

**10283 ILBERTON ROAD
SUBDIVISION**

**FUNCTIONAL SERVICING
REPORT**

Prepared For

VALLEYVIEW DEVELOPMENTS INC.

May 26, 2020



1.0 INTRODUCTION

This report has been prepared in support of the proposed draft plan of subdivision application for the property owned by Valleyview Developments Inc. The property is located at 10283 Ilderton Road which is on the south side of Ilderton Road, between Quaker Lane and Coldstream Road, in the hamlet of Coldstream.

A topographic survey was completed to define existing surface features such as existing streets, municipal drains, storm culverts and wells that service the surrounding area of the proposed subdivision. The information was utilized to establish internal servicing for the subdivision, including roads, sewers and stormwater management.

This report outlines the proposed servicing strategy for the subdivision.

All detailed design will be in accordance with the Municipality of Middlesex Centre design standards.

2.0 LOCATION AND DESCRIPTION

The 3.58 hectare parcel of land proposed for residential development is situated on the south side of Ilderton Road, approximately 125m east of Marsh Lane. The subject property abuts existing residential lots to the north, institutional lands to the east and agricultural lands to the south and west (Figure 1).

The development will consist of 2.69ha of developable area for single family residential land use. The remaining lands will be utilized for open space, a stormwater management facility, and right-of-way (Street A).

3.0 SUBDIVISION ACCESS

The subdivision will be accessible at one location, off Ilderton Road in the location of the existing driveway for Municipal No. 10283 Ilderton Road. Ilderton Road will be widened at the entrance to facilitate left and right turning movements into the new subdivision (see Figure 2). Existing pavement markings will be removed, and replaced with relevant markings where required.

The proposed entrance intersects Ilderton Road at a tangential portion south of a horizontal curve. Stopping sight distances have been analyzed for the proposed entrance.

A design speed of 60 km/h was used as per the requirements of section 1.1.1 of the Middlesex Centre design standards, representing the urban section of road having a posted speed of

50km/h. With a design speed of 60km/h the minimum stopping sight distance is 90m as per Figure E3-8 of the Geometric Design Guide for Ontario Highways. It was determined that the existing entrance has an insufficient sight line for both directions due to the boulevard trees at the existing entrance. The sight line distance for southbound traffic can be improved to $\pm 133.8\text{m}$ with the removal of a deciduous tree, a significant improvement from the existing condition. The distance to stop for northbound traffic on Ilderton Road can be improved to at least 160m through the removal of two boulevard trees.

Tree removal at the entrance will provide improvements to the entrance in order to maximize sight lines for the proposed development, exceeding the minimum stopping sight distance requirements. See Appendix A for supporting calculations and figures.

4.0 SANITARY SERVICING

There are no existing sanitary sewers fronting the subdivision. Each lot will require a private septic system, which is in line with existing properties in the area. A report titled 'Soil Testing & Domestic Wastewater Treatment Systems for Proposed Subdivision, 10283 Ilderton Road, Coldstream' has been prepared by BOS Engineering & Environmental Services Inc. in support of the proposed development. Additionally, nitrate calculations can be found in the the "Subsurface Assessment" prepared by EXP Services Inc.

5.0 STORMWATER DRAINAGE

This section will detail the stormwater management strategy for the proposed development.

Hydrologic Modeling

Stormwater drainage and peak flow rates were determined by hydrologic modeling using SWMHYMO 99 (Stormwater Management Hydrologic Model). This program allows the user to test the impact on new and existing systems, utilizing accepted rainfall data to represent design storms of various durations and aid in the design of SWM facilities.

The Middlesex Centre IDF curve parameters were used for the rainfall data. The 3 hour, Chicago Storm Distribution model, with a time to peak ratio of 0.38, was used for determining peak flow rates and storage requirements for meeting the stormwater management targets. Additionally, the 250 year 24 hour SCS Type II storm event was analyzed.

Table 1 – Middlesex Centre Chicago Distribution Storm Parameters

Storm Event	A	B	C
2 Year	724.69	5.500	0.800
5 Year	1330.31	7.938	0.855
10 Year	1497.19	7.188	0.850
25 Year	1455.00	5.000	0.820
50 Year	1499.06	4.188	0.809
100 Year	1499.53	3.297	0.794
250 Year**	3048.22	10.030	0.888

**City of London 250 Year Storm Event

The modeling parameters and SWMHYMO output can be seen in the Appendices.

5.1. Existing Drainage

The subject property is primarily a residential land use with a gravel driveway, grassed lawn and an existing residential dwelling. The Subsurface Assessment completed by EXP Services Inc. includes borehole logs that illustrate that the subsurface soils are predominantly ‘clayed silt till’. These soils are known to have high runoff potential. Parameters for pre development analyses were assigned accordingly.

Drainage from an upstream external area (27.85ha) consisting of agricultural lands, woodlands and a small amount of institutional lands is also conveyed through the subject property.

Runoff from the subject lands and external area drain in a westerly direction, crossing through a neighbouring agricultural property, then onto the Municipal Office Property at 10227 Ilderton Road. Runoff will pass through a series of 1200 diameter culverts and continue in a southwest direction toward the Sydenham River (Figure 3).

The pre development drainage area under consideration is 31.47ha, which includes the 27.85ha external area (Figure 3). The pre development flows to the neighbouring property are given in the table below.

Table 2 – Pre development Flows

Storm Event	Flow (m³/s)
2 Year	0.350
5 Year	0.689
10 Year	0.911
25 Year	1.153
50 Year	1.342
100 Year	1.530
250 Year	2.152
250 Year-24hr	2.248

See Appendix B for a summary pre development modelling parameters and results.

The downstream ditch and culverts have limited capacity to convey pre development major system flows. It is expected that the properties in close proximity to the downstream culverts experience ponding under the pre development condition.

5.2. Proposed Drainage

The design of the proposed stormwater management measures (quantity and quality) follows criteria presented in the Middlesex Centre *Stormwater Management Policy Manual* (June 2011).

The proposed subdivision (3.58ha) will consist of 13 residential lots having split drainage, 1 stormwater management block, Street 'A', and an open space block containing a grassed channel to convey external drainage.

Stormwater management quantity controls will be provided by a SWM facility (dry pond), in conjunction with lot level controls (exfiltration trenches). The dry pond will be located west of Street 'A', between lot 11 and 12 (Figure 4). The pond will service 3.31ha including; Street 'A', a portion of 13 lots and an external area. A diversion channel will convey drainage from external lands, and backyards on the east side of Street A (27.58ha) through the site, bypassing the pond.

Sufficient storage is provided within the dry pond, and exfiltration trenches on each lot, such that total post development peak flow rates from the site are less than pre development levels.

5.2.1. Stormwater Management Pond

The 3.31ha drainage area tributary to the pond (Figure 4) includes a 2.69ha area internal to the subdivision, comprised of the Street 'A' right-of-way, a portion of 13 residential lots and the SWM pond, along with a 0.62ha area of agricultural land.

INTERNAL TRIBUTARY AREA

The 2.69ha internal tributary area has been assigned a 21.47% level of imperviousness for modelling purposes, which will conservatively represent the road, sidewalk and driveways. The exfiltration trench on each lot will be required to attenuate runoff generated by additional hard surface areas on each lot. Stormwater runoff will enter the pond through a storm sewer network for the minor storm event (2 year storm) and an overland flow route for major storm events.

EXTERNAL TRIBUTARY AREA

The runoff generated by the 0.62ha external area will be conveyed to the pond through a rear yard grassed swale from Lots 7 to 11.

SWM POND DETAILS

The proposed SWM Block will accommodate a Dry Pond having a maximum depth of 1.67m and 4:1 side slopes, providing a total storage volume of approximately 1,231m³.

The pond outlet will consist of a headwall with a 190mm diameter steel plate orifice controlling discharge to a 300mm outlet pipe set at the pond bottom (elevation 246.55m) and a second steel plate orifice, 300mm diameter, controlling discharge to a 450mm outlet pipe at elevation 247.15m (Figure 5 and 6). An overflow weir will be set at elevation 248.10m, providing 0.35m of freeboard above the 100 year water level. See Table 3 for the pond performance.

Table 3 - SWM Pond Performance

STORM EVENT	MAXIMUM STORAGE (m ³)	WATER ELEVATION (m)	190 ORIFICE DISCHARGE (m ³ /s)	300 ORIFICE DISCHARGE (m ³ /s)	COMBINED DISCHARGE (m ³ /s)
2 Year	207	247.12	0.051	0.000	0.051
5 Year	388	247.36	0.065	0.025	0.090
10 Year	475	247.47	0.070	0.065	0.135
25 Year	565	247.58	0.075	0.094	0.169
50 Year	642	247.66	0.078	0.111	0.189
100 Year	721	247.75	0.082	0.124	0.206
250 Year	1005	248.01	0.091	0.161	0.252
250 Year-24hr	966	247.98	0.090	0.157	0.247

Discharge from the pond will combine with flows bypassing the pond through the diversion channel and exit the site to the west.

5.2.2. Lot Level Controls

Each lot will be equipped with an exfiltration trench to attenuate the runoff generated as a result of additional impervious areas (hard surfaces) such as roofs and patios, etc. The trench will also provide nitrate dilution improvements for septic system discharge.

MIDUSS was used to model a typical exfiltration trench. The Trench Command considers the Hydraulic Conductivity of the subsurface material and the trench dimensions when calculating an infiltrated flow.

The Percolation Time of the native material, determined by others, is 50 minutes/centimeter which can be used to derive the field hydraulic conductivity in accordance with Appendix C of the *Low Impact Development Stormwater Management Planning and Design Guide*. The field hydraulic conductivity of 1x10⁻⁶ centimetres/second is interpolated from Table C1. Using a

factor of safety of 2.5, the design hydraulic conductivity is 4×10^{-7} centimeters/second (0.0144 millimeters/hour).

The exfiltration trenches will have a catchbasin inlet, with 35m of perforated 450mm diameter pipe to distribute flow to the trench. The trenches are to be 1.5m wide and 1.45m high, set at 0.7m below the invert of the perforated pipe. Triple wash clear stone, 50mm in diameter, with a void ratio of at least 0.30 should be used within the trench (Figure 9).

Sizing is based on a hard surface area of 350 m² for a typical lot, generating 25.6m³ of impervious runoff for the 250 year storm event. The Exfiltration trench performance can be seen in Table 4 below. For the analysis, the proposed ground elevation was set at 100.00m as datum.

Table 4 – Exfiltration Trench Performance

STORM EVENT	IMPERV AREA (m ²)	TRENCH BOTTOM ELEV. (m)	PERF. PIPE INV. ELEV. (m)	MAX WATER ELEV. IN TRENCH (m)	MAX STORAGE VOL (m ³)
250 Year	350	97.5	98.20	98.86	25.19

Sufficient storage is to be provided on each lot to attenuate additional runoff volume generated by impervious areas. The exfiltration trench sizing will need to be reassessed if the impervious area on the lot exceeds 350 m².

A storm PDC will be connected at elevation 98.90m to provide an outlet directly to the storm sewer where possible. An overland flow route to Street 'A' will be provided for additional runoff generated by pervious areas.

5.2.3. Drainage Bypassing Pond

A 27.58ha drainage area will generate runoff that bypasses the pond; consisting of the external area to southeast (26.88ha) and backyards from Lot 1 to 6 (0.70ha). These flows will be conveyed through a diversion channel and cross Street 'A' through an 875x1350 Elliptical culvert. The backyards of Lot 12 and 13, west of Street 'A' and the area of the diversion channel will also bypass the pond uncontrolled. The 0.54ha area will primarily travel in a southwesterly direction toward the neighbouring property.

As mentioned, drainage bypassing the pond (uncontrolled) will combine with discharge from the pond (controlled) at the subdivision limit and exit the subdivision to the west. A grassed channel will be constructed through the neighbouring property, to connect to the existing downstream ditch. Consent will be sought from the neighbouring property owner as required to

complete the work. Under severe storm events, it is expected that ponding on downstream neighbouring properties will continue.

The combined post development peak flows to the neighbouring property can be seen in Table 5.

Table 5 – Post Development Flows

STORM EVENT	PRE DEV.. FLOW (m ³ /s)	POND DISCHARGE (m ³ /s)	BYPASSING DISCHARGE (m ³ /s)	TOTAL DISCHARGE (m ³ /s)
2 Year	0.350	0.051	0.295	0.344
5 Year	0.689	0.090	0.589	0.669
10 Year	0.911	0.135	0.782	0.883
25 Year	1.153	0.169	0.993	1.128
50 Year	1.342	0.189	1.161	1.320
100 Year	1.530	0.206	1.325	1.505
250 Year	2.152	0.252	1.874	2.104
250 Year-24hr	2.248	0.247	1.970	2.199

5.2.4. Quality Controls

Stormwater quality will address the MOE “enhanced” level of protection, which is the long-term average removal of 80% of suspended solids. A treatment unit will be located at the inlet to the proposed dry pond.

The drainage area tributary to the oil grit separator is 2.09ha requiring water quality protection. With an overall imperviousness of 26.7%, the impervious area served by the Stormceptor is 0.56ha (shown in red on Figure 10). The Stormceptor model STC-2000 or approved equal, will achieve an 82% annual removal of suspended solids. The Stormceptor report can be found in Appendix D.

5.3. Summary

The proposed development will utilize an on-site dry pond, exfiltration trenches and diversion channel to attenuate post development peak flows exiting the site to less than pre development levels. A Stormceptor STC-2000 (or approved equal) oil grit separator will provide the ‘Enhanced’ level of water quality treatment.

External works are required on the neighbouring property for regrading to create a properly defined channel for conveying drainage to the west.

6.0 Water Distribution

Each lot will be serviced by a private well. The Subsurface Assessment prepared by EXP Services Inc. discusses the availability of potable groundwater in the area. The potable wells on each lot will be located such that they meet the 15m setback requirement from septic beds under the Ontario Building Code.

7.0 Conclusion

The proposed development will direct storm runoff westerly to the existing ditch on the neighbouring property, which will be regraded to better define the flow path to convey drainage. Each lot will be equipped with a private septic system and potable well. All detailed engineering design will be completed in accordance with Middlesex Centre Infrastructure Design Standards.

We trust that this satisfies your requirements for Draft Condition approval. If you have any questions or require additional information please contact our office.

Prepared By:

Archibald Gray & McKay Engineering Ltd.

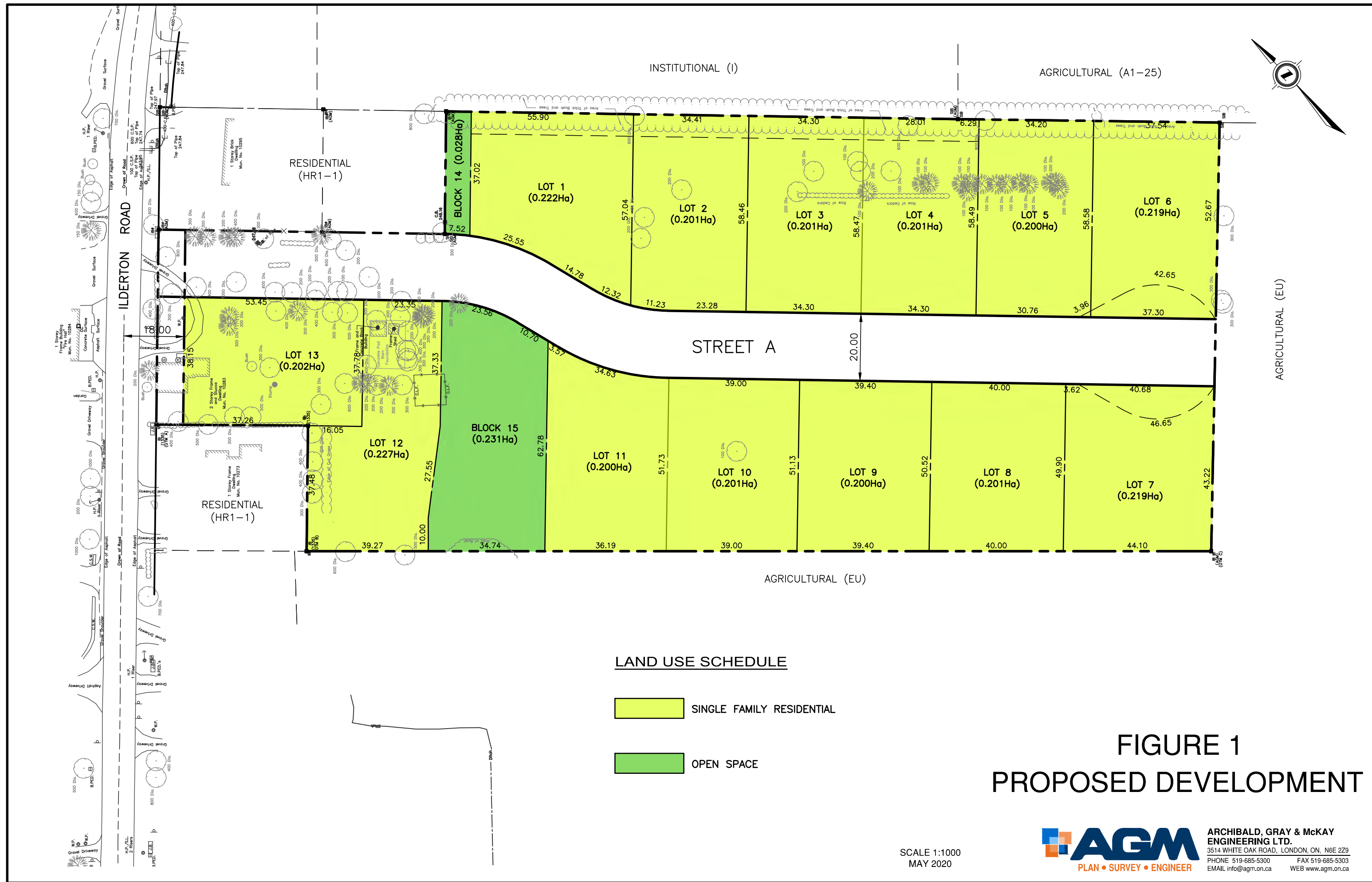


Lukas Grabowski, EIT



Steve Brown, P.Eng.
Engineering Design Manager

FIGURES



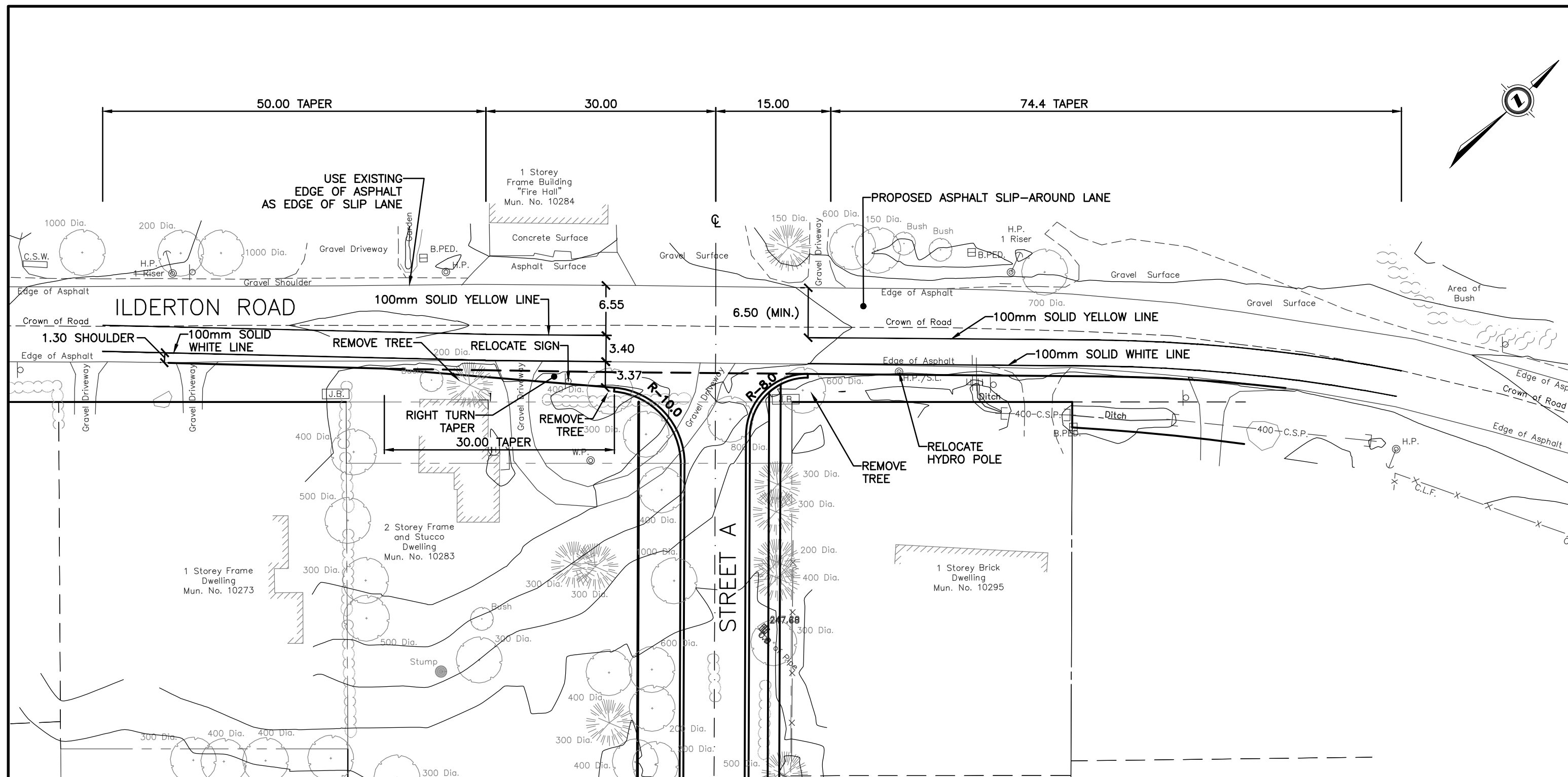


FIGURE 2
PROPOSED ENTRANCE

SCALE 1:500
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ARCHIBALD, GRAY & MCKAY
ENGINEERING LTD.
3514 WHITE OAK ROAD, LONDON, ON, N6E 2Z9
PHONE 519-685-5300 FAX 519-685-5303
EMAIL info@agm.on.ca WEB www.agm.on.ca



