 2-Year, 24-Hour SCS Storm
00066 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[102]
00067 *# ["SC2402X.sta"] <-storm filename, one per line for NSTORM time
00068 *#
00069 *# 5-Year, 24-Hour SCS Storm
00070 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[105]
00071 *# ["SC2405X.sta"] <-storm filename, one per line for NSTORM time
00072 *#
00073 *# 10-Year, 24-Hour SCS Storm
00074 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[110]
00075 *# ["SC2410X.sta"] <-storm filename, one per line for NSTORM time
00076 *#
00077 *# 25-Year, 24-Hour SCS Storm
00078 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[125]
00079 *# ["SC2425X.sta"] <-storm filename, one per line for NSTORM time
00080 *#
00081 *# 50-Year, 24-Hour SCS Storm
00082 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[150]
00083 *# ["SC2450X.sta"] <-storm filename, one per line for NSTORM time
00084 *#
00085 *# 100-Year, 24-Hour SCS Storm
00086 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[199]
00087 *# ["SC24100X.sta"] <-storm filename, one per line for NSTORM time
00088 *#
00089 *# July 1st, 1979 Storm - Ottawa International Airport
00090 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[1979]
00091 *# ["19790701.sta"] <-storm filename, one per line for NSTORM time
00092 *#
00093 *# August 4th, 1988 Storm - Ottawa International Airport
00094 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[1988]
00095 *# ["19880804.sta"] <-storm filename, one per line for NSTORM time
00096 *#
00097 *# August 8th, 1996 Storm - Ottawa International Airport
00098 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[1996]
00099 *# ["19960808.sta"] <-storm filename, one per line for NSTORM time
00100 *#
00101 *# 100-Year, 3-Hour Chicago Storm + 20%
00102 *#*START TIER0=[0.0], METOUT=[2], NSTORM=[1], NRUN=[1999]
00103 *# ["1999YCH.sta"] <-storm filename, one per line for NSTORM time
00104 *#
00105 *#-----
00106 *# FINISH

```



```

00001 *****
00002 *****
00003 SSSS W W M M H H Y Y M M O O 222 000 11 5555 *****
00004 S W W M M H H Y Y M M O O 2 0 0 11 5 *****
00005 SSSS W W M M H H Y Y M M O O 222 0 0 11 5 Ver 5.000
00006 S W W M M H H Y Y M M O O 222 0 0 11 555 FEB 2015
00007 SSSS W W M M H H Y Y M M O O 2 0 0 11 5 *****
00008 *****
00009 Stormwater Management Hydrologic Model 222 000 11 555 *****
00010 *****
00011 *****
00012 *****
00013 ***** A single event and continuous hydrologic simulation model *****
00014 ***** based on the principles of HMM and its successors *****
00015 ***** CTRM90 and CTRM98 *****
00016 ***** distributed by: J.F. Sabourin and Associates Inc. *****
00017 ***** Ottawa, Ontario: (613) 836-3884 *****
00018 ***** Gatineau, Quebec: (819) 243-6858 *****
00019 ***** E-mail: jsabourin@jfa.com *****
00020 *****
00021 *****
00022 *****
00023 *****
00024 ***** Licensed user: JFSAinc *****
00025 ***** SERIAL#:2549237 *****
00026 *****
00027 *****
00028 *****
00029 *****
00030 ***** Maximum value for ID numbers : 11 *****
00031 ***** Max. number of rainfall points: 105408 *****
00032 ***** Max. number of flow points : 105408 *****
00033 *****
00034 *****
00035 *****
00036 ***** S U M M A R Y O U T P U T *****
00037 *****
00038 ***** RUN DATE: 2021-07-19 TIME: 10:39:02 RUN COUNTER: 004037 *****