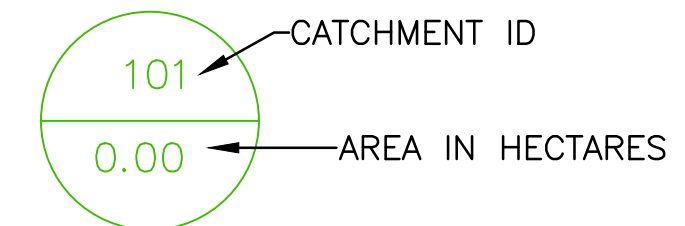
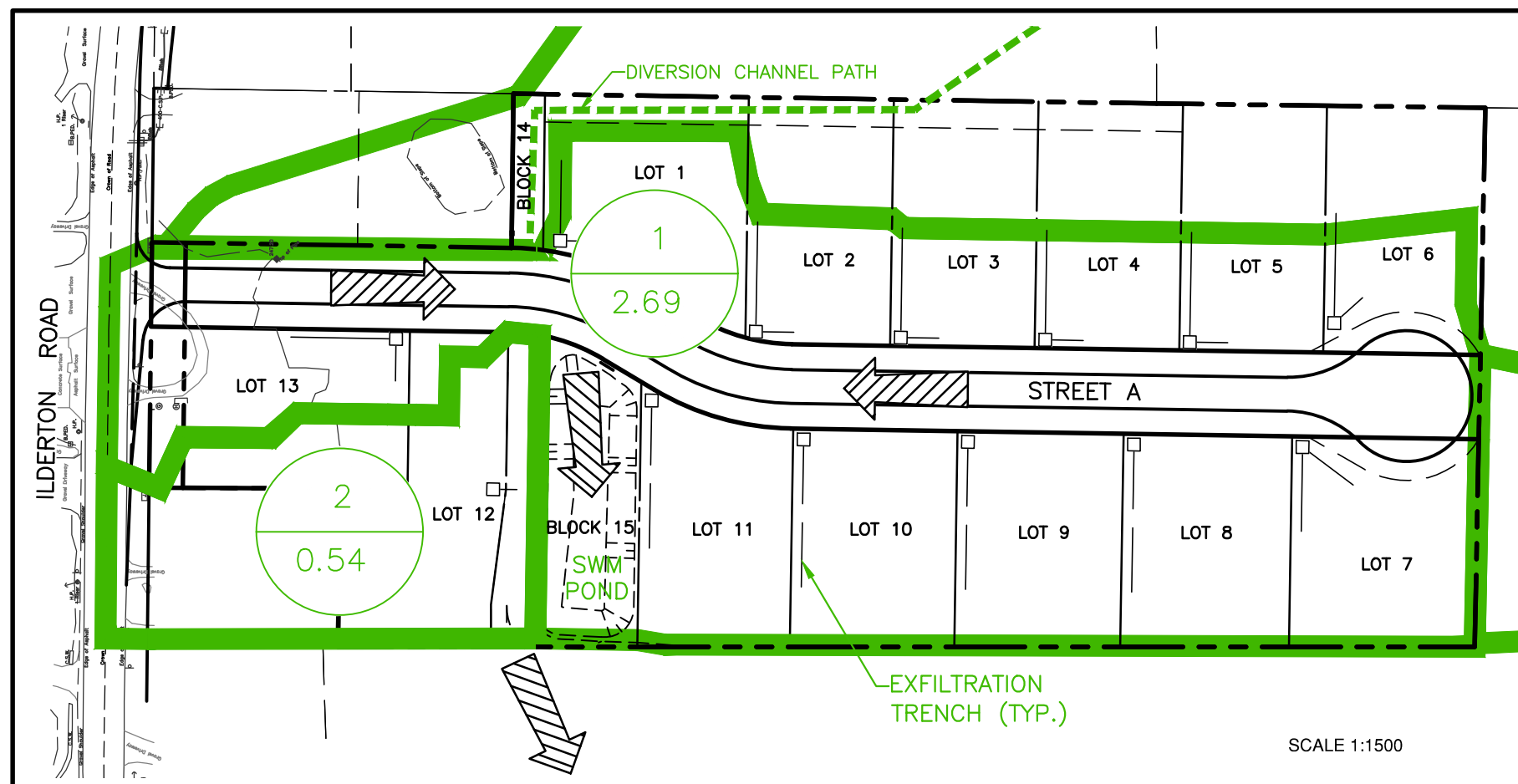
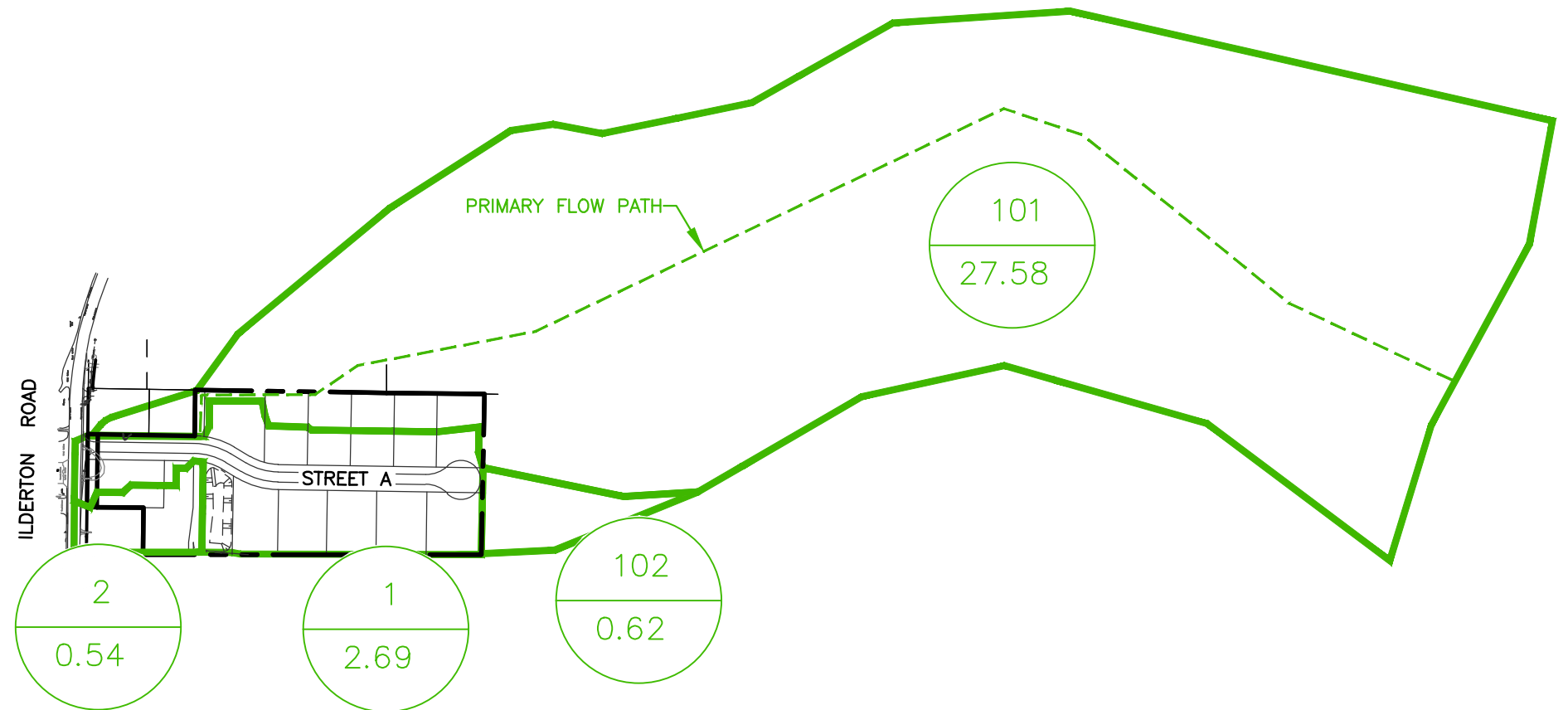
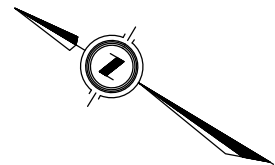
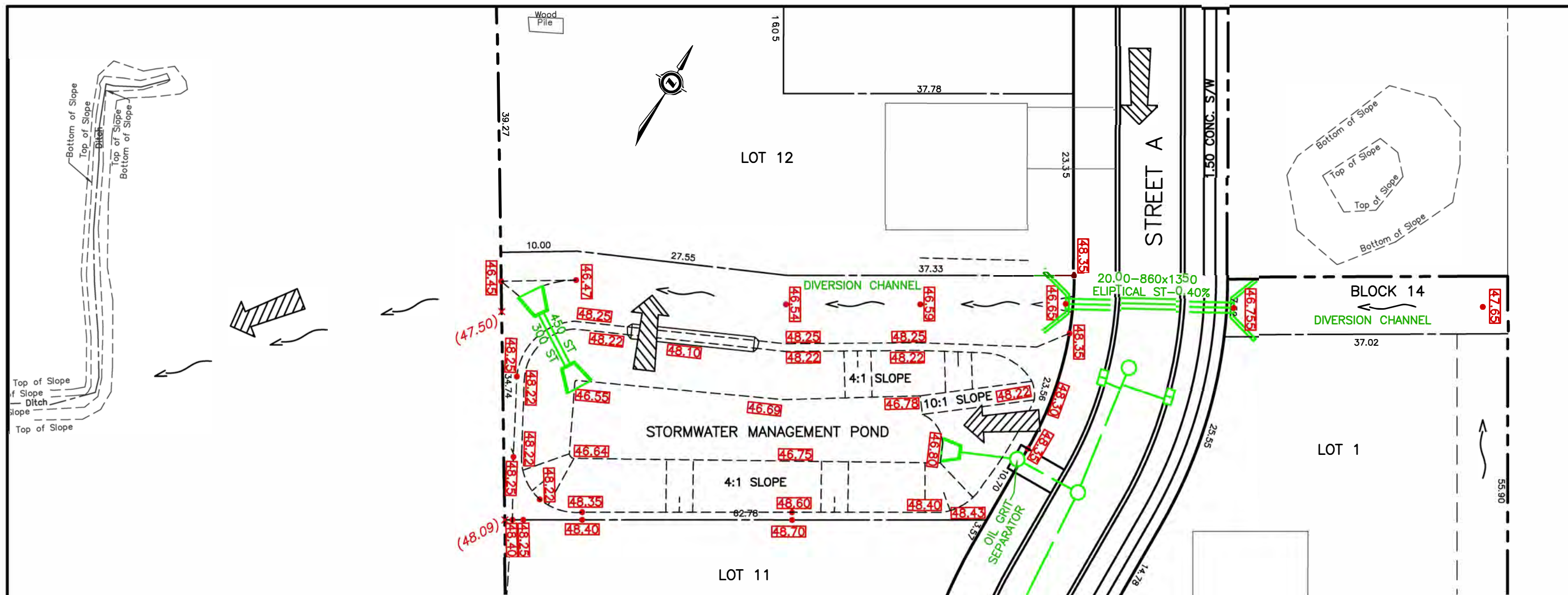


FIGURE 4
POST DEVELOPMENT



3514 WHITE OAK ROAD, LONDON, ON, N6E 2Z9
PHONE 519-685-5300 FAX 519-685-5303
EMAIL info@agm.on.ca WEB www.agm.on.ca

SCALE 1:5000
MAY 2020



WATER ELEVATIONS

2 Year Storm	247.12
5 Year Storm	247.36
10 Year Storm	247.47
25 Year Storm	247.58
50 Year Storm	247.66
100 Year Storm	247.75
250 Year Storm	248.04
250 Year-24 hour	247.98

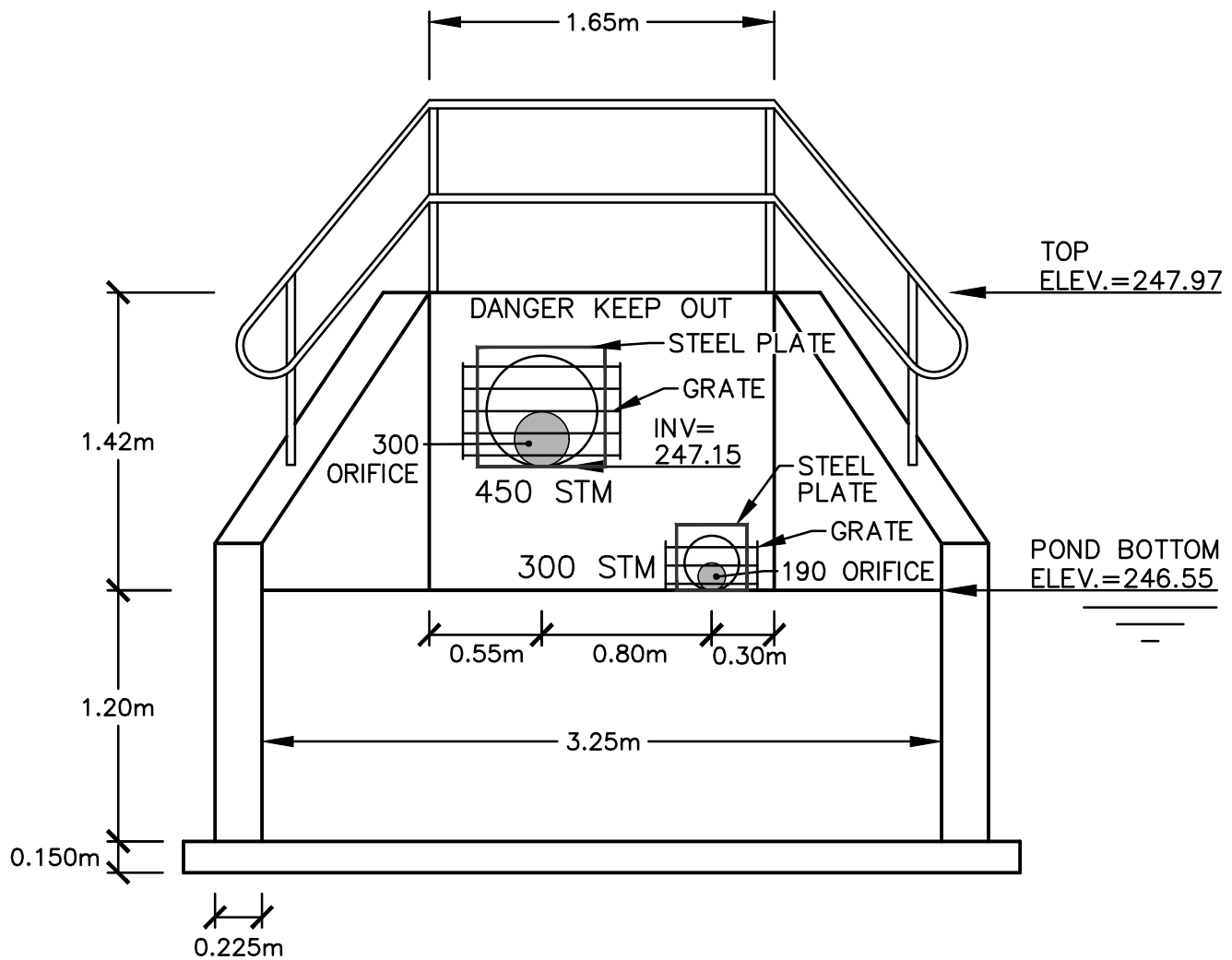
- 52.00 • PROPOSED ELEVATION
- (52.00) x EXISTING ELEVATION
- PROPOSED SWALE
- PROPOSED OVERLAND FLOW ROUTE

FIGURE 5
STORM WATER
MANAGEMENT POND

SCALE 1:500
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**ARCHIBALD, GRAY & McKAY
ENGINEERING LTD.**
3514 WHITE OAK ROAD, LONDON, ON, N6E 2Z9
PHONE 519-685-5300 FAX 519-685-5303
EMAIL info@agm.on.ca WEB www.agm.on.ca



OPSD 804.040 FOR A 1200Ø PIPE (MODIFIED FOR TWO PIPES)

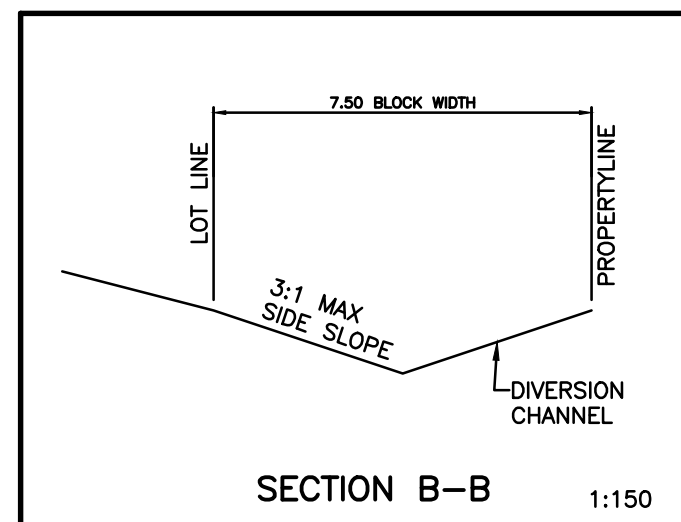
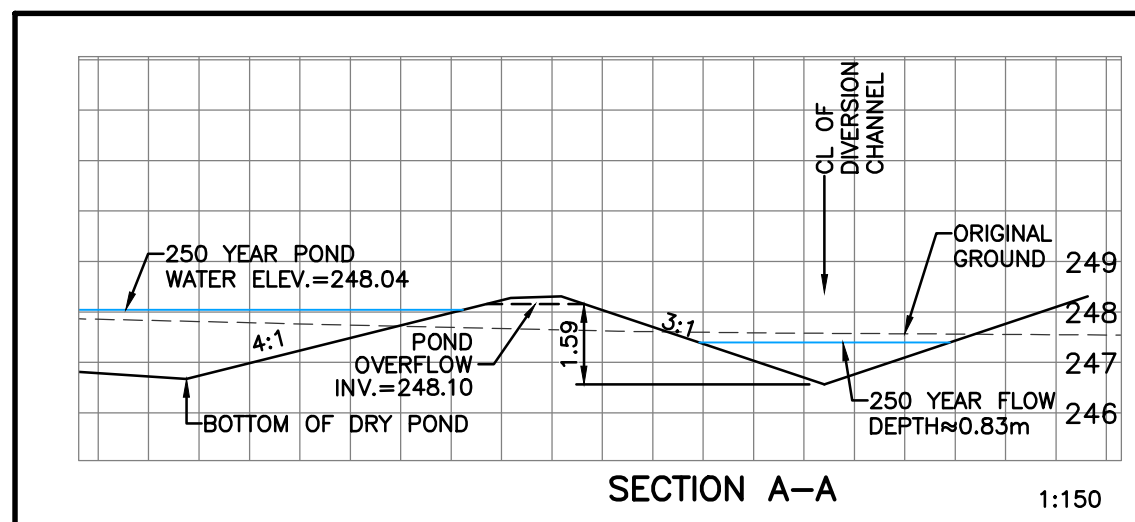
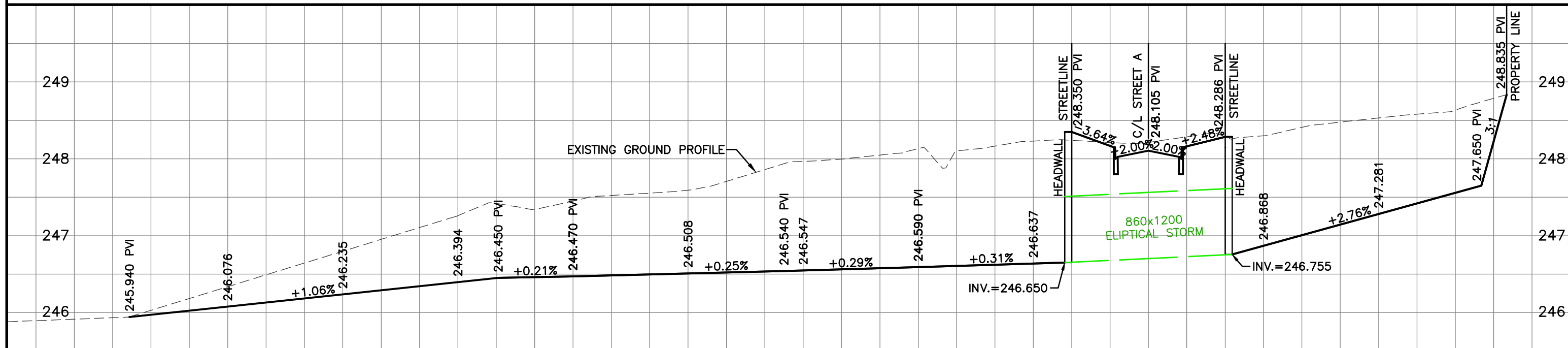
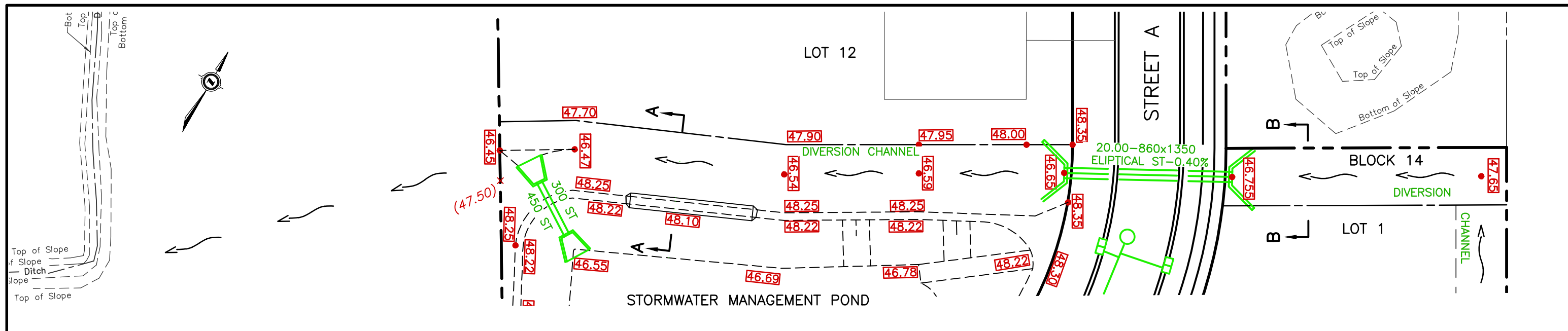
FIGURE 6

OUTLET STRUCTURE DETAIL

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NOT TO SCALE



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ENGINEERING LTD.**
3514 WHITE OAK ROAD, LONDON, ON, N6E 2Z9
PHONE 519-685-5300 FAX 519-685-5303
EMAIL info@agm.on.ca WEB www.agm.on.ca



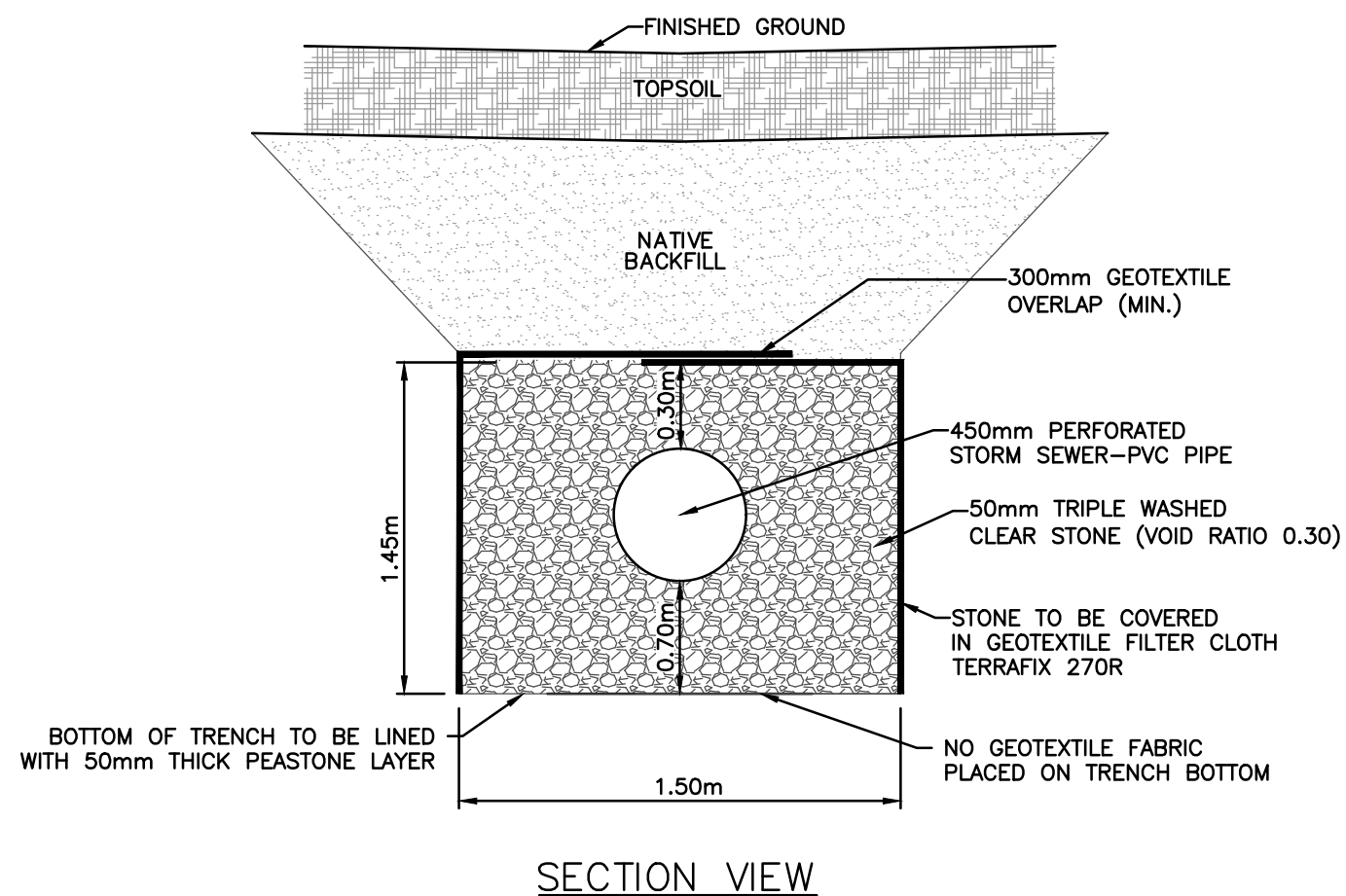
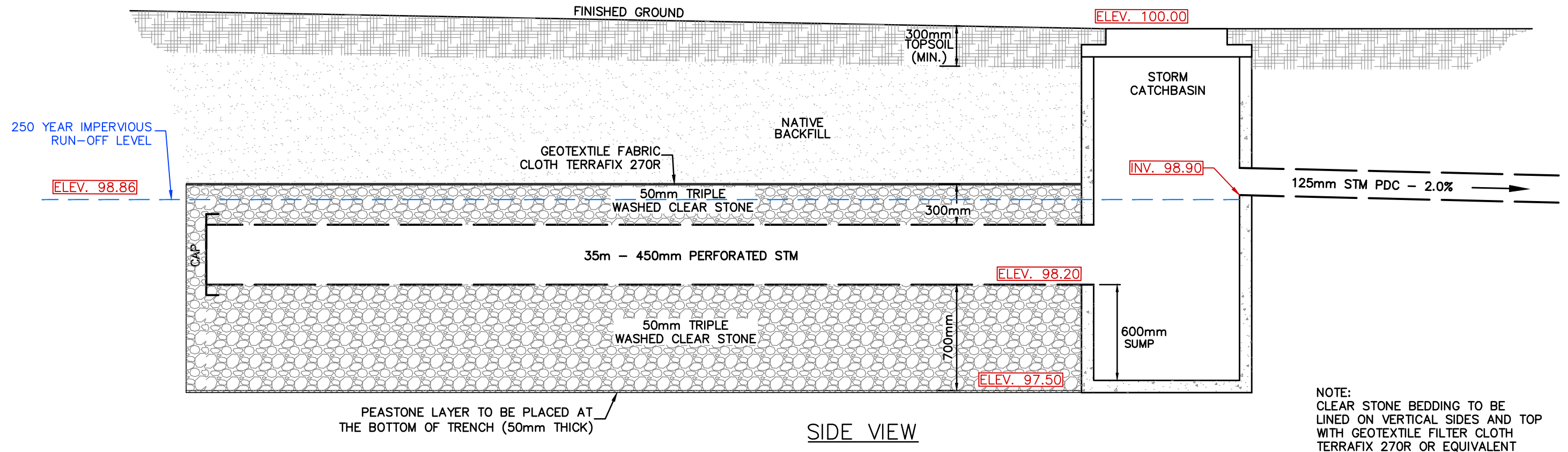
- 52.00 • PROPOSED ELEVATION
- (52.00) x EXISTING ELEVATION
- ← PROPOSED SWALE

FIGURE 7
DIVERSION CHANNEL



ARCHIBALD, GRAY & MCKAY
ENGINEERING LTD.
3514 WHITE OAK ROAD, LONDON, ON, N6E 2Z9
PHONE 519-685-5300 FAX 519-685-5303
EMAIL info@agm.on.ca WEB www.agm.on.ca

SCALE 1:500
MAY 2020



**FIGURE 9
TYPICAL EXFILTRATION
TRENCH**

N.T.S.
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PHONE 519-685-5300 FAX 519-685-5303
EMAIL info@agm.on.ca WEB www.agm.on.ca

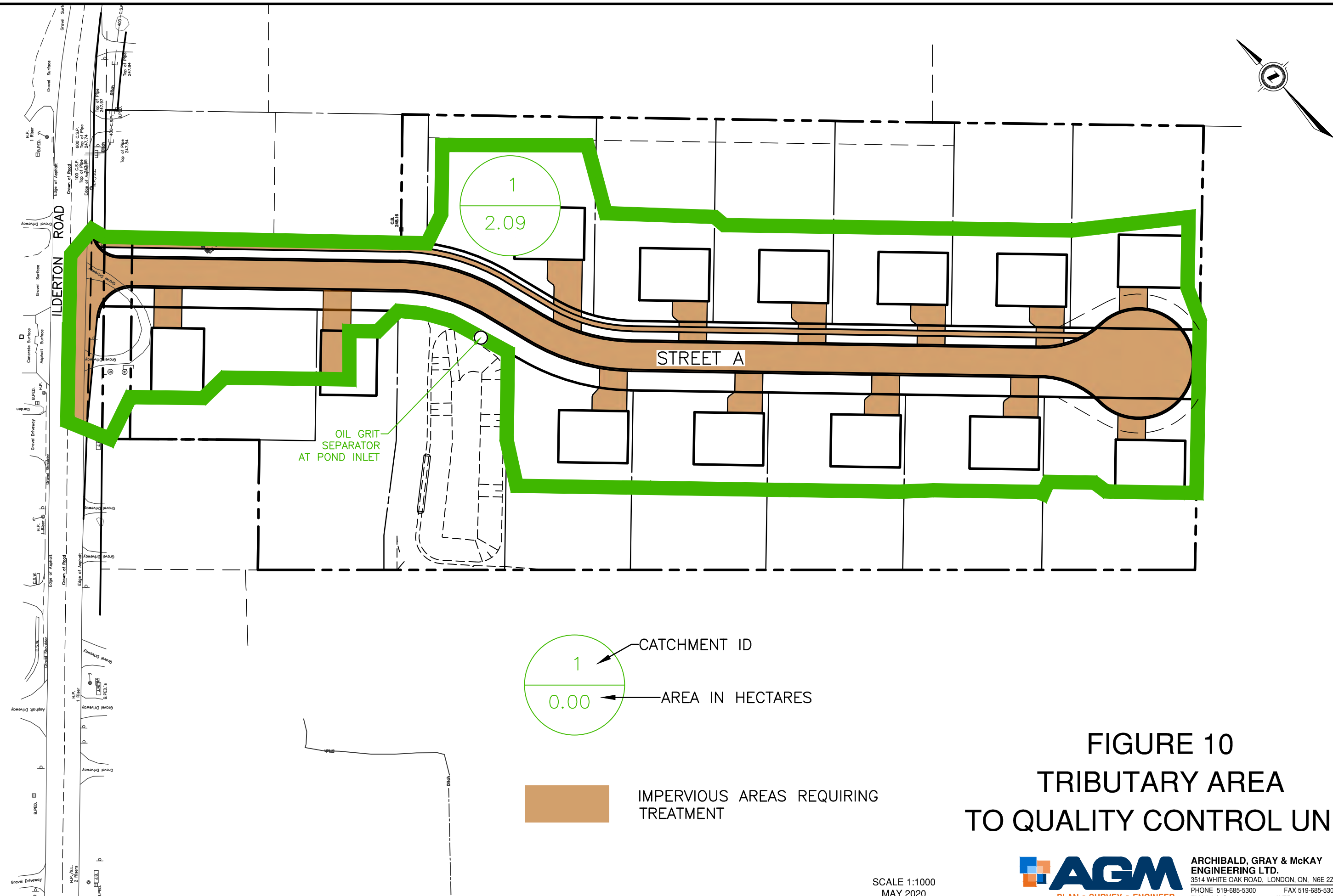


FIGURE 10
TRIBUTARY AREA
TO QUALITY CONTROL UNIT

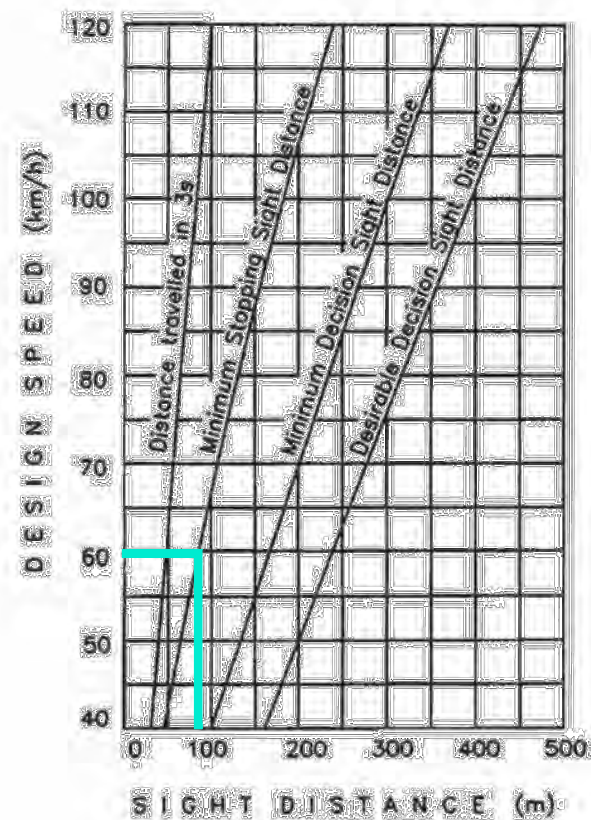
SCALE 1:1000
MAY 2020



ARCHIBALD, GRAY & MCKAY
ENGINEERING LTD.
3514 WHITE OAK ROAD, LONDON, ON, N6E 2Z9
PHONE 519-685-5300 FAX 519-685-5303
EMAIL info@agm.on.ca WEB www.agm.on.ca

APPENDIX A

Stopping Sight Distance



STOPPING SIGHT DISTANCE

**ARCHIBALD, GRAY & McKAY
ENGINEERING LTD.**
3514 WHITE OAK ROAD, LONDON, ON, N6E 2Z9
PHONE 519-685-5300 FAX 519-685-5303
EMAIL info@agm.on.ca WEB www.agm.on.ca

APPENDIX B

Stormwater Management Pre Development Model

PRE DEVELOPMENT MODELING DATA
CALIB NASH HYDROGRAPH (RURAL PERVIOUS AREAS)

CATCHMENT NO.	AREA (ha)	SCS CURVE #	BASE FLOW (cms)	Initial Abstraction (mm)	Time to Peak (hrs)	Time of concentration (hrs)	Time of concentration (hrs)	Time of concentration (hrs)	Runoff Coef., C	Watershed Length, L (m)	Watershed Slope, (%)	Velocity From Uplands Method Figure (m/s)
101	31.47	83	0.000	7.5	0.859	1.699	1.442	1.156	0.20	1206.9	1	0.29

0.6 x Tc(avg) Airport Method SCS Method Uplands Method Tc=(Length/Velocity)

PRE DEVELOPMENT MODEL FLOW SUMMARY

	TOTAL FLOW
2	0.350
5	0.689
10	0.911
25	1.153
50	1.342
100	1.530
250	2.152
250-24hr	2.248

Airport Method

$$T_c = \frac{3.26(1.1 - C)L^{0.5}}{S^{0.33}}$$

SCS Method

$$T_c = \frac{2.58L^{0.8}[(1000/CN) - 9]^{0.7}}{1900S^{0.5}} \times 100$$

Land Use	SCS CURVE #	Initial Abstraction (mm)	Area (sq.m.)
Agricultural	84	7	191722.1
lawn	86	5	40368.07
Wood lot	77	10	82577.13
Compund	83	7.5	314667.3

Pre Development

Catch 101
 $V=0.29\text{m/s}$

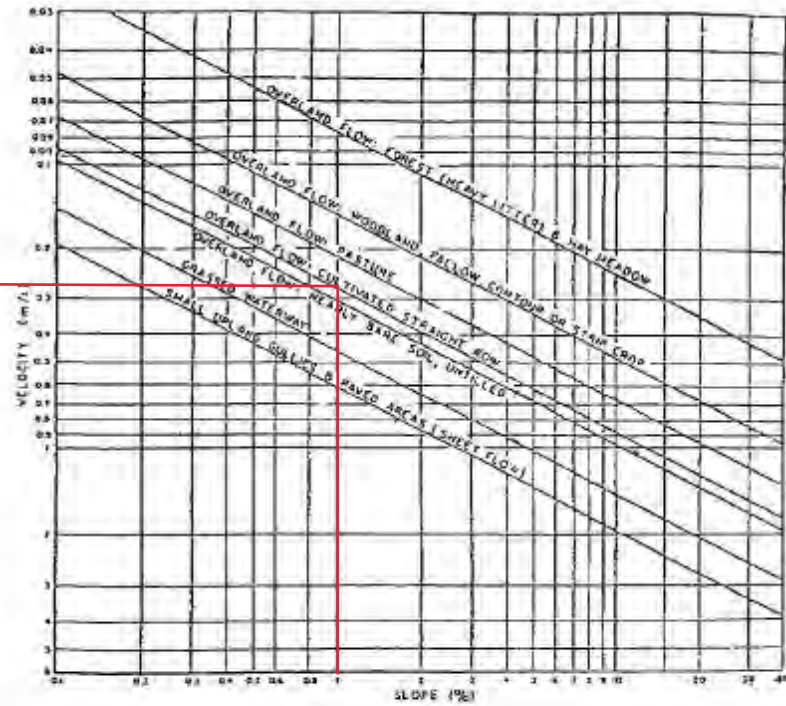


FIGURE 1 UPLANDS METHOD OF ESTIMATING TIME OF CONCENTRATION (SCS NATIONAL ENGINEERING HANDBOOK, 1971)

2 Year Storm

SSSSS W W M M H H Y Y M M 000 999 999 =====
S W W W M M H H Y Y M M 0 0 9 9 9 9
SSSSS W W W M M M H H H H Y M M M 0 0 ## 9 9 9 9 Ver 4.05
S W W M M H H Y M M 0 0 9999 9999 Sept 2011
SSSSS W W M M H H Y M M 000 9 9 9 =====
9 9 9 9 # 2957874
StormWater Management Hydrologic Model 999 999 =====

***** SWMHYMO Ver/4.05 *****
***** A single event and continuous hydrologic simulation model *****
***** based on the principles of HYMO and its successors *****
***** OTTHYMO-83 and OTTHYMO-89. *****
***** Distributed by: J.F. Sabourin and Associates Inc. *****
***** Ottawa, Ontario: (613) 836-3884 *****
***** Gatineau, Quebec: (819) 243-6858 *****
***** E-Mail: swmhymo@jfsa.Com *****

++++++ Licensed user: AGM Engineering Ltd. ++++++
++++++ London SERIAL#:2957874 ++++++
++++++

***** PROGRAM ARRAY DIMENSIONS *****
***** Maximum value for ID numbers : 10 *****
***** Max. number of rainfall points: 105408 *****
***** Max. number of flow points : 105408 *****

***** D E T A I L E D O U T P U T *****

* DATE: 2020-04-14 TIME: 11:20:52 RUN COUNTER: 000330 *

* Input filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre002yr.dat *
* Output filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre002yr.out *
* Summary filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre002yr.sum *
* User comments: *
* 1: *
* 2: *
* 3: *

001:0001-----
*#*****
*# Project Name: [10283 ILDERTON ROAD] Project Number: [1430-1]
*# Date : 04-06-2020
*# Modeller : [LRG]
*# Company : AGM Engineering Ltd.
*# License # : 2957874
*#*****

| START | Project dir.: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\
----- Rainfall dir.: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\
TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 001
NSTORM= 0

001:0002-----
* ["] <--storm filename, one per line for NSTORM time

| CHICAGO STORM | IDF curve parameters: A= 724.690

| Ptotal= 33.31 mm | B= 5.500
----- C= .800
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = .38

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.08	2.621	.83	8.023	1.58	9.859	2.33	3.744
.17	2.815	.92	10.810	1.67	8.265	2.42	3.518
.25	3.045	1.00	16.773	1.75	7.130	2.50	3.320
.33	3.321	1.08	37.614	1.83	6.281	2.58	3.145
.42	3.659	1.17	110.459	1.92	5.622	2.67	2.989
.50	4.082	1.25	44.943	2.00	5.096	2.75	2.849
.58	4.630	1.33	24.030	2.08	4.666	2.83	2.723
.67	5.367	1.42	16.238	2.17	4.307	2.92	2.609
.75	6.414	1.50	12.255	2.25	4.004	3.00	2.504

001:0003-----
*
*#OVERALL AREA INCLUDING EXTERNAL WITH A COMPOUND CN AND INITIAL ABSTRACTION TO
*#REFLECT DIFFERING LAND USE (PRIMARILY AGRICULTURAL, LAWN AND WOODLOT)
*
*

| CALIB NASHYD | Area (ha)= 31.47 Curve Number (CN)=83.00
| 01:CATCH DT= 1.00 | Ia (mm)= 7.500 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= .859

Unit Hyd Qpeak (cms)= 1.399

PEAK FLOW (cms)= .350 (i)
TIME TO PEAK (hrs)= 2.367
RUNOFF VOLUME (mm)= 8.559
TOTAL RAINFALL (mm)= 33.311
RUNOFF COEFFICIENT = .257

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0004-----
FINISH

***** WARNINGS / ERRORS / NOTES *****

Simulation ended on 2020-04-14 at 11:20:52
=====

5 Year Storm

SSSSS W W M M H H Y Y M M 000 999 999 =====
S W W W M M H H Y Y M M 0 0 9 9 9 9
SSSSS W W W M M M H H H H Y M M M 0 0 ## 9 9 9 9 Ver 4.05
S W W M M H H Y M M 0 0 9999 9999 Sept 2011
SSSSS W W M M H H Y M M 000 9 9 9 =====
9 9 9 9 # 2957874
StormWater Management Hydrologic Model 999 999 =====

***** SWMHYMO Ver/4.05 *****
***** A single event and continuous hydrologic simulation model *****
***** based on the principles of HYMO and its successors *****
***** OTTHYMO-83 and OTTHYMO-89. *****
***** Distributed by: J.F. Sabourin and Associates Inc. *****
***** Ottawa, Ontario: (613) 836-3884 *****
***** Gatineau, Quebec: (819) 243-6858 *****
***** E-Mail: swmhymo@jfsa.Com *****

++++++ Licensed user: AGM Engineering Ltd. ++++++
++++++ London SERIAL#:2957874 ++++++
++++++

***** +++++ PROGRAM ARRAY DIMENSIONS +++++ *****
***** Maximum value for ID numbers : 10 *****
***** Max. number of rainfall points: 105408 *****
***** Max. number of flow points : 105408 *****

***** D E T A I L E D O U T P U T *****

* DATE: 2020-04-14 TIME: 11:21:42 RUN COUNTER: 000331 *

* Input filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre005yr.dat *
* Output filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre005yr.out *
* Summary filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre005yr.sum *
* User comments: *
* 1: *
* 2: *
* 3: *

001:0001-----
*#*****
*# Project Name: [10283 ILDERTON ROAD] Project Number: [1430-1]
*# Date : 04-06-2020
*# Modeller : [LRG]
*# Company : AGM Engineering Ltd.
*# License # : 2957874
*#*****

| START | Project dir.: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\
----- Rainfall dir.: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\
TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 001
NSTORM= 0

001:0002-----
* [" "] <--storm filename, one per line for NSTORM time

| CHICAGO STORM | IDF curve parameters: A=1330.310

| Ptotal= 45.37 mm | B= 7.938
----- C= .855
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = .38