00039 *****
00040 ***** Input file: T:\PROJ\959(02)-11\202001 Subm1\Design\SMWHYMO\202107 Pre-Dev\CCV_V1.dat *****
00041 ***** Output file: T:\PROJ\959(02)-11\202001 Subm1\Design\SMWHYMO\202107 Pre-Dev\CCV_V1.out *****
00042 ***** Summary file: T:\PROJ\959(02)-11\202001 Subm1\Design\SMWHYMO\202107 Pre-Dev\CCV_V1.sum *****
00043 ***** User comments: *****
00044 ***** 1: *****
00045 ***** 2: *****
00046 ***** 3: *****
00047 *****
00048 *****
00049 *****
00050 *****
00051 ***** # SMWHYMO Ver:02/Jan 2001 <BETA> / INPUT DATA FILE *****
00052 *****
00053 ***** # Project Name : [Cardinal Creek Village] *****
00054 ***** # Project Number : [959-11] *****
00055 ***** # Date : [2021/07/07] *****
00056 ***** # Modeler : [Laura Pipkins, P.Eng.] *****
00057 ***** # Company : [J.F. Sabourin and Associates] *****
00058 ***** # License # : [2562634] *****
00059 ***** *****
00060 ***** ** END OF RUN : 24 *****
00061 *****
00062 *****
00063 *****
00064 *****
00065 *****
00066 *****
00067 *****
00068 ***** RUN#COMMAND# *****
00069 ***** R0225:C0001 *****
00070 ***** START *****
00071 ***** [ITER=0 : .00 hrs on 0] *****
00072 ***** [MFORM= 2 [!Imperial, 2=metric output]] *****
00073 ***** [NFORM= 1] *****
00074 ***** [NRUN = 0015] *****
00075 ***** *****
00076 ***** # SMWHYMO Ver:02/Jan 2001 <BETA> / INPUT DATA FILE *****
00077 ***** *****
00078 ***** # Project Name : [Cardinal Creek Village] *****
00079 ***** # Project Number : [959-11] *****
00080 ***** # Date : [2021/07/07] *****
00081 ***** # Modeler : [Laura Pipkins, P.Eng.] *****
00082 ***** # Company : [J.F. Sabourin and Associates] *****
00083 ***** # License # : [2562634] *****
00084 ***** *****
00085 ***** R0225:C0002 *****
00086 ***** READ STORM *****
00087 ***** Filename = storm.001 *****
00088 ***** Comment = CHICAGO STORM 25 Year, 3 Hours *****
00089 ***** [SDT=10.00;SDOR= 3.00;POT= 58.2] *****
00090 ***** R0225:C0003 *****
00091 ***** DEFAULT VALUES *****
00092 ***** Filename = T:\PROJ\959(02)-11\202001 Subm1\Design\SMWHYMO\202107 Pre-Dev\Ottawa.v1 *****
00093 ***** ICAEVD= 1 (read and print data) *****
00094 ***** FileTitle= File comment: [Parameters for City of Ottawa Projects] *****
00095 ***** THE FOLLOWING PARAMETERS ARE USED IN THE DESIGN STANDARD COM *****
00096 ***** Horton's infiltration equation parameters: *****
00097 ***** [Fw= 76.20 mm/hr] [Fc=13.20 mm/hr] [ICAV= 4.14 /hr] [F= .00 mm] *****
00098 ***** Parameters for IMPERVIOUS surfaces in STANDWID: *****
00099 ***** [Iaper= 4.67 mm] [LIP=40.00 mm] [MNP= .250] *****
00100 ***** Parameters used in NARBVD: *****
00101 ***** [Ia= 4.67 mm] [N= 3.00] *****
00102 ***** Average monthly Pan Evaporation data in (mm) *****
00103 ***** JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC *****
00104 ***** .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 *****
00105 ***** Average monthly Potential Evapotranspiration in (mm) *****
00106 ***** JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC *****
00107 ***** .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 *****
00108 ***** # CN -> 'CN' based on Ontario Soil Map 58, Nov 1985 MTO Manual Chart H2-6A, *****
00109 ***** # Lidar data, May 2000 SMWHYMO USER's Manual, air photos, assume good condition *****
00110 ***** *****