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.08	2.913	.83	10.664	1.58	13.500	2.33	4.400
.17	3.164	.92	14.992	1.67	11.032	2.42	4.094
.25	3.464	1.00	24.437	1.75	9.304	2.50	3.828
.33	3.830	1.08	56.256	1.83	8.033	2.58	3.595
.42	4.285	1.17	149.041	1.92	7.063	2.67	3.390
.50	4.867	1.25	67.155	2.00	6.300	2.75	3.207
.58	5.635	1.33	35.894	2.08	5.685	2.83	3.044
.67	6.692	1.42	23.589	2.17	5.180	2.92	2.897
.75	8.233	1.50	17.267	2.25	4.758	3.00	2.765

001:0003-----
*
*#OVERALL AREA INCLUDING EXTERNAL WITH A COMPOUND CN AND INITIAL ABSTRACTION TO
*#REFLECT DIFFERING LAND USE (PRIMARILY AGRICULTURAL, LAWN AND WOODLOT)
*
*

| CALIB NASHYD | Area (ha)= 31.47 Curve Number (CN)=83.00
| 01:CATCH DT= 1.00 | Ia (mm)= 7.500 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= .859

Unit Hyd Qpeak (cms)= 1.399

PEAK FLOW (cms)= .689 (i)
TIME TO PEAK (hrs)= 2.283
RUNOFF VOLUME (mm)= 15.954
TOTAL RAINFALL (mm)= 45.371
RUNOFF COEFFICIENT = .352

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0004-----
FINISH

***** WARNINGS / ERRORS / NOTES *****

Simulation ended on 2020-04-14 at 11:21:42
=====

10 Year Storm

SSSSS W W M M H H Y Y M M 000 999 999 =====
S W W W M M H H Y Y M M 0 0 9 9 9 9
SSSSS W W W M M M H H H H Y M M M 0 0 ## 9 9 9 9 Ver 4.05
S W W M M H H Y M M 0 0 9999 9999 Sept 2011
SSSSS W W M M H H Y M M 000 9 9 9 =====
9 9 9 9 # 2957874
StormWater Management Hydrologic Model 999 999 =====

***** SWMHYMO Ver/4.05 *****
***** A single event and continuous hydrologic simulation model *****
***** based on the principles of HYMO and its successors *****
***** OTTHYMO-83 and OTTHYMO-89. *****
***** Distributed by: J.F. Sabourin and Associates Inc. *****
***** Ottawa, Ontario: (613) 836-3884 *****
***** Gatineau, Quebec: (819) 243-6858 *****
***** E-Mail: swmhymo@jfsa.Com *****

++++++ Licensed user: AGM Engineering Ltd. ++++++
++++++ London SERIAL#:2957874 ++++++
++++++

***** +++++ PROGRAM ARRAY DIMENSIONS +++++ *****
***** Maximum value for ID numbers : 10 *****
***** Max. number of rainfall points: 105408 *****
***** Max. number of flow points : 105408 *****

***** D E T A I L E D O U T P U T *****

* DATE: 2020-04-14 TIME: 11:22:05 RUN COUNTER: 000332 *

* Input filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre010yr.dat *
* Output filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre010yr.out *
* Summary filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre010yr.sum *
* User comments: *
* 1: *
* 2: *
* 3: *

001:0001-----
*#*****
*# Project Name: [10283 ILDERTON ROAD] Project Number: [1430-1]
*# Date : 04-06-2020
*# Modeller : [LRG]
*# Company : AGM Engineering Ltd.
*# License # : 2957874
*#*****

| START | Project dir.: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\
----- Rainfall dir.: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\
TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 001
NSTORM= 0

001:0002-----
* [" "] <--storm filename, one per line for NSTORM time

| CHICAGO STORM | IDF curve parameters: A=1497.190

| Ptotal= 52.60 mm | B= 7.188
----- C= .850
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = .38

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.08	3.401	.83	12.137	1.58	15.317	2.33	5.093
.17	3.688	.92	16.990	1.67	12.549	2.42	4.745
.25	4.030	1.00	27.637	1.75	10.612	2.50	4.443
.33	4.446	1.08	64.461	1.83	9.186	2.58	4.179
.42	4.963	1.17	178.745	1.92	8.096	2.67	3.945
.50	5.621	1.25	77.233	2.00	7.237	2.75	3.737
.58	6.488	1.33	40.683	2.08	6.545	2.83	3.551
.67	7.679	1.42	26.672	2.17	5.975	2.92	3.383
.75	9.410	1.50	19.545	2.25	5.498	3.00	3.231

001:0003-----
*
*#OVERALL AREA INCLUDING EXTERNAL WITH A COMPOUND CN AND INITIAL ABSTRACTION TO
*#REFLECT DIFFERING LAND USE (PRIMARILY AGRICULTURAL, LAWN AND WOODLOT)
*
*

| CALIB NASHYD | Area (ha)= 31.47 Curve Number (CN)=83.00
| 01:CATCH DT= 1.00 | Ia (mm)= 7.500 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= .859

Unit Hyd Qpeak (cms)= 1.399

PEAK FLOW (cms)= .911 (i)
TIME TO PEAK (hrs)= 2.267
RUNOFF VOLUME (mm)= 20.939
TOTAL RAINFALL (mm)= 52.596
RUNOFF COEFFICIENT = .398

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0004-----
FINISH

***** WARNINGS / ERRORS / NOTES *****

Simulation ended on 2020-04-14 at 11:22:05
=====

25 Year Storm

SSSSS W W M M H H Y Y M M 000 999 999 =====
S W W W M M H H Y Y M M 0 0 9 9 9 9
SSSSS W W W M M M H H H H Y M M M 0 0 ## 9 9 9 9 Ver 4.05
S W W M M H H Y M M 0 0 9999 9999 Sept 2011
SSSSS W W M M H H Y M M 000 9 9 9 =====
9 9 9 9 # 2957874
StormWater Management Hydrologic Model 999 999 =====

***** SWMHYMO Ver/4.05 *****
***** A single event and continuous hydrologic simulation model *****
***** based on the principles of HYMO and its successors *****
***** OTTHYMO-83 and OTTHYMO-89. *****
***** Distributed by: J.F. Sabourin and Associates Inc. *****
***** Ottawa, Ontario: (613) 836-3884 *****
***** Gatineau, Quebec: (819) 243-6858 *****
***** E-Mail: swmhymo@jfsa.Com *****

+++++++ Licensed user: AGM Engineering Ltd. +++++++
+++++++ London SERIAL#:2957874 +++++++
+++++++

***** +++++ PROGRAM ARRAY DIMENSIONS +++++ *****
***** Maximum value for ID numbers : 10 *****
***** Max. number of rainfall points: 105408 *****
***** Max. number of flow points : 105408 *****

***** D E T A I L E D O U T P U T *****

* DATE: 2020-04-14 TIME: 11:22:41 RUN COUNTER: 000333 *

* Input filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre025yr.dat *
* Output filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre025yr.out *
* Summary filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre025yr.sum *
* User comments: *
* 1: *
* 2: *
* 3: *

001:0001-----
*#*****
*# Project Name: [10283 ILDERTON ROAD] Project Number: [1430-1]
*# Date : 04-06-2020
*# Modeller : [LRG]
*# Company : AGM Engineering Ltd.
*# License # : 2957874
*#*****

| START | Project dir.: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\
----- Rainfall dir.: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\
TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 001
NSTORM= 0

001:0002-----
* ["] <--storm filename, one per line for NSTORM time

| CHICAGO STORM | IDF curve parameters: A=1455.000

| Ptotal= 60.38 mm | B= 5.000
----- C= .820
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = .38

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.08	4.299	.83	13.644	1.58	16.893	2.33	6.207
.17	4.628	.92	18.591	1.67	14.069	2.42	5.821
.25	5.018	1.00	29.391	1.75	12.073	2.50	5.484
.33	5.487	1.08	68.962	1.83	10.590	2.58	5.187
.42	6.062	1.17	220.223	1.92	9.444	2.67	4.922
.50	6.787	1.25	83.137	2.00	8.532	2.75	4.685
.58	7.728	1.33	42.821	2.08	7.790	2.83	4.472
.67	9.001	1.42	28.399	2.17	7.173	2.92	4.279
.75	10.823	1.50	21.179	2.25	6.652	3.00	4.103

001:0003-----
*
*#OVERALL AREA INCLUDING EXTERNAL WITH A COMPOUND CN AND INITIAL ABSTRACTION TO
*#REFLECT DIFFERING LAND USE (PRIMARILY AGRICULTURAL, LAWN AND WOODLOT)
*
*

| CALIB NASHYD | Area (ha)= 31.47 Curve Number (CN)=83.00
| 01:CATCH DT= 1.00 | Ia (mm)= 7.500 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= .859

Unit Hyd Qpeak (cms)= 1.399

PEAK FLOW (cms)= 1.153 (i)
TIME TO PEAK (hrs)= 2.250
RUNOFF VOLUME (mm)= 26.656
TOTAL RAINFALL (mm)= 60.380
RUNOFF COEFFICIENT = .441

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0004-----
FINISH

***** WARNINGS / ERRORS / NOTES *****

Simulation ended on 2020-04-14 at 11:22:41
=====

50 Year Storm

SSSSS W W M M H H Y Y M M 000 999 999 =====
S W W W M M H H Y Y M M 0 0 9 9 9 9
SSSSS W W W M M M H H H H Y M M M 0 0 ## 9 9 9 9 Ver 4.05
S W W M M H H Y M M 0 0 9999 9999 Sept 2011
SSSSS W W M M H H Y M M 000 9 9 9 =====
9 9 9 9 # 2957874
StormWater Management Hydrologic Model 999 999 =====

***** SWMHYMO Ver/4.05 *****
***** A single event and continuous hydrologic simulation model *****
***** based on the principles of HYMO and its successors *****
***** OTTHYMO-83 and OTTHYMO-89. *****
***** Distributed by: J.F. Sabourin and Associates Inc. *****
***** Ottawa, Ontario: (613) 836-3884 *****
***** Gatineau, Quebec: (819) 243-6858 *****
***** E-Mail: swmhymo@jfsa.Com *****

++++++ Licensed user: AGM Engineering Ltd. ++++++
++++++ London SERIAL#:2957874 ++++++
++++++

***** +++++ PROGRAM ARRAY DIMENSIONS +++++ *****
***** Maximum value for ID numbers : 10 *****
***** Max. number of rainfall points: 105408 *****
***** Max. number of flow points : 105408 *****

***** D E T A I L E D O U T P U T *****

* DATE: 2020-04-14 TIME: 11:23:43 RUN COUNTER: 000336 *

* Input filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre050yr.dat *
* Output filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre050yr.out *
* Summary filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre050yr.sum *
* User comments: *
* 1: *
* 2: *
* 3: *

001:0001-----
*#*****
*# Project Name: [10283 ILDERTON ROAD] Project Number: [1430-1]
*# Date : 04-06-2020
*# Modeller : [LRG]
*# Company : AGM Engineering Ltd.
*# License # : 2957874
*#*****

| START | Project dir.: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\
----- Rainfall dir.: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\
TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 001
NSTORM= 0

001:0002-----
* ["] <--storm filename, one per line for NSTORM time

| CHICAGO STORM | IDF curve parameters: A=1499.060

| Ptotal= 66.12 mm | B= 4.188
----- C= .809
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = .38

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.08	4.868	.83	14.816	1.58	18.203	2.33	6.942
.17	5.228	.92	19.964	1.67	15.261	2.42	6.525
.25	5.653	1.00	31.141	1.75	13.172	2.50	6.160
.33	6.163	1.08	72.869	1.83	11.611	2.58	5.837
.42	6.786	1.17	249.214	1.92	10.400	2.67	5.549
.50	7.566	1.25	87.992	2.00	9.432	2.75	5.290
.58	8.574	1.33	45.076	2.08	8.641	2.83	5.057
.67	9.930	1.42	30.115	2.17	7.981	2.92	4.845
.75	11.856	1.50	22.648	2.25	7.422	3.00	4.652

001:0003-----
*
*#OVERALL AREA INCLUDING EXTERNAL WITH A COMPOUND CN AND INITIAL ABSTRACTION TO
*#REFLECT DIFFERING LAND USE (PRIMARILY AGRICULTURAL, LAWN AND WOODLOT)
*
*

| CALIB NASHYD | Area (ha)= 31.47 Curve Number (CN)=83.00
| 01:CATCH DT= 1.00 | Ia (mm)= 7.500 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= .859

Unit Hyd Qpeak (cms)= 1.399

PEAK FLOW (cms)= 1.342 (i)
TIME TO PEAK (hrs)= 2.233
RUNOFF VOLUME (mm)= 31.057
TOTAL RAINFALL (mm)= 66.120
RUNOFF COEFFICIENT = .470

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0004-----
FINISH

***** WARNINGS / ERRORS / NOTES *****

Simulation ended on 2020-04-14 at 11:23:43
=====

100 Year Storm

```
=====
SSSSS W W M M H H Y Y M M 000      999 999 =====
S      W W W M M M H H Y Y M M 0 0    9 9 9 9
SSSSS W W W M M M H H H H Y M M M 0 0 ## 9 9 9 9 Ver 4.05
S      W W M M H H Y M M 0 0    9999 9999 Sept 2011
SSSSS W W M M H H Y M M 000      9 9 9 =====
                        9 9 9 9 # 2957874
StormWater Management Hydrologic Model      999 999 =====

*****
***** SWHYMO Ver/4.05 *****
***** A single event and continuous hydrologic simulation model *****
***** based on the principles of HYMO and its successors *****
***** OTTHYMO-83 and OTTHYMO-89. *****
***** Distributed by: J.F. Sabourin and Associates Inc. *****
***** Ottawa, Ontario: (613) 836-3884 *****
***** Gatineau, Quebec: (819) 243-6858 *****
***** E-Mail: swmymo@jfsa.Com *****
*****

+++++
+++++ Licensed user: AGM Engineering Ltd. +++++
+++++ London SERIAL#:2957874 +++++
+++++

*****
***** +++++ PROGRAM ARRAY DIMENSIONS +++++ *****
***** Maximum value for ID numbers : 10 *****
***** Max. number of rainfall points: 105408 *****
***** Max. number of flow points : 105408 *****
*****

***** D E T A I L E D O U T P U T *****
*****
* DATE: 2020-04-14 TIME: 11:24:15 RUN COUNTER: 000337 *
*****
* Input filename: G:\CLIENT\1430\1\SWHYMO\Pre\overall\pre100yr.dat *
* Output filename: G:\CLIENT\1430\1\SWHYMO\Pre\overall\pre100yr.out *
* Summary filename: G:\CLIENT\1430\1\SWHYMO\Pre\overall\pre100yr.sum *
* User comments: *
* 1: *
* 2: *
* 3: *
*****

-----
001:0001-----
*#*****
*# Project Name: [10283 ILDERTON ROAD] Project Number: [1430-1]
*# Date : 04-06-2020
*# Modeller : [LRG]
*# Company : AGM Engineering Ltd.
*# License # : 2957874
*#*****

-----
| START | Project dir.: G:\CLIENT\1430\1\SWHYMO\Pre\overall\
----- Rainfall dir.: G:\CLIENT\1430\1\SWHYMO\Pre\overall\
TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 001
NSTORM= 0
-----
001:0002-----
* [" "] <--storm filename, one per line for NSTORM time
-----
| CHICAGO STORM | IDF curve parameters: A=1499.530
```

```
| Ptotal= 71.80 mm | B= 3.297
----- C= .794
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = .38

TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
.08 5.550 | .83 16.054 | 1.58 19.524 | 2.33 7.799
.17 5.944 | .92 21.315 | 1.67 16.513 | 2.42 7.351
.25 6.407 | 1.00 32.597 | 1.75 14.357 | 2.50 6.956
.33 6.959 | 1.08 75.188 | 1.83 12.735 | 2.58 6.606
.42 7.631 | 1.17 279.468 | 1.92 11.468 | 2.67 6.293
.50 8.468 | 1.25 90.785 | 2.00 10.450 | 2.75 6.011
.58 9.542 | 1.33 46.616 | 2.08 9.612 | 2.83 5.757
.67 10.974 | 1.42 31.567 | 2.17 8.911 | 2.92 5.525
.75 12.990 | 1.50 24.038 | 2.25 8.314 | 3.00 5.313

-----
001:0003-----
*
*#OVERALL AREA INCLUDING EXTERNAL WITH A COMPOUND CN AND INITIAL ABSTRACTION TO
*#REFLECT DIFFERING LAND USE (PRIMARILY AGRICULTURAL, LAWN AND WOODLOT)
*
*
-----
| CALIB NASHYD | Area (ha)= 31.47 Curve Number (CN)=83.00
| 01:CATCH DT= 1.00 | Ia (mm)= 7.500 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= .859

Unit Hyd Qpeak (cms)= 1.399

PEAK FLOW (cms)= 1.530 (i)
TIME TO PEAK (hrs)= 2.233
RUNOFF VOLUME (mm)= 35.542
TOTAL RAINFALL (mm)= 71.799
RUNOFF COEFFICIENT = .495

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----
001:0004-----
FINISH
-----
***** WARNINGS / ERRORS / NOTES *****
-----
Simulation ended on 2020-04-14 at 11:24:16
=====
```

250 Year Storm

```
=====
SSSSS W W M M H H Y Y M M 000      999 999 =====
S      W W W M M M H H Y Y M M 0 0    9 9 9 9
SSSSS W W W M M M H H H H Y M M M 0 0 ## 9 9 9 9 Ver 4.05
S      W W M M H H Y M M 0 0    9999 9999 Sept 2011
SSSSS W W M M H H Y M M 000      9 9 9 =====
                        9 9 9 9 # 2957874
StormWater Management Hydrologic Model      999 999 =====
```

```
*****
***** SWMHYMO Ver/4.05 *****
***** A single event and continuous hydrologic simulation model *****
***** based on the principles of HYMO and its successors *****
***** OTTHYMO-83 and OTTHYMO-89. *****
*****
***** Distributed by: J.F. Sabourin and Associates Inc. *****
***** Ottawa, Ontario: (613) 836-3884 *****
***** Gatineau, Quebec: (819) 243-6858 *****
***** E-Mail: swmhymo@jfsa.Com *****
*****
```

```
+++++
+++++ Licensed user: AGM Engineering Ltd. +++++
+++++ London SERIAL#:2957874 +++++
+++++
```

```
*****
***** +++++ PROGRAM ARRAY DIMENSIONS +++++ *****
***** Maximum value for ID numbers : 10 *****
***** Max. number of rainfall points: 105408 *****
***** Max. number of flow points : 105408 *****
*****
```

```
***** D E T A I L E D O U T P U T *****
*****
* DATE: 2020-04-14 TIME: 11:24:43 RUN COUNTER: 000338 *
*****
* Input filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre250yr.dat *
* Output filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre250yr.out *
* Summary filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pre250yr.sum *
* User comments: *
* 1: *
* 2: *
* 3: *
*****
```

```
-----
001:0001-----
*#*****
*# Project Name: [10283 ILDERTON ROAD] Project Number: [1430-1]
*# Date : 04-06-2020
*# Modeller : [LRG]
*# Company : AGM Engineering Ltd.
*# License # : 2957874
*#*****
-----
| START | Project dir.: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\
----- RainFall dir.: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\
TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 001
NSTORM= 0
-----
```

```
001:0002-----
* [" "] <--storm filename, one per line for NSTORM time
-----
| CHICAGO STORM | IDF curve parameters: A=3048.220
```

```
| Ptotal= 86.61 mm | B= 10.030
----- C= .888
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = .38
```

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.08	4.911	.83	20.544	1.58	26.471	2.33	7.766
.17	5.383	.92	29.598	1.67	21.310	2.42	7.167
.25	5.954	1.00	49.310	1.75	17.716	2.50	6.652
.33	6.656	1.08	12.508	1.83	15.092	2.58	6.204
.42	7.641	1.17	274.730	1.92	13.104	2.67	5.811
.50	8.685	1.25	133.591	2.00	11.554	2.75	5.465
.58	10.215	1.33	72.819	2.08	10.315	2.83	5.157
.67	12.349	1.42	47.569	2.17	9.306	2.92	4.882
.75	15.503	1.50	34.367	2.25	8.469	3.00	4.634

```
-----
001:0003-----
*
*#OVERALL AREA INCLUDING EXTERNAL WITH A COMPOUND CN AND INITIAL ABSTRACTION TO
*#REFLECT DIFFERING LAND USE (PRIMARILY AGRICULTURAL, LAWN AND WOODLOT)
*
*
-----
```

CALIB	NASHYD	Area	(ha)=	31.47	Curve Number (CN)=83.00
01:CATCH	DT= 1.00	Ia	(mm)=	7.500	# of Linear Res.(N)= 3.00
		U.H. Tp(hrs)=	.859		

```
Unit Hyd Qpeak (cms)= 1.399

PEAK FLOW (cms)= 2.152 (i)
TIME TO PEAK (hrs)= 2.217
RUNOFF VOLUME (mm)= 47.724
TOTAL RAINFALL (mm)= 86.609
RUNOFF COEFFICIENT = .551
```

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
-----
001:0004-----
FINISH
-----
***** WARNINGS / ERRORS / NOTES *****
-----
Simulation ended on 2020-04-14 at 11:24:44
=====
```

250 Year SCS Type II Storm

```
=====
SSSSS W W M M H H Y Y M M 000      999 999 =====
S      W W W M M M H H Y Y M M 0 0      9 9 9 9
SSSSS W W W M M M H H H H Y M M 0 0 ## 9 9 9 9 Ver 4.05
S      W W M M H H Y M M 0 0      9999 9999 Sept 2011
SSSSS W W M M H H Y M M 000      9 9 9 =====
StormWater Management Hydrologic Model      999 999 =====

*****
***** SWMHYMO Ver/4.05 *****
***** A single event and continuous hydrologic simulation model *****
***** based on the principles of HYMO and its successors *****
***** OTTHYMO-83 and OTTHYMO-89. *****
***** Distributed by: J.F. Sabourin and Associates Inc. *****
***** Ottawa, Ontario: (613) 836-3884 *****
***** Gatineau, Quebec: (819) 243-6858 *****
***** E-Mail: swmhymo@jfsa.Com *****
*****

+++++
+++++ Licensed user: AGM Engineering Ltd. +++++
+++++ London SERIAL#:2957874 +++++
+++++

*****
***** +++++ PROGRAM ARRAY DIMENSIONS +++++ *****
***** Maximum value for ID numbers : 10 *****
***** Max. number of rainfall points: 105408 *****
***** Max. number of flow points : 105408 *****
*****

***** D E T A I L E D O U T P U T *****
*****
* DATE: 2020-04-14 TIME: 11:25:12 RUN COUNTER: 000339 *
*****
* Input filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pr250scs.dat *
* Output filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pr250scs.out *
* Summary filename: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\pr250scs.sum *
* User comments: *
* 1: *
* 2: *
* 3: *
*****

-----
001:0001-----
*#*****
*# Project Name: [10283 ILDERTON ROAD] Project Number: [1430-1]
*# Date : 04-06-2020
*# Modeller : [LRG]
*# Company : AGM Engineering Ltd.
*# License # : 2957874
*#*****
-----
| START | Project dir.: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\
----- Rainfall dir.: G:\CLIENT\1430\1\SWMHYMO\Pre\overall\
TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 001
NSTORM= 0
-----
001:0002-----
* [ " "] <--storm filename, one per line for NSTORM time
-----
| MASS STORM | Filename: c:\storms\scs24h.mst
```

| Ptotal=119.00 mm | Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 24.00 hrs
Mass curve time step = 15.00 min
Selected storm time step = 1.00 min
Volume of derived storm = 119.00 mm

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.02	1.428	6.02	1.904	12.02	17.136	18.02	2.380
.03	1.428	6.03	1.904	12.03	17.136	18.03	2.380
.05	1.428	6.05	1.904	12.05	17.136	18.05	2.380
.07	1.428	6.07	1.904	12.07	17.136	18.07	2.380
.08	1.428	6.08	1.904	12.08	17.136	18.08	2.380
.10	1.428	6.10	1.904	12.10	17.136	18.10	2.380
.12	1.428	6.12	1.904	12.12	17.136	18.12	2.380
.13	1.428	6.13	1.904	12.13	17.136	18.13	2.380
.15	1.428	6.15	1.904	12.15	17.136	18.15	2.380
.17	1.428	6.17	1.904	12.17	17.136	18.17	2.380
.18	1.428	6.18	1.904	12.18	17.136	18.18	2.380
.20	1.428	6.20	1.904	12.20	17.136	18.20	2.380
.22	1.428	6.22	1.904	12.22	17.136	18.22	2.380
.23	1.428	6.23	1.904	12.23	17.136	18.23	2.380
.25	1.428	6.25	1.904	12.25	17.136	18.25	2.380
.27	1.428	6.27	2.380	12.27	17.136	18.27	1.904
.28	1.428	6.28	2.380	12.28	17.136	18.28	1.904
.30	1.428	6.30	2.380	12.30	17.136	18.30	1.904
.32	1.428	6.32	2.380	12.32	17.136	18.32	1.904
.33	1.428	6.33	2.380	12.33	17.136	18.33	1.904
.35	1.428	6.35	2.380	12.35	17.136	18.35	1.904
.37	1.428	6.37	2.380	12.37	17.136	18.37	1.904
.38	1.428	6.38	2.380	12.38	17.136	18.38	1.904
.40	1.428	6.40	2.380	12.40	17.136	18.40	1.904
.42	1.428	6.42	2.380	12.42	17.136	18.42	1.904
.43	1.428	6.43	2.380	12.43	17.136	18.43	1.904
.45	1.428	6.45	2.380	12.45	17.136	18.45	1.904
.47	1.428	6.47	2.380	12.47	17.136	18.47	1.904
.48	1.428	6.48	2.380	12.48	17.136	18.48	1.904
.50	1.428	6.50	2.380	12.50	17.136	18.50	1.904
.52	.952	6.52	1.904	12.52	9.044	18.52	2.380
.53	.952	6.53	1.904	12.53	9.044	18.53	2.380
.55	.952	6.55	1.904	12.55	9.044	18.55	2.380
.57	.952	6.57	1.904	12.57	9.044	18.57	2.380
.58	.952	6.58	1.904	12.58	9.044	18.58	2.380
.60	.952	6.60	1.904	12.60	9.044	18.60	2.380
.62	.952	6.62	1.904	12.62	9.044	18.62	2.380
.63	.952	6.63	1.904	12.63	9.044	18.63	2.380
.65	.952	6.65	1.904	12.65	9.044	18.65	2.380
.67	.952	6.67	1.904	12.67	9.044	18.67	2.380
.68	.952	6.68	1.904	12.68	9.044	18.68	2.380
.70	.952	6.70	1.904	12.70	9.044	18.70	2.380
.72	.952	6.72	1.904	12.72	9.044	18.72	2.380
.73	.952	6.73	1.904	12.73	9.044	18.73	2.380
.75	.952	6.75	1.904	12.75	9.044	18.75	2.380
.77	1.428	6.77	2.380	12.77	8.568	18.77	1.904
.78	1.428	6.78	2.380	12.78	8.568	18.78	1.904
.80	1.428	6.80	2.380	12.80	8.568	18.80	1.904
.82	1.428	6.82	2.380	12.82	8.568	18.82	1.904
.83	1.428	6.83	2.380	12.83	8.568	18.83	1.904
.85	1.428	6.85	2.380	12.85	8.568	18.85	1.904
.87	1.428	6.87	2.380	12.87	8.568	18.87	1.904
.88	1.428	6.88	2.380	12.88	8.568	18.88	1.904
.90	1.428	6.90	2.380	12.90	8.568	18.90	1.904
.92	1.428	6.92	2.380	12.92	8.568	18.92	1.904
.93	1.428	6.93	2.380	12.93	8.568	18.93	1.904
.95	1.428	6.95	2.380	12.95	8.568	18.95	1.904
.97	1.428	6.97	2.380	12.97	8.568	18.97	1.904
.98	1.428	6.98	2.380	12.98	8.568	18.98	1.904
1.00	1.428	7.00	2.380	13.00	8.568	19.00	1.904

1.02	1.428	7.02	2.380	13.02	6.664	19.02	2.380
1.03	1.428	7.03	2.380	13.03	6.664	19.03	2.380
1.05	1.428	7.05	2.380	13.05	6.664	19.05	2.380
1.07	1.428	7.07	2.380	13.07	6.664	19.07	2.380
1.08	1.428	7.08	2.380	13.08	6.664	19.08	2.380
1.10	1.428	7.10	2.380	13.10	6.664	19.10	2.380
1.12	1.428	7.12	2.380	13.12	6.664	19.12	2.380
1.13	1.428	7.13	2.380	13.13	6.664	19.13	2.380
1.15	1.428	7.15	2.380	13.15	6.664	19.15	2.380
1.17	1.428	7.17	2.380	13.17	6.664	19.17	2.380
1.18	1.428	7.18	2.380	13.18	6.664	19.18	2.380
1.20	1.428	7.20	2.380	13.20	6.664	19.20	2.380
1.22	1.428	7.22	2.380	13.22	6.664	19.22	2.380
1.23	1.428	7.23	2.380	13.23	6.664	19.23	2.380
1.25	1.428	7.25	2.380	13.25	6.664	19.25	2.380
1.27	1.428	7.27	2.856	13.27	6.188	19.27	1.904
1.28	1.428	7.28	2.856	13.28	6.188	19.28	1.904
1.30	1.428	7.30	2.856	13.30	6.188	19.30	1.904
1.32	1.428	7.32	2.856	13.32	6.188	19.32	1.904
1.33	1.428	7.33	2.856	13.33	6.188	19.33	1.904
1.35	1.428	7.35	2.856	13.35	6.188	19.35	1.904
1.37	1.428	7.37	2.856	13.37	6.188	19.37	1.904
1.38	1.428	7.38	2.856	13.38	6.188	19.38	1.904
1.40	1.428	7.40	2.856	13.40	6.188	19.40	1.904
1.42	1.428	7.42	2.856	13.42	6.188	19.42	1.904
1.43	1.428	7.43	2.856	13.43	6.188	19.43	1.904
1.45	1.428	7.45	2.856	13.45	6.188	19.45	1.904
1.47	1.428	7.47	2.856	13.47	6.188	19.47	1.904
1.48	1.428	7.48	2.856	13.48	6.188	19.48	1.904
1.50	1.428	7.50	2.856	13.50	6.188	19.50	1.904
1.52	.952	7.52	2.380	13.52	5.236	19.52	2.380
1.53	.952	7.53	2.380	13.53	5.236	19.53	2.380
1.55	.952	7.55	2.380	13.55	5.236	19.55	2.380
1.57	.952	7.57	2.380	13.57	5.236	19.57	2.380
1.58	.952	7.58	2.380	13.58	5.236	19.58	2.380
1.60	.952	7.60	2.380	13.60	5.236	19.60	2.380
1.62	.952	7.62	2.380	13.62	5.236	19.62	2.380
1.63	.952	7.63	2.380	13.63	5.236	19.63	2.380
1.65	.952	7.65	2.380	13.65	5.236	19.65	2.380
1.67	.952	7.67	2.380	13.67	5.236	19.67	2.380
1.68	.952	7.68	2.380	13.68	5.236	19.68	2.380
1.70	.952	7.70	2.380	13.70	5.236	19.70	2.380
1.72	.952	7.72	2.380	13.72	5.236	19.72	2.380
1.73	.952	7.73	2.380	13.73	5.236	19.73	2.380
1.75	.952	7.75	2.380	13.75	5.236	19.75	2.380
1.77	1.428	7.77	2.856	13.77	4.760	19.77	1.904
1.78	1.428	7.78	2.856	13.78	4.760	19.78	1.904
1.80	1.428	7.80	2.856	13.80	4.760	19.80	1.904
1.82	1.428	7.82	2.856	13.82	4.760	19.82	1.904
1.83	1.428	7.83	2.856	13.83	4.760	19.83	1.904
1.85	1.428	7.85	2.856	13.85	4.760	19.85	1.904
1.87	1.428	7.87	2.856	13.87	4.760	19.87	1.904
1.88	1.428	7.88	2.856	13.88	4.760	19.88	1.904
1.90	1.428	7.90	2.856	13.90	4.760	19.90	1.904
1.92	1.428	7.92	2.856	13.92	4.760	19.92	1.904
1.93	1.428	7.93	2.856	13.93	4.760	19.93	1.904
1.95	1.428	7.95	2.856	13.95	4.760	19.95	1.904
1.97	1.428	7.97	2.856	13.97	4.760	19.97	1.904
1.98	1.428	7.98	2.856	13.98	4.760	19.98	1.904
2.00	1.428	8.00	2.856	14.00	4.760	20.00	1.904
2.02	1.428	8.02	2.856	14.02	3.808	20.02	1.428
2.03	1.428	8.03	2.856	14.03	3.808	20.03	1.428
2.05	1.428	8.05	2.856	14.05	3.808	20.05	1.428
2.07	1.428	8.07	2.856	14.07	3.808	20.07	1.428
2.08	1.428	8.08	2.856	14.08	3.808	20.08	1.428
2.10	1.428	8.10	2.856	14.10	3.808	20.10	1.428
2.12	1.428	8.12	2.856	14.12	3.808	20.12	1.428
2.13	1.428	8.13	2.856	14.13	3.808	20.13	1.428
2.15	1.428	8.15	2.856	14.15	3.808	20.15	1.428

2.17	1.428	8.17	2.856	14.17	3.808	20.17	1.428
2.18	1.428	8.18	2.856	14.18	3.808	20.18	1.428
2.20	1.428	8.20	2.856	14.20	3.808	20.20	1.428
2.22	1.428	8.22	2.856	14.22	3.808	20.22	1.428
2.23	1.428	8.23	2.856	14.23	3.808	20.23	1.428
2.25	1.428	8.25	2.856	14.25	3.808	20.25	1.428
2.27	1.904	8.27	3.332	14.27	3.332	20.27	1.428
2.28	1.904	8.28	3.332	14.28	3.332	20.28	1.428
2.30	1.904	8.30	3.332	14.30	3.332	20.30	1.428
2.32	1.904	8.32	3.332	14.32	3.332	20.32	1.428
2.33	1.904	8.33	3.332	14.33	3.332	20.33	1.428
2.35	1.904	8.35	3.332	14.35	3.332	20.35	1.428
2.37	1.904	8.37	3.332	14.37	3.332	20.37	1.428
2.38	1.904	8.38	3.332	14.38	3.332	20.38	1.428
2.40	1.904	8.40	3.332	14.40	3.332	20.40	1.428
2.42	1.904	8.42	3.332	14.42	3.332	20.42	1.428
2.43	1.904	8.43	3.332	14.43	3.332	20.43	1.428
2.45	1.904	8.45	3.332	14.45	3.332	20.45	1.428
2.47	1.904	8.47	3.332	14.47	3.332	20.47	1.428
2.48	1.904	8.48	3.332	14.48	3.332	20.48	1.428
2.50	1.904	8.50	3.332	14.50	3.332	20.50	1.428
2.52	1.428	8.52	3.332	14.52	3.808	20.52	1.428
2.53	1.428	8.53	3.332	14.53	3.808	20.53	1.428
2.55	1.428	8.55	3.332	14.55	3.808	20.55	1.428
2.57	1.428	8.57	3.332	14.57	3.808	20.57	1.428
2.58	1.428	8.58	3.332	14.58	3.808	20.58	1.428
2.60	1.428	8.60	3.332	14.60	3.808	20.60	1.428
2.62	1.428	8.62	3.332	14.62	3.808	20.62	1.428
2.63	1.428	8.63	3.332	14.63	3.808	20.63	1.428
2.65	1.428	8.65	3.332	14.65	3.808	20.65	1.428
2.67	1.428	8.67	3.332	14.67	3.808	20.67	1.428
2.68	1.428	8.68	3.332	14.68	3.808	20.68	1.428
2.70	1.428	8.70	3.332	14.70	3.808	20.70	1.428
2.72	1.428	8.72	3.332	14.72	3.808	20.72	1.428
2.73	1.428	8.73	3.332	14.73	3.808	20.73	1.428
2.75	1.428	8.75	3.332	14.75	3.808	20.75	1.428
2.77	1.428	8.77	3.332	14.77	3.332	20.77	1.428
2.78	1.428	8.78	3.332	14.78	3.332	20.78	1.428
2.80	1.428	8.80	3.332	14.80	3.332	20.80	1.428
2.82	1.428	8.82	3.332	14.82	3.332	20.82	1.428
2.83	1.428	8.83	3.332	14.83	3.332	20.83	1.428
2.85	1.428	8.85	3.332	14.85	3.332	20.85	1.428
2.87	1.428	8.87	3.332	14.87	3.332	20.87	1.428
2.88	1.428	8.88	3.332	14.88	3.332	20.88	1.428
2.90	1.428	8.90	3.332	14.90	3.332	20.90	1.428
2.92	1.428	8.92	3.332	14.92	3.332	20.92	1.428
2.93	1.428	8.93	3.332	14.93	3.332	20.93	1.428
2.95	1.428	8.95	3.332	14.95	3.332	20.95	1.428
2.97	1.428	8.97	3.332	14.97	3.332	20.97	1.428
2.98	1.428	8.98	3.332	14.98	3.332	20.98	1.428
3.00	1.428	9.00	3.332	15.00	3.332	21.00	1.428
3.02	1.428	9.02	3.808	15.02	3.808	21.02	1.428
3.03	1.428	9.03	3.808	15.03	3.808	21.03	1.428
3.05	1.428	9.05	3.808	15.05	3.808	21.05	1.428
3.07	1.428	9.07	3.808	15.07	3.808	21.07	1.428
3.08	1.428	9.08	3.808	15.08	3.808	21.08	1.428
3.10	1.428	9.10	3.808	15.10	3.808	21.10	1.428
3.12	1.428	9.12	3.808	15.12	3.808	21.12	1.428
3.13	1.428	9.13	3.808	15.13	3.808	21.13	1.428
3.15	1.428	9.15	3.808	15.15	3.808	21.15	1.428
3.17	1.428	9.17	3.808	15.17	3.808	21.17	1.428
3.18	1.428	9.18	3.808	15.18	3.808	21.18	1.428
3.20	1.428	9.20	3.808	15.20	3.808	21.20	1.428
3.22	1.428	9.22	3.808	15.22	3.808	21.22	1.428
3.23	1.428	9.23	3.808	15.23	3.808	21.23	1.428
3.25	1.428	9.25	3.808	15.25	3.808	21.25	1.428
3.27	1.904	9.27	3.808	15.27	3.332	21.27	1.428
3.28	1.904	9.28	3.808	15.28	3.332	21.28	1.428
3.30	1.904	9.30	3.808	15.30	3.332	21.30	1.428

3.32	1.904	9.32	3.808	15.32	3.332	21.32	1.428
3.33	1.904	9.33	3.808	15.33	3.332	21.33	1.428
3.35	1.904	9.35	3.808	15.35	3.332	21.35	1.428
3.37	1.904	9.37	3.808	15.37	3.332	21.37	1.428
3.38	1.904	9.38	3.808	15.38	3.332	21.38	1.428
3.40	1.904	9.40	3.808	15.40	3.332	21.40	1.428
3.42	1.904	9.42	3.808	15.42	3.332	21.42	1.428
3.43	1.904	9.43	3.808	15.43	3.332	21.43	1.428
3.45	1.904	9.45	3.808	15.45	3.332	21.45	1.428
3.47	1.904	9.47	3.808	15.47	3.332	21.47	1.428
3.48	1.904	9.48	3.808	15.48	3.332	21.48	1.428
3.50	1.904	9.50	3.808	15.50	3.332	21.50	1.428
3.52	1.428	9.52	4.284	15.52	3.808	21.52	1.428
3.53	1.428	9.53	4.284	15.53	3.808	21.53	1.428
3.55	1.428	9.55	4.284	15.55	3.808	21.55	1.428
3.57	1.428	9.57	4.284	15.57	3.808	21.57	1.428
3.58	1.428	9.58	4.284	15.58	3.808	21.58	1.428
3.60	1.428	9.60	4.284	15.60	3.808	21.60	1.428
3.62	1.428	9.62	4.284	15.62	3.808	21.62	1.428
3.63	1.428	9.63	4.284	15.63	3.808	21.63	1.428
3.65	1.428	9.65	4.284	15.65	3.808	21.65	1.428
3.67	1.428	9.67	4.284	15.67	3.808	21.67	1.428
3.68	1.428	9.68	4.284	15.68	3.808	21.68	1.428
3.70	1.428	9.70	4.284	15.70	3.808	21.70	1.428
3.72	1.428	9.72	4.284	15.72	3.808	21.72	1.428
3.73	1.428	9.73	4.284	15.73	3.808	21.73	1.428
3.75	1.428	9.75	4.284	15.75	3.808	21.75	1.428
3.77	1.428	9.77	4.284	15.77	3.332	21.77	1.428
3.78	1.428	9.78	4.284	15.78	3.332	21.78	1.428
3.80	1.428	9.80	4.284	15.80	3.332	21.80	1.428
3.82	1.428	9.82	4.284	15.82	3.332	21.82	1.428
3.83	1.428	9.83	4.284	15.83	3.332	21.83	1.428
3.85	1.428	9.85	4.284	15.85	3.332	21.85	1.428
3.87	1.428	9.87	4.284	15.87	3.332	21.87	1.428
3.88	1.428	9.88	4.284	15.88	3.332	21.88	1.428
3.90	1.428	9.90	4.284	15.90	3.332	21.90	1.428
3.92	1.428	9.92	4.284	15.92	3.332	21.92	1.428
3.93	1.428	9.93	4.284	15.93	3.332	21.93	1.428
3.95	1.428	9.95	4.284	15.95	3.332	21.95	1.428
3.97	1.428	9.97	4.284	15.97	3.332	21.97	1.428
3.98	1.428	9.98	4.284	15.98	3.332	21.98	1.428
4.00	1.428	10.00	4.284	16.00	3.332	22.00	1.428
4.02	1.904	10.02	5.236	16.02	2.380	22.02	1.428
4.03	1.904	10.03	5.236	16.03	2.380	22.03	1.428
4.05	1.904	10.05	5.236	16.05	2.380	22.05	1.428
4.07	1.904	10.07	5.236	16.07	2.380	22.07	1.428
4.08	1.904	10.08	5.236	16.08	2.380	22.08	1.428
4.10	1.904	10.10	5.236	16.10	2.380	22.10	1.428
4.12	1.904	10.12	5.236	16.12	2.380	22.12	1.428
4.13	1.904	10.13	5.236	16.13	2.380	22.13	1.428
4.15	1.904	10.15	5.236	16.15	2.380	22.15	1.428
4.17	1.904	10.17	5.236	16.17	2.380	22.17	1.428
4.18	1.904	10.18	5.236	16.18	2.380	22.18	1.428
4.20	1.904	10.20	5.236	16.20	2.380	22.20	1.428
4.22	1.904	10.22	5.236	16.22	2.380	22.22	1.428
4.23	1.904	10.23	5.236	16.23	2.380	22.23	1.428
4.25	1.904	10.25	5.236	16.25	2.380	22.25	1.428
4.27	1.904	10.27	5.712	16.27	1.904	22.27	1.428
4.28	1.904	10.28	5.712	16.28	1.904	22.28	1.428
4.30	1.904	10.30	5.712	16.30	1.904	22.30	1.428
4.32	1.904	10.32	5.712	16.32	1.904	22.32	1.428
4.33	1.904	10.33	5.712	16.33	1.904	22.33	1.428
4.35	1.904	10.35	5.712	16.35	1.904	22.35	1.428
4.37	1.904	10.37	5.712	16.37	1.904	22.37	1.428
4.38	1.904	10.38	5.712	16.38	1.904	22.38	1.428
4.40	1.904	10.40	5.712	16.40	1.904	22.40	1.428
4.42	1.904	10.42	5.712	16.42	1.904	22.42	1.428
4.43	1.904	10.43	5.712	16.43	1.904	22.43	1.428
4.45	1.904	10.45	5.712	16.45	1.904	22.45	1.428

4.47	1.904	10.47	5.712	16.47	1.904	22.47	1.428
4.48	1.904	10.48	5.712	16.48	1.904	22.48	1.428
4.50	1.904	10.50	5.712	16.50	1.904	22.50	1.428
4.52	1.904	10.52	7.140	16.52	2.380	22.52	1.428
4.53	1.904	10.53	7.140	16.53	2.380	22.53	1.428
4.55	1.904	10.55	7.140	16.55	2.380	22.55	1.428