00111 ***** # Time to Peak = 2/3 of FFA Tc *****
00112 ***** *****
00113 ***** # EXISTING CONDITIONS - Drainage to South Tributary East of Cox County Road *****
00114 ***** *****
00115 ***** # Existing Drainage from Subject Site to Ottawa River *****
00116 ***** *****
00117 ***** # Existing Drainage from Subject Site to Ottawa River *****
00118 ***** *****
00119 ***** R0225:C0004 *****
00120 ***** # DESIGN NARBVD *****
00121 ***** [CN= 61.0; N= 3.00; Tp= 1.29] *****
00122 ***** *****
00123 ***** # STORMS *****
00124 ***** *****
00125 ***** ** END OF RUN : 49 *****
00126 *****
00127 *****
00128 *****
00129 *****
00130 *****
00131 *****
00132 ***** RUN#COMMAND# *****
00133 ***** R0250:C0001 *****
00134 ***** START *****
00135 ***** [ITER=0 : .00 hrs on 0] *****
00136 ***** [MFORM= 2 [!Imperial, 2=metric output]] *****
00137 ***** [NFORM= 1] *****
00138 ***** [NRUN = 0015] *****
00139 ***** *****
00140 ***** # SMWHYMO Ver:02/Jan 2001 <BETA> / INPUT DATA FILE *****
00141 ***** *****
00142 ***** # Project Name : [Cardinal Creek Village] *****
00143 ***** # Project Number : [959-11] *****
00144 ***** # Date : [2021/07/07] *****
00145 ***** # Modeler : [Laura Pipkins, P.Eng.] *****
00146 ***** # Company : [J.F. Sabourin and Associates] *****
00147 ***** # License # : [2562634] *****
00148 ***** *****
00149 ***** R0250:C0002 *****
00150 ***** READ STORM *****
00151 ***** Filename = storm.001 *****
00152 ***** Comment = CHICAGO STORM 50 Year, 3 Hours *****
00153 ***** [SDT=10.00;SDOR= 3.00;POT= 64.81] *****
00154 ***** R0250:C0003 *****
00155 ***** DEFAULT VALUES *****
00156 ***** Filename = T:\PROJ\959(02)-11\202001 Subm1\Design\SMWHYMO\202107 Pre-Dev\Ottawa.v1 *****
00157 ***** ICAEVD= 1 (read and print data) *****
00158 ***** FileTitle= File comment: [Parameters for City of Ottawa Projects] *****
00159 ***** THE FOLLOWING PARAMETERS ARE USED IN THE DESIGN STANDARD COM *****
00160 ***** Horton's infiltration equation parameters: *****
00161 ***** [Fw= 76.20 mm/hr] [Fc=13.20 mm/hr] [ICAV= 4.14 /hr] [F= .00 mm] *****
00162 ***** Parameters for IMPERVIOUS surfaces in STANDWID: *****
00163 ***** [Iaper= 4.67 mm] [LIP=40.00 mm] [MNP= .250] *****
00164 ***** Parameters for IMPERVIOUS surfaces in STANDWID: *****
00165 ***** [Iaper= 4.67 mm] [LIP=40.00 mm] [MNP= .250] *****
00166 ***** Parameters used in NARBVD: *****
00167 ***** [Ia= 4.67 mm] [N= 3.00] *****
00168 ***** Average monthly Pan Evaporation data in (mm) *****
00169 ***** JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC *****
00170 ***** .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 *****
00171 ***** Average monthly Potential Evapotranspiration in (mm) *****
00172 ***** JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC *****
00173 ***** .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 *****
00174 ***** # CN -> 'CN' based on Ontario Soil Map 58, Nov 1985 MTO Manual Chart H2-6A, *****
00175 ***** # Lidar data, May 2000 SMWHYMO USER's Manual, air photos, assume good condition *****
00176 ***** *****
00177 ***** # Time to Peak = 2/3 of FFA Tc *****
00178 ***** *****
00179 ***** # EXISTING CONDITIONS - Drainage to South Tributary East of Cox County Road *****
00180 ***** *****
00181 ***** # Existing Drainage from Subject Site to Ottawa River *****