4.57	1.904	10.57	7.140	16.57	2.380	22.57	1.428
4.58	1.904	10.58	7.140	16.58	2.380	22.58	1.428
4.60	1.904	10.60	7.140	16.60	2.380	22.60	1.428
4.62	1.904	10.62	7.140	16.62	2.380	22.62	1.428
4.63	1.904	10.63	7.140	16.63	2.380	22.63	1.428
4.65	1.904	10.65	7.140	16.65	2.380	22.65	1.428
4.67	1.904	10.67	7.140	16.67	2.380	22.67	1.428
4.68	1.904	10.68	7.140	16.68	2.380	22.68	1.428
4.70	1.904	10.70	7.140	16.70	2.380	22.70	1.428
4.72	1.904	10.72	7.140	16.72	2.380	22.72	1.428
4.73	1.904	10.73	7.140	16.73	2.380	22.73	1.428
4.75	1.904	10.75	7.140	16.75	2.380	22.75	1.428
4.77	1.904	10.77	7.616	16.77	1.904	22.77	1.428
4.78	1.904	10.78	7.616	16.78	1.904	22.78	1.428
4.80	1.904	10.80	7.616	16.80	1.904	22.80	1.428
4.82	1.904	10.82	7.616	16.82	1.904	22.82	1.428
4.83	1.904	10.83	7.616	16.83	1.904	22.83	1.428
4.85	1.904	10.85	7.616	16.85	1.904	22.85	1.428
4.87	1.904	10.87	7.616	16.87	1.904	22.87	1.428
4.88	1.904	10.88	7.616	16.88	1.904	22.88	1.428
4.90	1.904	10.90	7.616	16.90	1.904	22.90	1.428
4.92	1.904	10.92	7.616	16.92	1.904	22.92	1.428
4.93	1.904	10.93	7.616	16.93	1.904	22.93	1.428
4.95	1.904	10.95	7.616	16.95	1.904	22.95	1.428
4.97	1.904	10.97	7.616	16.97	1.904	22.97	1.428
4.98	1.904	10.98	7.616	16.98	1.904	22.98	1.428
5.00	1.904	11.00	7.616	17.00	1.904	23.00	1.428
5.02	1.904	11.02	11.424	17.02	2.380	23.02	1.428
5.03	1.904	11.03	11.424	17.03	2.380	23.03	1.428
5.05	1.904	11.05	11.424	17.05	2.380	23.05	1.428
5.07	1.904	11.07	11.424	17.07	2.380	23.07	1.428
5.08	1.904	11.08	11.424	17.08	2.380	23.08	1.428
5.10	1.904	11.10	11.424	17.10	2.380	23.10	1.428
5.12	1.904	11.12	11.424	17.12	2.380	23.12	1.428
5.13	1.904	11.13	11.424	17.13	2.380	23.13	1.428
5.15	1.904	11.15	11.424	17.15	2.380	23.15	1.428
5.17	1.904	11.17	11.424	17.17	2.380	23.17	1.428
5.18	1.904	11.18	11.424	17.18	2.380	23.18	1.428
5.20	1.904	11.20	11.424	17.20	2.380	23.20	1.428
5.22	1.904	11.22	11.424	17.22	2.380	23.22	1.428
5.23	1.904	11.23	11.424	17.23	2.380	23.23	1.428
5.25	1.904	11.25	11.424	17.25	2.380	23.25	1.428
5.27	1.904	11.27	11.424	17.27	1.904	23.27	1.428
5.28	1.904	11.28	11.424	17.28	1.904	23.28	1.428
5.30	1.904	11.30	11.424	17.30	1.904	23.30	1.428
5.32	1.904	11.32	11.424	17.32	1.904	23.32	1.428
5.33	1.904	11.33	11.424	17.33	1.904	23.33	1.428
5.35	1.904	11.35	11.424	17.35	1.904	23.35	1.428
5.37	1.904	11.37	11.424	17.37	1.904	23.37	1.428
5.38	1.904	11.38	11.424	17.38	1.904	23.38	1.428
5.40	1.904	11.40	11.424	17.40	1.904	23.40	1.428
5.42	1.904	11.42	11.424	17.42	1.904	23.42	1.428
5.43	1.904	11.43	11.424	17.43	1.904	23.43	1.428
5.45	1.904	11.45	11.424	17.45	1.904	23.45	1.428
5.47	1.904	11.47	11.424	17.47	1.904	23.47	1.428
5.48	1.904	11.48	11.424	17.48	1.904	23.48	1.428
5.50	1.904	11.50	11.424	17.50	1.904	23.50	1.428
5.52	1.904	11.52	35.224	17.52	2.380	23.52	1.428
5.53	1.904	11.53	35.224	17.53	2.380	23.53	1.428
5.55	1.904	11.55	35.224	17.55	2.380	23.55	1.428
5.57	1.904	11.57	35.224	17.57	2.380	23.57	1.428
5.58	1.904	11.58	35.224	17.58	2.380	23.58	1.428
5.60	1.904	11.60	35.224	17.60	2.380	23.60	1.428

5.62	1.904	11.62	35.224	17.62	2.380	23.62	1.428
5.63	1.904	11.63	35.224	17.63	2.380	23.63	1.428
5.65	1.904	11.65	35.224	17.65	2.380	23.65	1.428
5.67	1.904	11.67	35.224	17.67	2.380	23.67	1.428
5.68	1.904	11.68	35.224	17.68	2.380	23.68	1.428
5.70	1.904	11.70	35.224	17.70	2.380	23.70	1.428
5.72	1.904	11.72	35.224	17.72	2.380	23.72	1.428
5.73	1.904	11.73	35.224	17.73	2.380	23.73	1.428
5.75	1.904	11.75	35.224	17.75	2.380	23.75	1.428
5.77	1.904	11.77	145.656	17.77	1.904	23.77	1.428
5.78	1.904	11.78	145.656	17.78	1.904	23.78	1.428
5.80	1.904	11.80	145.656	17.80	1.904	23.80	1.428
5.82	1.904	11.82	145.656	17.82	1.904	23.82	1.428
5.83	1.904	11.83	145.656	17.83	1.904	23.83	1.428
5.85	1.904	11.85	145.656	17.85	1.904	23.85	1.428
5.87	1.904	11.87	145.656	17.87	1.904	23.87	1.428
5.88	1.904	11.88	145.656	17.88	1.904	23.88	1.428
5.90	1.904	11.90	145.656	17.90	1.904	23.90	1.428
5.92	1.904	11.92	145.656	17.92	1.904	23.92	1.428
5.93	1.904	11.93	145.656	17.93	1.904	23.93	1.428
5.95	1.904	11.95	145.656	17.95	1.904	23.95	1.428
5.97	1.904	11.97	145.656	17.97	1.904	23.97	1.428
5.98	1.904	11.98	145.656	17.98	1.904	23.98	1.428
6.00	1.904	12.00	145.656	18.00	1.904	24.00	1.428

001:0003-----
*
*#OVERALL AREA INCLUDING EXTERNAL WITH A COMPOUND CN AND INITIAL ABSTRACTION TO
*#REFLECT DIFFERING LAND USE (PRIMARYLY AGRICULTURAL, LAWN AND WOODLOT)
*
*

| CALIB NASHYD | Area (ha)= 31.47 Curve Number (CN)=83.00
| 01:CATCH DT= 1.00 | Ia (mm)= 7.500 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= .859

Unit Hyd Qpeak (cms)= 1.399

PEAK FLOW (cms)= 2.248 (i)
TIME TO PEAK (hrs)= 12.817
RUNOFF VOLUME (mm)= 76.027
TOTAL RAINFALL (mm)= 118.999
RUNOFF COEFFICIENT = .639

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0004-----
FINISH

WARNINGS / ERRORS / NOTES

Simulation ended on 2020-04-14 at 11:25:13
=====

APPENDIX C

Stormwater Management Post Development Model

POST DEVELOPMENT MODELING DATA
CALIB NASH HYDROGRAPH (RURAL PERVIOUS AREAS)

CATCHMENT NO.	AREA (ha)	SCS CURVE #	BASE FLOW (cms)	Initial Abstraction (mm)	Time to Peak (hrs)	Time of concentration (hrs)	Time of concentration (hrs)	Time of concentration (hrs)	Runoff Coef., C	Watershed Length, L (m)	Watershed Slope, (%)	Velocity From Uplands Method Figure (m/s)
101	27.58	82	0.000	7.8	0.835	1.654	1.427	1.095	0.20	1143.6	1	0.29
102	0.62	84	0.000	7	0.207	0.613	0.273	0.150	0.20	157.0	1	0.29
2	0.54	86.5	0.000	4.94	0.116	0.398	0.133	0.047	0.22	110.0	2	0.65
0.6 x Tc(avg) Airport Method SCS Method Uplands Method Tc=(Length/Velocity) <avg>												

Land Use	SCS CURVE #	Initial Abstraction (mm)	Area (sq.m.)
Agricultural	84	7	173329.9
lawn	86	5	19934.99
Wood lot	77	10	82577.13
Compund	82.0	7.8	275842

CALIB STANDARD HYDROGRAPH (URBAN AREAS)

CATCHMENT NO.	AREA (ha)	XIMP (%)	TIMP (%)	BASE FLOW (cms)	PERVIOUS LENGTH (m)	IMP. LENGTH (m)	Perv. Initial Abstraction (mm)	Imp. Initial Abstraction (mm)	PERVIOUS MANNINGS (n)	Pervious Slope (%)	Impervious Slope (%)	SCS CURVE #
1	2.69	19.64	21.47	0	28	218.7	5	2	0.25	2	1.9	86

POST DEVELOPMENT MODEL FLOW SUMMARY

	TOTAL FLOW
2	0.344
5	0.669
10	0.883
25	1.128
50	1.320
100	1.505
250	2.104
250-24hr	2.199

Airport Method

$$T_c = \frac{3.26(1.1 - C)L^{0.5}}{S^{0.33}}$$

Tc in minutes

SCS Method

$$T_c = \frac{2.58L^{0.8}[(1000/CN) - 9]^{0.7}}{1900S^{0.5}} \times 100$$

Tc in minutes

Post Development

Catch 101&102
 $V=0.29\text{m/s}$

Catch 2
 $V=0.65\text{m/s}$

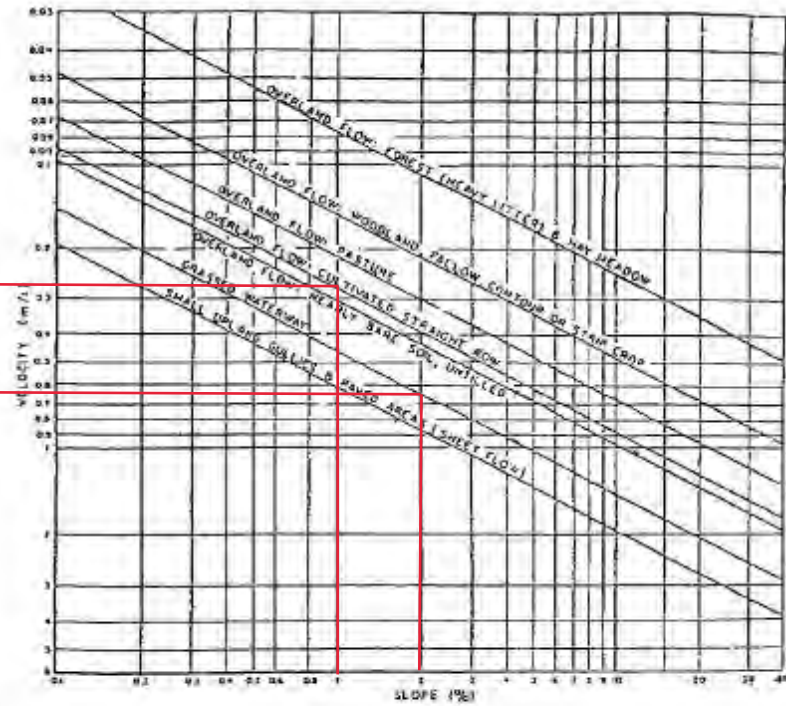


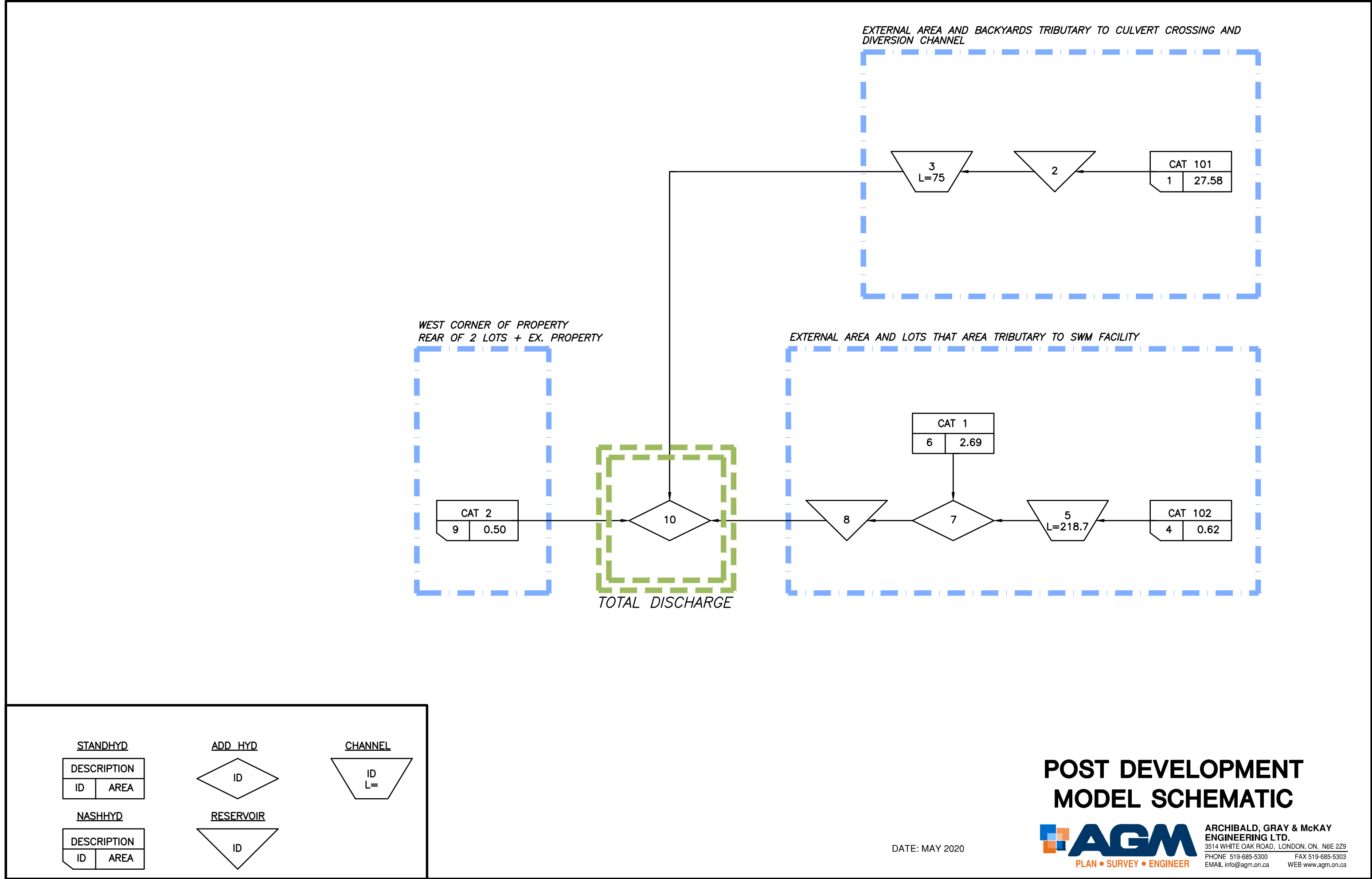
FIGURE 1 UPLANDS METHOD OF ESTIMATING TIME OF CONCENTRATION (SCS NATIONAL ENGINEERING HANDBOOK, 1971)

CULVERT PERFORMANCE CURVE

Elevation (m)	Upstream Storage		Discharge	Description
	Incremental Storage (m³)	Total Storage (m³)	Elliptical 860x1350 Culvert	
246.755	0.0	0.0	0.00000	
246.800	0.0	0.04	0.00500	
247.000	0.9	0.91	0.13000	
247.200	2.9	3.81	0.40000	
247.400	6.6	10.36	0.81000	
247.600	12.0	22.34	1.27000	
247.800	20.2	42.54	1.73000	
248.000	29.2	71.69	2.11500	

SWM POND STORAGE DATA

Elevation (m)	Storage		Discharge			Description
	Incremental Storage (m ³)	Pond Storage (m ³)	190 orifice	300 orifice	Combined (m ³ /s)	
246.550		0	0.00000	0.00000	0.00000	2 year water Elev = 247.12
246.600	0.5	0.5	0.00125	0.00000	0.00125	
246.700	12.6	13.1	0.00948	0.00000	0.00948	
246.800	35.0	48.0	0.02779	0.00000	0.02779	
246.900	48.7	96.8	0.03739	0.00000	0.03739	
247.000	53.7	150.4	0.04499	0.00000	0.04499	
247.100	58.8	209.2	0.05148	0.00000	0.05148	
247.150	31.3	240.5	0.05436	0.00000	0.05436	
247.200	64.0	273.2	0.05724	0.00130	0.05854	
247.300	69.3	342.5	0.06247	0.01343	0.07590	
247.400	74.7	417.2	0.06729	0.03254	0.09983	5 year water Elev = 247.36
247.500	80.3	497.5	0.07179	0.07640	0.14819	10 year water Elev = 247.47
247.600	86.0	583.5	0.07603	0.09863	0.17466	25 year water Elev = 247.58
247.700	91.9	675.4	0.08004	0.11670	0.19674	50 year water Elev = 247.66
247.800	98.0	773.5	0.08386	0.13230	0.21616	100 year water Elev = 247.75
247.900	104.4	877.8	0.08751	0.14630	0.23381	250 year - 24hr water Elev = 247.98
248.000	110.9	988.8	0.09102	0.15900	0.25002	250 year water Elev = 248.01
248.100	117.8	1106.6	0.09439	0.17080	0.26519	Overflow Weir at Elev = 248.10
248.200	124.7	1231.3	0.09765	0.18190	0.27955	



2 Year Storm

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StormWater Management Hydrologic Model 999 999 # 2957874
=====

***** SWHYMO Ver/4.05 *****
***** A single event and continuous hydrologic simulation model *****
***** based on the principles of HYMO and its successors *****
***** OTTHYMO-83 and OTTHYMO-89. *****
***** Distributed by: J.F. Sabourin and Associates Inc. *****
***** Ottawa, Ontario: (613) 836-3884 *****
***** Gatineau, Quebec: (819) 243-6858 *****
***** E-Mail: swmymo@jfsa.Com *****

++++++ Licensed user: AGM Engineering Ltd. ++++++
++++++ London SERIAL#:2957874 ++++++
++++++

***** +++++ PROGRAM ARRAY DIMENSIONS +++++ *****
***** Maximum value for ID numbers : 10 *****
***** Max. number of rainfall points: 105408 *****
***** Max. number of flow points : 105408 *****

***** D E T A I L E D O U T P U T *****

* DATE: 2020-05-26 TIME: 10:23:49 RUN COUNTER: 000526 *

* Input filename: G:\CLIENT\1430\1\SWHYMO\Post\overall\pst002yr.dat *
* Output filename: G:\CLIENT\1430\1\SWHYMO\Post\overall\pst002yr.out *
* Summary filename: G:\CLIENT\1430\1\SWHYMO\Post\overall\pst002yr.sum *
* User comments: *
* 1: *
* 2: *
* 3: *

001:0001-----
*# Project Name: [10283 ILDERTON ROAD] Project Number: [1430-1]
*# Date : 05-06-2020
*# Modeller : [LRG]
*# Company : AGM Engineering Ltd.
*# License # : 2957874
*#

| START | Project dir.: G:\CLIENT\1430\1\SWHYMO\Post\overall\
| Rainfall dir.: G:\CLIENT\1430\1\SWHYMO\Post\overall\
TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 001
NSTORM= 0

001:0002-----
* [" "] <--storm filename, one per line for NSTORM time
*

*#
*# MODEL ASSESSING INTERNAL AND EXTERNAL FLOWS WITH EXTERNAL AREAS #
*# PASSING THROUGH THE PROPOSED DIVERSION CHANNEL #
*#
*#
*#
*#

| CHICAGO STORM | IDF curve parameters: A= 724.690
| Ptotal= 33.31 mm | B= 5.500
C= .800
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = .38

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.08	2.621	.83	8.023	1.58	9.859	2.33	3.744
.17	2.815	.92	10.810	1.67	8.265	2.42	3.518
.25	3.045	1.00	16.773	1.75	7.130	2.50	3.320
.33	3.321	1.08	37.614	1.83	6.281	2.58	3.145
.42	3.659	1.17	110.459	1.92	5.622	2.67	2.989
.50	4.082	1.25	44.943	2.00	5.096	2.75	2.849
.58	4.630	1.33	24.030	2.08	4.666	2.83	2.723
.67	5.367	1.42	16.238	2.17	4.307	2.92	2.609
.75	6.414	1.50	12.255	2.25	4.004	3.00	2.504

001:0003-----
*
*#REAR YARDS AND EXTERNAL AREA DRAINING UNCONTROLLED THROUGH CHANNEL, LOTS 1TO6
*
*
*#

| CALIB NASHYD | Area (ha)= 27.58 Curve Number (CN)=82.00
| 01:CAT 10 DT= 1.00 | Ia (mm)= 7.800 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .835

Unit Hyd Qpeak (cms)= 1.262

PEAK FLOW (cms)= .292 (i)
TIME TO PEAK (hrs)= 2.350
RUNOFF VOLUME (mm)= 8.008
TOTAL RAINFALL (mm)= 33.311
RUNOFF COEFFICIENT = .240

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0004-----
*#800x1350 ELIPTICAL CULVERT CROSSING STREET 'A' STAGE-STORAGE-PERFORMANCE
*
*
*#

| ROUTE RESERVOIR | Requested routing time step = 1.0 min.
| IN>01:(CAT 10) |
| OUT<02:(CULV) |
===== OUTFLOW STORAGE TABLE =====
OUTFLOW STORAGE OUTFLOW STORAGE
(cms) (ha.m.) (cms) (ha.m.)
.000 .0000E+00 .810 .1036E-02
.005 .4000E-05 1.270 .2234E-02
.130 .9100E-04 1.730 .4254E-02
.400 .3810E-03 2.115 .7169E-02

ROUTING RESULTS AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)

INFLOW >01: (CAT 10) 27.58 .292 2.350 8.008
OUTFLOW<02: (CULV) 27.58 .292 2.350 8.008

PEAK FLOW REDUCTION [Qout/Qin](%)= 100.000
TIME SHIFT OF PEAK FLOW (min)= .00
MAXIMUM STORAGE USED (ha.m.)=.2645E-03

001:0005-----

*#ROUTING PROPOSED CONVEYANCE CHANNEL TO SUBDIVISION LIMIT

*

ROUTE CHANNEL	Routing time step (min) = 1.00
IN> 02:CULV	Number of SEGMENTS = 3
OUT< 03:CHAN	Slopes (%), CHANNEL= .25 FLOODPLAIN= .25
	LENGTH = 75.00 (m)

<----- DATA FOR SECTION (.9) ----->		
Distance	Elevation	Manning
.00	247.68	.0300
3.74	246.43	.0300 / .0300 Main Channel
3.76	246.43	.0300 / .0300 Main Channel
7.50	247.68	.0300

<----- TRAVEL TIME TABLE ----->							
DEPTH	ELEV	X-VOLUME	S-VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	D x V
(m)	(m)	(cu.m.)	(cu.m.)	(cms)	(m/s)	(min)	(m2/s)
.066	246.496	.102E+01	.179E+00	.002	.170	7.34	.011
.132	246.562	.399E+01	.140E+01	.014	.266	4.69	.035
.197	246.627	.890E+01	.468E+01*	.041	.347	3.60	.069
.263	246.693	.158E+02	.111E+02*	.088	.420	2.98	.110
.329	246.759	.246E+02	.215E+02*	.159	.486	2.57	.160
.395	246.825	.353E+02	.372E+02*	.258	.548	2.28	.216
.460	246.890	.480E+02	.589E+02*	.389	.607	2.06	.280
.526	246.956	.626E+02	.879E+02*	.554	.663	1.88	.349
.592	247.022	.792E+02	.125E+03*	.758	.717	1.74	.425
.658	247.088	.977E+02	.171E+03*	1.002	.769	1.63	.506
.724	247.154	.118E+03	.228E+03*	1.291	.819	1.53	.593
.789	247.219	.141E+03	.296E+03*	1.628	.868	1.44	.685
.855	247.285	.165E+03	.376E+03*	2.014	.916	1.37	.783
.921	247.351	.191E+03	.470E+03*	2.453	.962	1.30	.886
.987	247.417	.220E+03	.578E+03*	2.947	1.007	1.24	.994
1.053	247.483	.250E+03	.701E+03*	3.499	1.051	1.19	1.106
1.118	247.548	.282E+03	.841E+03*	4.112	1.094	1.14	1.224
1.184	247.614	.316E+03	.998E+03*	4.788	1.137	1.10	1.346
1.250	247.680	.352E+03	.117E+04*	5.529	1.178	1.06	1.473

X-VOLUME= Total X-Section volume over given CHANNEL LENGTH at specified DEPTH.
S-VOLUME= Volume that can be stored in channel at specified ELEVATION.
(*) Actual value may be less due to limited CHANNEL LENGTH for given SLOPE.

<---- hydrograph ---->				<-pipe / channel->		
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL	
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)	
INFLOW : ID= 2:CULV	27.58	.292	2.35	8.008	.412	.562
OUTFLOW: ID= 3:CHAN	27.58	.291	2.38	8.008	.411	.562