00182 ***** *****
00183 ***** # Existing Drainage from Subject Site to Ottawa River *****
00184 ***** *****
00185 ***** R0250:C0004 *****
00186 ***** # DESIGN NARBVD *****
00187 ***** [CN= 61.0; N= 3.00; Tp= 1.29] *****
00188 ***** *****
00189 ***** # STORMS *****
00190 ***** *****
00191 ***** ** END OF RUN : 98 *****

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00190 *****
00191 *****
00192 *****
00193 *****
00194 *****
00195 *****
00196 ***** RUN#COMMAND# *****
00197 ***** R0250:C0001 *****
00198 ***** START *****
00199 ***** [ITER=0 : .00 hrs on 0] *****
00200 ***** [MFORM= 2 [!Imperial, 2=metric output]] *****
00201 ***** [NFORM= 1] *****
00202 ***** [NRUN = 0099] *****
00203 ***** *****
00204 ***** # SMWHYMO Ver:02/Jan 2001 <BETA> / INPUT DATA FILE *****
00205 ***** *****
00206 ***** # Project Name : [Cardinal Creek Village] *****
00207 ***** # Project Number : [959-11] *****
00208 ***** # Date : [2021/07/07] *****
00209 ***** # Modeler : [Laura Pipkins, P.Eng.] *****
00210 ***** # Company : [J.F. Sabourin and Associates] *****
00211 ***** # License # : [2562634] *****
00212 ***** *****
00213 ***** R0250:C0002 *****
00214 ***** READ STORM *****
00215 ***** Filename = storm.001 *****
00216 ***** Comment = CHICAGO STORM 100 Year, 3 Hours *****
00217 ***** [SDT=10.00;SDOR= 3.00;POT= 71.66] *****
00218 ***** R0250:C0003 *****
00219 ***** DEFAULT VALUES *****
00220 ***** Filename = T:\PROJ\959(02)-11\202001 Subm1\Design\SMWHYMO\202107 Pre-Dev\Ottawa.v1 *****
00221 ***** ICAEVD= 1 (read and print data) *****
00222 ***** FileTitle= File comment: [Parameters for City of Ottawa Projects] *****
00223 ***** THE FOLLOWING PARAMETERS ARE USED IN THE DESIGN STANDARD COM *****
00224 ***** Horton's infiltration equation parameters: *****
00225 ***** [Fw= 76.20 mm/hr] [Fc=13.20 mm/hr] [ICAV= 4.14 /hr] [F= .00 mm] *****
00226 ***** Parameters for IMPERVIOUS surfaces in STANDWID: *****
00227 ***** [Iaper= 4.67 mm] [LIP=40.00 mm] [MNP= .250] *****
00228 ***** Parameters for IMPERVIOUS surfaces in STANDWID: *****
00229 ***** [Iaper= 1.57 mm] [CL= 1.50] [MNI= .013] *****
00230 ***** Parameters used in NARBVD: *****
00231 ***** [Ia= 4.67 mm] [N= 3.00] *****
00232 ***** Average monthly Pan Evaporation data in (mm) *****
00233 ***** JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC *****
00234 ***** .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 *****
00235 ***** Average monthly Potential Evapotranspiration in (mm) *****
00236 ***** JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC *****
00237 ***** .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 *****
00238 ***** # CN -> 'CN' based on Ontario Soil Map 58, Nov 1985 MTO Manual Chart H2-6A, *****
00239 ***** # Lidar data, May 2000 SMWHYMO USER's Manual, air photos, assume good condition *****
00240 ***** *****
00241 ***** # Time to Peak = 2/3 of FFA Tc *****
00242 ***** *****
00243 ***** # EXISTING CONDITIONS - Drainage to South Tributary East of Cox County Road *****
00244 ***** *****
00245 ***** # Existing Drainage from Subject Site to Ottawa River *****
00246 ***** *****
00247 ***** R0250:C0004 *****
00248 ***** # DESIGN NARBVD *****
00249 ***** [CN= 61.0; N= 3.00; Tp= 1.29] *****
00250 ***** *****
00251 ***** # STORMS *****