001:0006-----

*#EXTERNAL FARMLAND THAT WILL ENTER PROPOSED SWM FACILITY

*

CALIB NASHYD	Area	(ha)=	.62	Curve Number (CN)=	84.00
04:CAT102 DT= 1.00	Ia	(mm)=	7.000	# of Linear Res.(N)=	3.00

U.H. Tp(hrs)= .207

Unit Hyd Qpeak (cms)= .114

PEAK FLOW (cms)= .019 (i)
TIME TO PEAK (hrs)= 1.450
RUNOFF VOLUME (mm)= 9.268
TOTAL RAINFALL (mm)= 33.311
RUNOFF COEFFICIENT = .278

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0007-----

*#CONVEYING EXTERNAL FLOWS TO SWM FACILITY

*

ROUTE CHANNEL	Routing time step (min) = 1.00
IN> 04:CAT102	Number of SEGMENTS = 3
OUT< 05:EX2SWM	Slopes (%), CHANNEL=1.75 FLOODPLAIN=1.75
	LENGTH = 218.70 (m)

<----- DATA FOR SECTION (1.0) ----->		
Distance	Elevation	Manning
.00	251.44	.0300
.49	251.30	.0300 / .0300 Main Channel
.50	251.30	.0300 / .0300 Main Channel
3.00	251.45	.0300

<----- TRAVEL TIME TABLE ----->							
DEPTH	ELEV	X-VOLUME	S-VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	D x V
(m)	(m)	(cu.m.)	(cu.m.)	(cms)	(m/s)	(min)	(m2/s)
.007	251.307	.120E+00	.115E-03	.000	.105	34.85	.001
.015	251.315	.511E+00	.984E-03	.000	.172	21.16	.003
.022	251.322	.113E+01	.325E-02	.001	.223	16.33	.005
.029	251.329	.198E+01	.762E-02	.002	.269	13.57	.008
.037	251.337	.307E+01	.148E-01	.004	.311	11.73	.011
.044	251.344	.441E+01	.254E-01	.007	.350	10.42	.015
.052	251.352	.598E+01	.403E-01	.011	.387	9.42	.020
.059	251.359	.779E+01	.600E-01	.015	.423	8.63	.025
.066	251.366	.984E+01	.852E-01	.021	.457	7.98	.030
.074	251.374	.121E+02	.117E+00	.027	.489	7.45	.036
.081	251.381	.147E+02	.155E+00	.035	.521	6.99	.042
.088	251.388	.174E+02	.201E+00	.044	.552	6.60	.049
.096	251.396	.204E+02	.256E+00	.054	.582	6.26	.056
.103	251.403	.237E+02	.319E+00	.066	.611	5.96	.063
.111	251.411	.272E+02	.392E+00	.079	.640	5.70	.071
.118	251.418	.309E+02	.476E+00	.094	.667	5.46	.079
.125	251.425	.349E+02	.570E+00	.111	.695	5.25	.087
.133	251.433	.391E+02	.677E+00	.129	.722	5.05	.096
.140	251.440	.435E+02	.796E+00	.149	.748	4.87	.105

X-VOLUME= Total X-Section volume over given CHANNEL LENGTH at specified DEPTH.
S-VOLUME= Volume that can be stored in channel at specified ELEVATION.

<---- hydrograph ---->				<-pipe / channel->		
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL	
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)	
INFLOW : ID= 4:CAT102	.62	.019	1.45	9.268	.064	.446
OUTFLOW: ID= 5:EX2SWM	.62	.016	1.58	9.268	.061	.430

001:0008-----

*#RIGHT-OF-WAY AND LOTS DRAINING AT GRASSED LEVELS

*

*
CALIB STANDHYD
06:CAT 1 DT= 1.00
Area (ha)= 2.69
Total Imp(%)= 21.47
Dir. Conn.(%)= 19.64

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= .58 2.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.90 2.00
Length (m)= 218.70 28.00
Mannings n = .015 .250
Max.eff.Inten.(mm/hr)= 110.46 25.22
over (min) 4.00 13.00
Storage Coeff. (min)= 3.53 (ii) 13.41 (ii)
Unit Hyd. Tpeak (min)= 4.00 13.00
Unit Hyd. peak (cms)= .31 .09
TOTALS
PEAK FLOW (cms)= .12 .09 .148 (iii)
TIME TO PEAK (hrs)= 1.20 1.40 1.200
RUNOFF VOLUME (mm)= 31.31 11.74 15.582
TOTAL RAINFALL (mm)= 33.31 33.31 33.311
RUNOFF COEFFICIENT = .94 .35 .468

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0009-
*
*#COMBINED FLOWS TRIBUTARY TO SWM FACILITY
*
*
| ADD HYD (2POND) | ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 05:EX2SWMF .62 .016 1.58 9.27 .000
+ID2 06:CAT 1 2.69 .148 1.20 15.58 .000
=====
SUM 07:2POND 3.31 .149 1.22 14.40 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0010-
*
*#PROPOSED DRY POND SWM FACILITY STAGE-STORAGE-DISCHARGE
*
*
Requested routing time step = 1.0 min.
===== OUTFLOW STORAGE TABLE =====
OUTFLOW STORAGE OUTFLOW STORAGE
(cms) (ha.m.) (cms) (ha.m.)
.000 .0000E+00 .100 .4172E-01
.001 .5000E-04 .148 .4975E-01
.009 .1310E-02 .175 .5835E-01
.028 .4800E-02 .197 .6754E-01
.037 .9680E-02 .216 .7735E-01
.045 .1504E-01 .234 .8778E-01
.052 .2092E-01 .250 .9888E-01
.054 .2405E-01 .265 .1107E+00
.059 .2732E-01 .280 .1231E+00
.076 .3425E-01 .000 .0000E+00

ROUTING RESULTS AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW >07: (2POND) 3.31 .149 1.217 14.399
OUTFLOW<08: (SWMF) 3.31 .051 1.983 14.399
PEAK FLOW REDUCTION [Qout/Qin](%)= 34.448
TIME SHIFT OF PEAK FLOW (min)= 46.00
MAXIMUM STORAGE USED (ha.m.)= .2070E-01

001:0011-
*
*#FLOWS FROM THE REAR OF LOT 12 AND 13 TO BE UNCONTROLLED AT GRASSED LEVELS
*
*
| CALIB NASHYD | Area (ha)= .54 Curve Number (CN)=86.50
| 09:CAT 2 DT= 1.00 | Ia (mm)= 4.940 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .116
Unit Hyd Qpeak (cms)= .178
PEAK FLOW (cms)= .031 (i)
TIME TO PEAK (hrs)= 1.300
RUNOFF VOLUME (mm)= 11.834
TOTAL RAINFALL (mm)= 33.311
RUNOFF COEFFICIENT = .355
(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0012-
*
*#COMBINED DIVERTED FLOW THORUGH THE SITE TO THE SOUTHWEST
*
*
| ADD HYD (BYPASS) | ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 09:CAT 2 .54 .031 1.30 11.83 .000
+ID2 03:CHAN 27.58 .291 2.38 8.01 .000
=====
SUM 10:BYPASS 28.12 .295 2.38 8.08 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0013-
*
*#COMBINED POST DEVELOPMENT DISCHARGE LEAVING THE SITE TO THE SOUTHWEST
*
*
| ADD HYD (EXIT) | ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 10:BYPASS 28.12 .295 2.38 8.08 .000
+ID2 08:SWMF 3.31 .051 1.98 14.40 .000
=====
SUM 01:EXIT 31.43 .344 2.32 8.75 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0014-
FINISH

WARNINGS / ERRORS / NOTES

Simulation ended on 2020-05-26 at 10:23:50

=====

5 Year Storm

SSSSS W W M M H H Y Y M M 000 999 999 =====
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SSSSS W W W M M M H H H H Y M M M 0 0 ## 9 9 9 9 Ver 4.05
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SSSSS W W M M H H Y M M 000 9 9 9
StormWater Management Hydrologic Model 999 999 # 2957874
=====

***** SWHMYO Ver/4.05 *****
***** A single event and continuous hydrologic simulation model *****
***** based on the principles of HYMO and its successors *****
***** OTTHYMO-83 and OTTHYMO-89. *****
***** Distributed by: J.F. Sabourin and Associates Inc. *****
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***** E-Mail: swmhymo@jfsa.Com *****

++++++ Licensed user: AGM Engineering Ltd. ++++++
++++++ London SERIAL#:2957874 ++++++
++++++

***** +++++ PROGRAM ARRAY DIMENSIONS +++++ *****
***** Maximum value for ID numbers : 10 *****
***** Max. number of rainfall points: 105408 *****
***** Max. number of flow points : 105408 *****

***** D E T A I L E D O U T P U T *****

* DATE: 2020-05-26 TIME: 10:23:57 RUN COUNTER: 000527 *

* Input filename: G:\CLIENT\1430\1\SWHMYO\Post\overall\pst005yr.dat *
* Output filename: G:\CLIENT\1430\1\SWHMYO\Post\overall\pst005yr.out *
* Summary filename: G:\CLIENT\1430\1\SWHMYO\Post\overall\pst005yr.sum *
* User comments: *
* 1: *
* 2: *
* 3: *

001:0001-----
*# Project Name: [10283 ILDERTON ROAD] Project Number: [1430-1]
*# Date : 05-06-2020
*# Modeller : [LRG]
*# Company : AGM Engineering Ltd.
*# License # : 2957874
*#

| START | Project dir.: G:\CLIENT\1430\1\SWHMYO\Post\overall\
| Rainfall dir.: G:\CLIENT\1430\1\SWHMYO\Post\overall\
TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 001
NSTORM= 0

001:0002-----
* [" "] <--storm filename, one per line for NSTORM time
*

*#
*# MODEL ASSESSING INTERNAL AND EXTERNAL FLOWS WITH EXTERNAL AREAS #
*# PASSING THROUGH THE PROPOSED DIVERSION CHANNEL #
*# #
*#####
*
*

| CHICAGO STORM | IDF curve parameters: A=1330.310
| Ptotal= 45.37 mm | B= 7.938
C= .855
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = .38

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.08	2.913	.83	10.664	1.58	13.500	2.33	4.400
.17	3.164	.92	14.992	1.67	11.032	2.42	4.094
.25	3.464	1.00	24.437	1.75	9.304	2.50	3.828
.33	3.830	1.08	56.256	1.83	8.033	2.58	3.595
.42	4.285	1.17	149.041	1.92	7.063	2.67	3.390
.50	4.867	1.25	67.155	2.00	6.300	2.75	3.207
.58	5.635	1.33	35.894	2.08	5.685	2.83	3.044
.67	6.692	1.42	23.589	2.17	5.180	2.92	2.897
.75	8.233	1.50	17.267	2.25	4.758	3.00	2.765

001:0003-----
*
*#REAR YARDS AND EXTERNAL AREA DRAINING UNCONTROLLED THROUGH CHANNEL, LOTS 1T06
*
*

| CALIB NASHYD | Area (ha)= 27.58 Curve Number (CN)=82.00
| 01:CAT 10 DT= 1.00 | Ia (mm)= 7.800 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .835

Unit Hyd Qpeak (cms)= 1.262

PEAK FLOW (cms)= .583 (i)
TIME TO PEAK (hrs)= 2.267
RUNOFF VOLUME (mm)= 15.125
TOTAL RAINFALL (mm)= 45.371
RUNOFF COEFFICIENT = .333

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0004-----
*#800x1350 ELIPTICAL CULVERT CROSSING STREET 'A' STAGE-STORAGE-PERFORMANCE
*
*

| ROUTE RESERVOIR | Requested routing time step = 1.0 min.
| IN>01:(CAT 10) |
| OUT<02:(CULV) |
===== OUTFLOW STORAGE TABLE =====
OUTFLOW STORAGE OUTFLOW STORAGE
(cms) (ha.m.) (cms) (ha.m.)
.000 .0000E+00 .810 .1036E-02
.005 .4000E-05 1.270 .2234E-02
.130 .9100E-04 1.730 .4254E-02
.400 .3810E-03 2.115 .7169E-02

ROUTING RESULTS AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)

INFLOW >01: (CAT 10) 27.58 .583 2.267 15.125
OUTFLOW<02: (CULV) 27.58 .583 2.267 15.125

PEAK FLOW REDUCTION [Qout/Qin](%)= 100.001
TIME SHIFT OF PEAK FLOW (min)= .00
MAXIMUM STORAGE USED (ha.m.)=.6735E-03

*** WARNING: Inflow peak was not reduced!
Check OUTFLOW/STORAGE table or reduce DT.

001:0005-----

*ROUTING PROPOSED CONVEYANCE CHANNEL TO SUBDIVISION LIMIT

*

ROUTE CHANNEL	Routing time step (min) = 1.00
IN> 02:CULV	Number of SEGMENTS = 3
OUT< 03:CHAN	Slopes (%), CHANNEL=.25 FLOODPLAIN=.25
	LENGTH = 75.00 (m)

<----- DATA FOR SECTION (.9) ----->

Distance	Elevation	Manning
.00	247.68	.0300
3.74	246.43	.0300 / .0300 Main Channel
3.76	246.43	.0300 / .0300 Main Channel
7.50	247.68	.0300

<----- TRAVEL TIME TABLE ----->

DEPTH	ELEV	X-VOLUME	S-VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	D x V
(m)	(m)	(cu.m.)	(cu.m.)	(cms)	(m/s)	(min)	(m2/s)
.066	246.496	.102E+01	.179E+00	.002	.170	7.34	.011
.132	246.562	.399E+01	.140E+01	.014	.266	4.69	.035
.197	246.627	.890E+01	.468E+01*	.041	.347	3.60	.069
.263	246.693	.158E+02	.111E+02*	.088	.420	2.98	.110
.329	246.759	.246E+02	.215E+02*	.159	.486	2.57	.160
.395	246.825	.353E+02	.372E+02*	.258	.548	2.28	.216
.460	246.890	.480E+02	.589E+02*	.389	.607	2.06	.280
.526	246.956	.626E+02	.879E+02*	.554	.663	1.88	.349
.592	247.022	.792E+02	.125E+03*	.758	.717	1.74	.425
.658	247.088	.977E+02	.171E+03*	1.002	.769	1.63	.506
.724	247.154	.118E+03	.228E+03*	1.291	.819	1.53	.593
.789	247.219	.141E+03	.296E+03*	1.628	.868	1.44	.685
.855	247.285	.165E+03	.376E+03*	2.014	.916	1.37	.783
.921	247.351	.191E+03	.470E+03*	2.453	.962	1.30	.886
.987	247.417	.220E+03	.578E+03*	2.947	1.007	1.24	.994
1.053	247.483	.250E+03	.701E+03*	3.499	1.051	1.19	1.106
1.118	247.548	.282E+03	.841E+03*	4.112	1.094	1.14	1.224
1.184	247.614	.316E+03	.998E+03*	4.788	1.137	1.10	1.346
1.250	247.680	.352E+03	.117E+04*	5.529	1.178	1.06	1.473

X-VOLUME= Total X-Section volume over given CHANNEL LENGTH at specified DEPTH.

S-VOLUME= Volume that can be stored in channel at specified ELEVATION.

(*) Actual value may be less due to limited CHANNEL LENGTH for given SLOPE.

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2:CULV	27.58	.583	2.27	15.125	.536	.671
OUTFLOW: ID= 3:CHAN	27.58	.583	2.28	15.125	.534	.669

001:0006-----

*EXTERNAL FARMLAND THAT WILL ENTER PROPOSED SWM FACILITY

*

*

CALIB NASHYD	Area (ha)=	.62	Curve Number (CN)=84.00
04:CAT102 DT= 1.00	Ia (mm)=	7.000	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	.207	

Unit Hyd Qpeak (cms)= .114

PEAK FLOW (cms)= .039 (i)
TIME TO PEAK (hrs)= 1.433
RUNOFF VOLUME (mm)= 16.972
TOTAL RAINFALL (mm)= 45.371
RUNOFF COEFFICIENT = .374

(1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0007-----

*CONVEYING EXTERNAL FLOWS TO SWM FACILITY

*

ROUTE CHANNEL	Routing time step (min) = 1.00
IN> 04:CAT102	Number of SEGMENTS = 3
OUT< 05:EX2SWM	Slopes (%), CHANNEL=1.75 FLOODPLAIN=1.75
	LENGTH = 218.70 (m)

<----- DATA FOR SECTION (1.0) ----->

Distance	Elevation	Manning
.00	251.44	.0300
.49	251.30	.0300 / .0300 Main Channel
.50	251.30	.0300 / .0300 Main Channel
3.00	251.45	.0300

<----- TRAVEL TIME TABLE ----->

DEPTH	ELEV	X-VOLUME	S-VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	D x V
(m)	(m)	(cu.m.)	(cu.m.)	(cms)	(m/s)	(min)	(m2/s)
.007	251.307	.120E+00	.115E-03	.000	.105	34.85	.001
.015	251.315	.511E+00	.984E-03	.000	.172	21.16	.003
.022	251.322	.113E+01	.325E-02	.001	.223	16.33	.005
.029	251.329	.198E+01	.762E-02	.002	.269	13.57	.008
.037	251.337	.307E+01	.148E-01	.004	.311	11.73	.011
.044	251.344	.441E+01	.254E-01	.007	.350	10.42	.015
.052	251.352	.598E+01	.403E-01	.011	.387	9.42	.020
.059	251.359	.779E+01	.600E-01	.015	.423	8.63	.025
.066	251.366	.984E+01	.852E-01	.021	.457	7.98	.030
.074	251.374	.121E+02	.117E+00	.027	.489	7.45	.036
.081	251.381	.147E+02	.155E+00	.035	.521	6.99	.042
.088	251.388	.174E+02	.201E+00	.044	.552	6.60	.049
.096	251.396	.204E+02	.256E+00	.054	.582	6.26	.056
.103	251.403	.237E+02	.319E+00	.066	.611	5.96	.063
.111	251.411	.272E+02	.392E+00	.079	.640	5.70	.071
.118	251.418	.309E+02	.476E+00	.094	.667	5.46	.079
.125	251.425	.349E+02	.570E+00	.111	.695	5.25	.087
.133	251.433	.391E+02	.677E+00	.129	.722	5.05	.096
.140	251.440	.435E+02	.796E+00	.149	.748	4.87	.105

X-VOLUME= Total X-Section volume over given CHANNEL LENGTH at specified DEPTH.

S-VOLUME= Volume that can be stored in channel at specified ELEVATION.

	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 4:CAT102	.62	.039	1.43	16.972	.084	.534
OUTFLOW: ID= 5:EX2SWM	.62	.035	1.53	16.971	.081	.519

001:0008-----

*

✱
✱

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	.58	2.11
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.90	2.00
Length	(m)=	218.70	28.00
Mannings n	=	.015	.250

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

*

*

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

*

✱

ROUTE RESERVOIR Requested routing time step = 1.0 min.

2