00252 ***** *****
00253 ***** ** END OF RUN : 124 *****
00254 *****
00255 *****
00256 *****
00257 *****
00258 *****
00259 *****
00260 ***** RUN#COMMAND# *****
00261 ***** R0262:C0001 *****
00262 ***** START *****
00263 ***** [ITER=0 : .00 hrs on 0] *****
00264 ***** [MFORM= 2 [!Imperial, 2=metric output]] *****
00265 ***** [NFORM= 1] *****
00266 ***** [NRUN = 0123] *****
00267 ***** *****
00268 ***** # SMWHYMO Ver:02/Jan 2001 <BETA> / INPUT DATA FILE *****
00269 ***** *****
00270 ***** # Project Name : [Cardinal Creek Village] *****
00271 ***** # Project Number : [959-11] *****
00272 ***** # Date : [2021/07/07] *****
00273 ***** # Modeler : [Laura Pipkins, P.Eng.] *****
00274 ***** # Company : [J.F. Sabourin and Associates] *****
00275 ***** # License # : [2562634] *****
00276 ***** *****
00277 ***** R0262:C0002 *****
00278 ***** READ STORM *****
00279 ***** Filename = storm.001 *****
00280 ***** Comment = 25 years SCS Type 2 Storm 24 hours step 10 min, City of Ottawa *****
00281 ***** [SDT=10.00;SDOR= 24.00;POT= 86.89] *****
00282 ***** R0262:C0003 *****
00283 ***** DEFAULT VALUES *****
00284 ***** Filename = T:\PROJ\959(02)-11\202001 Subm1\Design\SMWHYMO\202107 Pre-Dev\Ottawa.v1 *****
00285 ***** ICAEVD= 1 (read and print data) *****
00286 ***** FileTitle= File comment: [Parameters for City of Ottawa Projects] *****
00287 ***** THE FOLLOWING PARAMETERS ARE USED IN THE DESIGN STANDARD COM *****
00288 ***** Horton's infiltration equation parameters: *****
00289 ***** [Fw= 76.20 mm/hr] [Fc=13.20 mm/hr] [ICAV= 4.14 /hr] [F= .00 mm] *****
00290 ***** Parameters for IMPERVIOUS surfaces in STANDWID: *****
00291 ***** [Iaper= 4.67 mm] [LIP=40.00 mm] [MNP= .250] *****
00292 ***** Parameters for IMPERVIOUS surfaces in STANDWID: *****
00293 ***** [Iaper= 1.57 mm] [CL= 1.50] [MNI= .013] *****
00294 ***** Parameters used in NARBVD: *****
00295 ***** [Ia= 4.67 mm] [N= 3.00] *****
00296 ***** Average monthly Pan Evaporation data in (mm) *****
00297 ***** JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC *****
00298 ***** .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 *****
00299 ***** Average monthly Potential Evapotranspiration in (mm) *****
00300 ***** JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC *****
00301 ***** .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 *****
00302 ***** # CN -> 'CN' based on Ontario Soil Map 58, Nov 1985 MTO Manual Chart H2-6A, *****
00303 ***** # Lidar data, May 2000 SMWHYMO USER's Manual, air photos, assume good condition *****
00304 ***** *****
00305 ***** # Time to Peak = 2/3 of FFA Tc *****
00306 ***** *****
00307 ***** # EXISTING CONDITIONS - Drainage to South Tributary East of Cox County Road *****
00308 ***** *****
00309 ***** # Existing Drainage from Subject Site to Ottawa River *****
00310 ***** *****
00311 ***** R0262:C0004 *****
00312 ***** # DESIGN NARBVD *****
00313 ***** [CN= 61.0; N= 3.00; Tp= 1.29] *****
00314 ***** *****
00315 ***** # STORMS *****
00316 ***** *****
00317 ***** ** END OF RUN : 149 *****
00318 *****
00319 *****
00320 *****
00321 *****
00322 *****
00323 *****
00324 ***** RUN#COMMAND# *****
00325 ***** R0150:C0001 *****
00326 ***** START *****
00327 ***** [ITER=0 : .00 hrs on 0] *****
00328 ***** [MFORM= 2 [!Imperial, 2=metric output]] *****
00329 ***** [NFORM= 1] *****
00330 ***** [NRUN = 0101] *****
00331 ***** *****
00332 ***** # SMWHYMO Ver:02/Jan 2001 <BETA> / INPUT DATA FILE *****
00333 ***** *****
00334 ***** # Project Name : [Cardinal Creek Village] *****
00335 ***** # Project Number : [959-11] *****
00336 ***** # Date : [2021/07/07] *****
00337 ***** # Modeler : [Laura Pipkins, P.Eng.] *****
00338 ***** # Company : [J.F. Sabourin and Associates] *****
00339 ***** # License # : [2562634] *****
00340 ***** *****
00341 ***** R0150:C0002 *****
00342 ***** READ STORM *****
00343 ***** Filename = storm.001 *****
00344 ***** Comment = 50 years SCS Type 2 Storm 24 hours step 10 min, City of Ottawa *****
00345 ***** [SDT=10.00;SDOR= 24.00;POT= 96.53] *****
00346 ***** R0150:C0003 *****
00347 ***** DEFAULT VALUES *****
00348 ***** Filename = T:\PROJ\959(02)-11\202001 Subm1\Design\SMWHYMO\202107 Pre-Dev\Ottawa.v1 *****
00349 ***** ICAEVD= 1 (read and print data) *****
00350 ***** FileTitle= File comment: [Parameters for City of Ottawa Projects] *****
00351 ***** THE FOLLOWING PARAMETERS ARE USED IN THE DESIGN STANDARD COM *****
00352 ***** Horton's infiltration equation parameters: *****
00353 ***** [Fw= 76.20 mm/hr] [Fc=13.20 mm/hr] [ICAV= 4.14 /hr] [F= .00 mm] *****
00354 ***** Parameters for IMPERVIOUS surfaces in STANDWID: *****
00355 ***** [Iaper= 4.67 mm] [LIP=40.00 mm] [MNP= .250] *****
00356 ***** Parameters for IMPERVIOUS surfaces in STANDWID: *****
00357 ***** [Iaper= 1.57 mm] [CL= 1.50] [MNI= .013] *****
00358 ***** Parameters used in NARBVD: *****
00359 ***** [Ia= 4.67 mm] [N= 3.00] *****
00360 ***** Average monthly Pan Evaporation data in (mm) *****
00361 ***** JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC *****
00362 ***** .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 *****
00363 ***** Average monthly Potential Evapotranspiration in (mm) *****
00364 ***** JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC *****
00365 ***** .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 *****
00366 ***** # CN -> 'CN' based on Ontario Soil Map 58, Nov 1985 MTO Manual Chart H2-6A, *****
00367 ***** # Lidar data, May 2000 SMWHYMO USER's Manual, air photos, assume good condition *****
00368 ***** *****
00369 ***** # Time to Peak = 2/3 of FFA Tc *****
00370 ***** *****
00371 ***** # EXISTING CONDITIONS - Drainage to South Tributary East of Cox County Road *****
00372 ***** *****
00373 ***** # Existing Drainage from Subject Site to Ottawa River *****
00374 ***** *****
00375 ***** R0150:C0004 *****
00376 ***** # DESIGN NARBVD *****
00377 ***** [CN= 61.0; N= 3.00; Tp= 1.29] *****
00378 ***** *****
00379 ***** # STORMS *****
00380 ***** *****
00381 ***** ** END OF RUN : 207 *****

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00379 *****
00380 ** END OF RUN : 198
00381
-----
00382
00383
00384
00385
00386
00387
00388 RUN:COMMAND#
00389 R0199:CO001#
-----
00390
00391 START
00392 ITCR0 = .00 hrs on 0]
00393 [METOUT= 2 (1=imperial, 2=metric output)]
00394 [INSTORM= 1]
00395 [NRUN = 0199 ]
-----
00396 # SWMHYMO Ver:5.02/Jan 2001 <BETA> / INPUT DATA FILE
00397 #
00398 # Project Name : [Cardinal Creek Village]
00399 # Project Number: [959-11]
00400 # Date : 2021/07/07
00401 # Modeler : Laura Pipkins, P.Eng.
00402 # Company : J.F. Sabourin and Associates
00403 # License # : 2582634
00404 #
-----
00405 R0199:CO002#
00406 READ STORM
00407 Filename = storm.001
00408 Comment = 100 years SCS Type 2 Storm 24 Hours step 10 min, City of Ottawa
00409 [SDI=10.00;SDUR= 24.00;PFD= 106.73]
00410 R0199:CO001#
-----
00411 DEFAULT VALUES
00412 Filename = T:\PROJ\959(02)-11\202001 Subml\Design\SWMHYMO\202107 Pre-Dev\Ottawa.val
00413 ICASEGV = 1 (read and print data)
00414 FileTitle= File comment: [Parameters for City of Ottawa Project]
00415 THE FOLLOWING PARAMETERS ARE USED IN THE DESIGN STANDRDY COM
00416 Horton's infiltration equation parameters:
00417 [F= 76.20 mm/hr] [FC=11.20 mm/hr] [CAVE= 4.14 /hr] [P= .00 mm]
00418 Parameters for PERVIOUS surfaces in STANDRDY:
00419 [Iq= 4.67 mm] [Iq=40.00 ml] [IMP= .250]
00420 Parameters for IMPERVIOUS surfaces in STANDRDY:
00421 [Ialmp= 1.57 mm] [ICL= 1.50] [MNI= .013]
00422 Parameters used in WASHD:
00423 [Ia= 4.67 mm] [N= 3.00]
00424 Average monthly Pan Evaporation data in (mm)
00425 JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
00426 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00
00427 Average monthly Potential Evapotranspiration in (mm)
00428 JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
00429 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00
00430 # CN -> CN* based on Ontario Soil Map 58, Nov 1989 MTO Manual Chart H2-6A,
00431 # Lidar data, May 2000 SWMTO USER's Manual, air photos, assume good condition
00432 #
00433 # Time to Peak = 2/3 of PFA Tc
00434 *****
00435 # EXISTING CONDITIONS - Drainage to South Tributary East of Cox County Road
00436 *****
00437 # Existing Drainage from Subject Site to Ottawa River
00438 R0199:CO004#-----Ottaw-TO000#-----SRSha-qPARqms-TpeakData_hh:mm-----9Wm-B.C.---OWFcms
00439 DESIGN WASHD 1.0 01:0CCR 74.30 1.904 No_date 13:21 39.39 .369 .000
00440 [CN= 0.1; N= 3.00; Tc= 1.25]
00441 *****
00442 # STORMS
00443 *****
00444 R0199:CO002#-----
00445 FINISH
-----
00446
00447
00448 WARNINGS / ERRORS / NOTES
00449
00450 Simulation ended on 2021-07-19 at 10:39:03
00451
00452#

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