```

PEAK FLOW REDUCTION [Qout/Qin](%)= 33.172
TIME SHIFT OF PEAK FLOW (min)= 34.00
MAXIMUM STORAGE USED (ha.m.)=.3880E-01

```

✱

Unit Hyd Opeak (cms)= .178

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

*

*

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

*

✱

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

WARNINGS / ERRORS / NOTES

001:0004 ROUTE RESERVOIR

*** WARNING: Inflow peak was not reduced!

Check OUTFLOW/STORAGE table or reduce DT.

Simulation ended on 2020-05-26 at 10:23:57

=====

10 Year Storm

SSSSS W W M M H H Y Y M M 000 999 999 =====
S W W W M M M H H Y Y M M 0 0 9 9 9 9
SSSSS W W W M M M H H H H Y M M M 0 0 ## 9 9 9 9 Ver 4.05
S W W M M H H Y M M 0 0 9999 9999 Sept 2011
SSSSS W W M M H H Y M M 000 9 9 9
StormWater Management Hydrologic Model 999 999 # 2957874
=====

***** SWHMYMO Ver/4.05 *****
***** A single event and continuous hydrologic simulation model *****
***** based on the principles of HYMO and its successors *****
***** OTTHYMO-83 and OTTHYMO-89. *****
***** Distributed by: J.F. Sabourin and Associates Inc. *****
***** Ottawa, Ontario: (613) 836-3884 *****
***** Gatineau, Quebec: (819) 243-6858 *****
***** E-Mail: swmhymo@jfsa.Com *****

++++++ Licensed user: AGM Engineering Ltd. ++++++
++++++ London SERIAL#:2957874 ++++++
++++++

***** +++++ PROGRAM ARRAY DIMENSIONS +++++ *****
***** Maximum value for ID numbers : 10 *****
***** Max. number of rainfall points: 105408 *****
***** Max. number of flow points : 105408 *****

***** D E T A I L E D O U T P U T *****

* DATE: 2020-05-26 TIME: 10:24:04 RUN COUNTER: 000528 *

* Input filename: G:\CLIENT\1430\1\SWHMYMO\Post\overall\pst010yr.dat *
* Output filename: G:\CLIENT\1430\1\SWHMYMO\Post\overall\pst010yr.out *
* Summary filename: G:\CLIENT\1430\1\SWHMYMO\Post\overall\pst010yr.sum *
* User comments: *
* 1: *
* 2: *
* 3: *

001:0001-----
*# Project Name: [10283 ILDERTON ROAD] Project Number: [1430-1]
*# Date : 05-06-2020
*# Modeller : [LRG]
*# Company : AGM Engineering Ltd.
*# License # : 2957874
*#

| START | Project dir.: G:\CLIENT\1430\1\SWHMYMO\Post\overall\
| Rainfall dir.: G:\CLIENT\1430\1\SWHMYMO\Post\overall\
TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 001
NSTORM= 0

001:0002-----
* [" "] <--storm filename, one per line for NSTORM time
*

*#
*# MODEL ASSESSING INTERNAL AND EXTERNAL FLOWS WITH EXTERNAL AREAS #
*# PASSING THROUGH THE PROPOSED DIVERSION CHANNEL #
*# #
*#####
*
*

CHICAGO STORM | IDF curve parameters: A=1497.190
| Ptotal= 52.60 mm | B= 7.188
C= .850
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = .38

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.08	3.401	.83	12.137	1.58	15.317	2.33	5.093
.17	3.688	.92	16.990	1.67	12.549	2.42	4.745
.25	4.030	1.00	27.637	1.75	10.612	2.50	4.443
.33	4.446	1.08	64.461	1.83	9.186	2.58	4.179
.42	4.963	1.17	178.745	1.92	8.096	2.67	3.945
.50	5.621	1.25	77.233	2.00	7.237	2.75	3.737
.58	6.488	1.33	40.683	2.08	6.545	2.83	3.551
.67	7.679	1.42	26.672	2.17	5.975	2.92	3.383
.75	9.410	1.50	19.545	2.25	5.498	3.00	3.231

001:0003-----
*
*#REAR YARDS AND EXTERNAL AREA DRAINING UNCONTROLLED THROUGH CHANNEL, LOTS 1TO6
*
*

CALIB NASHYD | Area (ha)= 27.58 Curve Number (CN)=82.00
| 01:CAT 10 DT= 1.00 | Ia (mm)= 7.800 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .835

Unit Hyd Qpeak (cms)= 1.262

PEAK FLOW (cms)= .776 (i)
TIME TO PEAK (hrs)= 2.233
RUNOFF VOLUME (mm)= 19.956
TOTAL RAINFALL (mm)= 52.596
RUNOFF COEFFICIENT = .379

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0004-----
*#800x1350 ELIPTICAL CULVERT CROSSING STREET 'A' STAGE-STORAGE-PERFORMANCE
*
*

ROUTE RESERVOIR | Requested routing time step = 1.0 min.
| IN>01:(CAT 10) |
| OUT<02:(CULV) |

OUTFLOW	STORAGE	OUTFLOW	STORAGE
(cms)	(ha.m.)	(cms)	(ha.m.)
.000	.0000E+00	.810	.1036E-02
.005	.4000E-05	1.270	.2234E-02
.130	.9100E-04	1.730	.4254E-02
.400	.3810E-03	2.115	.7169E-02

ROUTING RESULTS AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)

INFLOW >01: (CAT 10) 27.58 .776 2.233 19.956
OUTFLOW<02: (CULV) 27.58 .775 2.233 19.956

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.994
TIME SHIFT OF PEAK FLOW (min)= .00
MAXIMUM STORAGE USED (ha.m.)=.9810E-03

001:0005-----

*#ROUTING PROPOSED CONVEYANCE CHANNEL TO SUBDIVISION LIMIT

*

ROUTE CHANNEL	Routing time step (min) = 1.00
IN> 02:CULV	Number of SEGMENTS = 3
OUT< 03:CHAN	Slopes (%), CHANNEL= .25 FLOODPLAIN= .25
	LENGTH = 75.00 (m)

<----- DATA FOR SECTION (.9) ----->		
Distance	Elevation	Manning
.00	247.68	.0300
3.74	246.43	.0300 / .0300 Main Channel
3.76	246.43	.0300 / .0300 Main Channel
7.50	247.68	.0300

<----- TRAVEL TIME TABLE ----->									
DEPTH	ELEV	X-VOLUME	S-VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	D x V		
(m)	(m)	(cu.m.)	(cu.m.)	(cms)	(m/s)	(min)	(m2/s)		
.066	246.496	.102E+01	.179E+00	.002	.170	7.34	.011		
.132	246.562	.399E+01	.140E+01	.014	.266	4.69	.035		
.197	246.627	.890E+01	.468E+01*	.041	.347	3.60	.069		
.263	246.693	.158E+02	.111E+02*	.088	.420	2.98	.110		
.329	246.759	.246E+02	.215E+02*	.159	.486	2.57	.160		
.395	246.825	.353E+02	.372E+02*	.258	.548	2.28	.216		
.460	246.890	.480E+02	.589E+02*	.389	.607	2.06	.280		
.526	246.956	.626E+02	.879E+02*	.554	.663	1.88	.349		
.592	247.022	.792E+02	.125E+03*	.758	.717	1.74	.425		
.658	247.088	.977E+02	.171E+03*	1.002	.769	1.63	.506		
.724	247.154	.118E+03	.228E+03*	1.291	.819	1.53	.593		
.789	247.219	.141E+03	.296E+03*	1.628	.868	1.44	.685		
.855	247.285	.165E+03	.376E+03*	2.014	.916	1.37	.783		
.921	247.351	.191E+03	.470E+03*	2.453	.962	1.30	.886		
.987	247.417	.220E+03	.578E+03*	2.947	1.007	1.24	.994		
1.053	247.483	.250E+03	.701E+03*	3.499	1.051	1.19	1.106		
1.118	247.548	.282E+03	.841E+03*	4.112	1.094	1.14	1.224		
1.184	247.614	.316E+03	.998E+03*	4.788	1.137	1.10	1.346		
1.250	247.680	.352E+03	.117E+04*	5.529	1.178	1.06	1.473		

X-VOLUME= Total X-Section volume over given CHANNEL LENGTH at specified DEPTH.

S-VOLUME= Volume that can be stored in channel at specified ELEVATION.

(*) Actual value may be less due to limited CHANNEL LENGTH for given SLOPE.

<---- hydrograph ---->				<-pipe / channel->	
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2:CULV	27.58	.775	2.23	19.956	.597
OUTFLOW: ID= 3:CHAN	27.58	.774	2.28	19.956	.597

001:0006-----

*

*#EXTERNAL FARMLAND THAT WILL ENTER PROPOSED SWM FACILITY

*

*

CALIB NASHYD	Area	(ha)=	.62	Curve Number (CN)=	84.00
04:CAT102 DT= 1.00	Ia	(mm)=	7.000	# of Linear Res.(N)=	3.00

U.H. Tp(hrs)= .207

Unit Hyd Qpeak (cms)= .114

PEAK FLOW (cms)= .052 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 22.122
TOTAL RAINFALL (mm)= 52.596
RUNOFF COEFFICIENT = .421

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0007-----

*#CONVEYING EXTERNAL FLOWS TO SWM FACILITY

*

ROUTE CHANNEL	Routing time step (min) = 1.00
IN> 04:CAT102	Number of SEGMENTS = 3
OUT< 05:EX2SWM	Slopes (%), CHANNEL=1.75 FLOODPLAIN=1.75
	LENGTH = 218.70 (m)

<----- DATA FOR SECTION (1.0) ----->		
Distance	Elevation	Manning
.00	251.44	.0300
.49	251.30	.0300 / .0300 Main Channel
.50	251.30	.0300 / .0300 Main Channel
3.00	251.45	.0300

<----- TRAVEL TIME TABLE ----->									
DEPTH	ELEV	X-VOLUME	S-VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	D x V		
(m)	(m)	(cu.m.)	(cu.m.)	(cms)	(m/s)	(min)	(m2/s)		
.007	251.307	.120E+00	.115E-03	.000	.105	34.85	.001		
.015	251.315	.511E+00	.984E-03	.000	.172	21.16	.003		
.022	251.322	.113E+01	.325E-02	.001	.223	16.33	.005		
.029	251.329	.198E+01	.762E-02	.002	.269	13.57	.008		
.037	251.337	.307E+01	.148E-01	.004	.311	11.73	.011		
.044	251.344	.441E+01	.254E-01	.007	.350	10.42	.015		
.052	251.352	.598E+01	.403E-01	.011	.387	9.42	.020		
.059	251.359	.779E+01	.600E-01	.015	.423	8.63	.025		
.066	251.366	.984E+01	.852E-01	.021	.457	7.98	.030		
.074	251.374	.121E+02	.117E+00	.027	.489	7.45	.036		
.081	251.381	.147E+02	.155E+00	.035	.521	6.99	.042		
.088	251.388	.174E+02	.201E+00	.044	.552	6.60	.049		
.096	251.396	.204E+02	.256E+00	.054	.582	6.26	.056		
.103	251.403	.237E+02	.319E+00	.066	.611	5.96	.063		
.111	251.411	.272E+02	.392E+00	.079	.640	5.70	.071		
.118	251.418	.309E+02	.476E+00	.094	.667	5.46	.079		
.125	251.425	.349E+02	.570E+00	.111	.695	5.25	.087		
.133	251.433	.391E+02	.677E+00	.129	.722	5.05	.096		
.140	251.440	.435E+02	.796E+00	.149	.748	4.87	.105		

X-VOLUME= Total X-Section volume over given CHANNEL LENGTH at specified DEPTH.

S-VOLUME= Volume that can be stored in channel at specified ELEVATION.

<---- hydrograph ---->				<-pipe / channel->	
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 4:CAT102	.62	.052	1.42	22.122	.094
OUTFLOW: ID= 5:EX2SWM	.62	.047	1.52	22.122	.090

001:0008-----

*

*#RIGHT-OF-WAY AND LOTS DRAINING AT GRASSED LEVELS

*

*
CALIB STANDHYD
06:CAT 1 DT= 1.00
Area (ha)= 2.69
Total Imp(%)= 21.47
Dir. Conn.(%)= 19.64

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= .58 2.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.90 2.00
Length (m)= 218.70 28.00
Mannings n = .015 .250
Max.eff.Inten.(mm/hr)= 178.75 72.48
over (min)= 3.00 9.00
Storage Coeff. (min)= 2.91 (ii) 9.39 (ii)
Unit Hyd. Tpeak (min)= 3.00 9.00
Unit Hyd. peak (cms)= .38 .12
TOTALS
PEAK FLOW (cms)= .22 .26 .372 (iii)
TIME TO PEAK (hrs)= 1.18 1.30 1.267
RUNOFF VOLUME (mm)= 50.60 25.83 30.695
TOTAL RAINFALL (mm)= 52.60 52.60 52.596
RUNOFF COEFFICIENT = .96 .49 .584

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0009-
*
*#COMBINED FLOWS TRIBUTARY TO SWM FACILITY
*
*
ADD HYD (2POND) ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 05:EX2SWMF .62 .047 1.52 22.12 .000
+ID2 06:CAT 1 2.69 .372 1.27 30.70 .000
SUM 07:2POND 3.31 .387 1.28 29.09 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0010-
*
*#PROPOSED DRY POND SWM FACILITY STAGE-STORAGE-DISCHARGE
*
*
ROUTE RESERVOIR Requested routing time step = 1.0 min.
IN>07:(2POND)
OUT<08:(SWMF)
===== OUTFLOW STORAGE TABLE =====
OUTFLOW STORAGE OUTFLOW STORAGE
(cms) (ha.m.) (cms) (ha.m.)
.000 .0000E+00 .100 .4172E-01
.001 .5000E-04 .148 .4975E-01
.009 .1310E-02 .175 .5835E-01
.028 .4800E-02 .197 .6754E-01
.037 .9680E-02 .216 .7735E-01
.045 .1504E-01 .234 .8778E-01
.052 .2092E-01 .250 .9888E-01
.054 .2405E-01 .265 .1107E+00
.059 .2732E-01 .280 .1231E+00
.076 .3425E-01 .000 .0000E+00

ROUTING RESULTS AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW >07: (2POND) 3.31 .387 1.283 29.089
OUTFLOW<08: (SWMF) 3.31 .135 1.767 29.089

PEAK FLOW REDUCTION [Qout/Qin](%)= 34.771
TIME SHIFT OF PEAK FLOW (min)= 29.00
MAXIMUM STORAGE USED (ha.m.)=.4752E-01

001:0011-
*
*#FLOWS FROM THE REAR OF LOT 12 AND 13 TO BE UNCONTROLLED AT GRASSED LEVELS
*
CALIB NASHYD Area (ha)= .54 Curve Number (CN)=86.50
09:CAT 2 DT= 1.00 Ia (mm)= 4.940 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .116
Unit Hyd Qpeak (cms)= .178
PEAK FLOW (cms)= .076 (i)
TIME TO PEAK (hrs)= 1.283
RUNOFF VOLUME (mm)= 26.015
TOTAL RAINFALL (mm)= 52.596
RUNOFF COEFFICIENT = .495
(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0012-
*
*#COMBINED DIVERTED FLOW THORUGH THE SITE TO THE SOUTHWEST
*
*
ADD HYD (BYPASS) ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 09:CAT 2 .54 .076 1.28 26.02 .000
+ID2 03:CHAN 27.58 .774 2.28 19.96 .000
SUM 10:BYPASS 28.12 .782 2.22 20.07 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0013-
*
*#COMBINED POST DEVELOPMENT DISCHARGE LEAVING THE SITE TO THE SOUTHWEST
*
*
ADD HYD (EXIT) ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 10:BYPASS 28.12 .782 2.22 20.07 .000
+ID2 08:SWMF 3.31 .135 1.77 29.09 .000
SUM 01:EXIT 31.43 .883 2.20 21.02 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0014-
FINISH

WARNINGS / ERRORS / NOTES

Simulation ended on 2020-05-26 at 10:24:05

=====

25 Year Storm

```
=====
SSSSS W W M M H H Y Y M M 000      999 999 =====
S      W W W M M M H H Y Y M M 0 0      9 9 9 9
SSSSS W W W M M M H H H H Y M M M 0 0 ## 9 9 9 9 Ver 4.05
S      W W M M H H Y M M 0 0      9999 9999 Sept 2011
SSSSS W W M M H H Y M M 000      9 9 9
StormWater Management Hydrologic Model      999 999 # 2957874
=====

***** SWHYMO Ver/4.05 *****
***** A single event and continuous hydrologic simulation model *****
***** based on the principles of HYMO and its successors *****
***** OTHYMO-83 and OTHYMO-89. *****
***** Distributed by: J.F. Sabourin and Associates Inc. *****
***** Ottawa, Ontario: (613) 836-3884 *****
***** Gatineau, Quebec: (819) 243-6858 *****
***** E-Mail: swmhyom@jfsa.Com *****

+++++ Licensed user: AGM Engineering Ltd. +++++
+++++ London SERIAL#:2957874 +++++

*****
***** +++++ PROGRAM ARRAY DIMENSIONS +++++ *****
***** Maximum value for ID numbers : 10 *****
***** Max. number of rainfall points: 105408 *****
***** Max. number of flow points : 105408 *****

***** D E T A I L E D O U T P U T *****
*****
* DATE: 2020-05-26 TIME: 10:24:11 RUN COUNTER: 000529 *
*****
* Input filename: G:\CLIENT\1430\1\SWHYMO\Post\overall\pst025yr.dat *
* Output filename: G:\CLIENT\1430\1\SWHYMO\Post\overall\pst025yr.out *
* Summary filename: G:\CLIENT\1430\1\SWHYMO\Post\overall\pst025yr.sum *
* User comments: *
* 1: *
* 2: *
* 3: *
*****

001:0001-----
*# Project Name: [10283 ILDERTON ROAD] Project Number: [1430-1]
*# Date : 05-06-2020
*# Modeller : [LRG]
*# Company : AGM Engineering Ltd.
*# License # : 2957874
*#
-----
| START | Project dir.: G:\CLIENT\1430\1\SWHYMO\Post\overall\
----- Rainfall dir.: G:\CLIENT\1430\1\SWHYMO\Post\overall\
TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 001
NSTORM= 0
-----
001:0002-----
* [" "] <--storm filename, one per line for NSTORM time
*
*****
```

```
*#
*# MODEL ASSESSING INTERNAL AND EXTERNAL FLOWS WITH EXTERNAL AREAS #
*# PASSING THROUGH THE PROPOSED DIVERSION CHANNEL #
*#
*# #####
*#
*#
```

```
-----
| CHICAGO STORM | IDF curve parameters: A=1455.000
| Ptotal= 60.38 mm | B= 5.000
C= .820
used in: INTENSITY = A / (t + B)^C
Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = .38
```

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.08	4.299	.83	13.644	1.58	16.893	2.33	6.207
.17	4.628	.92	18.591	1.67	14.069	2.42	5.821
.25	5.018	1.00	29.391	1.75	12.073	2.50	5.484
.33	5.487	1.08	68.962	1.83	10.590	2.58	5.187
.42	6.062	1.17	220.223	1.92	9.444	2.67	4.922
.50	6.787	1.25	83.137	2.00	8.532	2.75	4.685
.58	7.728	1.33	42.821	2.08	7.790	2.83	4.472
.67	9.001	1.42	28.399	2.17	7.173	2.92	4.279
.75	10.823	1.50	21.179	2.25	6.652	3.00	4.103

```
001:0003-----
*
*#REAR YARDS AND EXTERNAL AREA DRAINING UNCONTROLLED THROUGH CHANNEL, LOTS 1TO6
*
*#
```

```
-----
| CALIB NASHYD | Area (ha)= 27.58 Curve Number (CN)=82.00
| 01:CAT 10 DT= 1.00 | Ia (mm)= 7.800 # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)= .835
```

```
Unit Hyd Qpeak (cms)= 1.262

PEAK FLOW (cms)= .985 (i)
TIME TO PEAK (hrs)= 2.217
RUNOFF VOLUME (mm)= 25.519
TOTAL RAINFALL (mm)= 60.380
RUNOFF COEFFICIENT = .423
```

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
001:0004-----
*#800x1350 ELIPTICAL CULVERT CROSSING STREET 'A' STAGE-STORAGE-PERFORMANCE
*
*#
```

```
-----
| ROUTE RESERVOIR | Requested routing time step = 1.0 min.
| IN>01:(CAT 10) |
| OUT<02:(CULV ) |
===== OUTFLOW STORAGE TABLE =====
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
.000 .0000E+00 | .810 .1036E-02
.005 .4000E-05 | 1.270 .2234E-02
.130 .9100E-04 | 1.730 .4254E-02
.400 .3810E-03 | 2.115 .7169E-02
```

ROUTING RESULTS	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)

INFLOW >01: (CAT 10) 27.58 .985 2.217 25.519
OUTFLOW<02: (CULV) 27.58 .985 2.233 25.519

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.994
TIME SHIFT OF PEAK FLOW (min)= 1.00
MAXIMUM STORAGE USED (ha.m.)=.1492E-02

001:0005-----

*#ROUTING PROPOSED CONVEYANCE CHANNEL TO SUBDIVISION LIMIT

*

ROUTE CHANNEL	Routing time step (min) = 1.00
IN> 02:CULV	Number of SEGMENTS = 3
OUT< 03:CHAN	Slopes (%), CHANNEL= .25 FLOODPLAIN= .25
	LENGTH = 75.00 (m)

<----- DATA FOR SECTION (.9) ----->			
Distance	Elevation	Manning	
.00	247.68	.0300	
3.74	246.43	.0300 / .0300	Main Channel
3.76	246.43	.0300 / .0300	Main Channel
7.50	247.68	.0300	

<----- TRAVEL TIME TABLE ----->									
DEPTH	ELEV	X-VOLUME	S-VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	D x V		
(m)	(m)	(cu.m.)	(cu.m.)	(cms)	(m/s)	(min)	(m2/s)		
.066	246.496	.102E+01	.179E+00	.002	.170	7.34	.011		
.132	246.562	.399E+01	.140E+01	.014	.266	4.69	.035		
.197	246.627	.890E+01	.468E+01*	.041	.347	3.60	.069		
.263	246.693	.158E+02	.111E+02*	.088	.420	2.98	.110		
.329	246.759	.246E+02	.215E+02*	.159	.486	2.57	.160		
.395	246.825	.353E+02	.372E+02*	.258	.548	2.28	.216		
.460	246.890	.480E+02	.589E+02*	.389	.607	2.06	.280		
.526	246.956	.626E+02	.879E+02*	.554	.663	1.88	.349		
.592	247.022	.792E+02	.125E+03*	.758	.717	1.74	.425		
.658	247.088	.977E+02	.171E+03*	1.002	.769	1.63	.506		
.724	247.154	.118E+03	.228E+03*	1.291	.819	1.53	.593		
.789	247.219	.141E+03	.296E+03*	1.628	.868	1.44	.685		
.855	247.285	.165E+03	.376E+03*	2.014	.916	1.37	.783		
.921	247.351	.191E+03	.470E+03*	2.453	.962	1.30	.886		
.987	247.417	.220E+03	.578E+03*	2.947	1.007	1.24	.994		
1.053	247.483	.250E+03	.701E+03*	3.499	1.051	1.19	1.106		
1.118	247.548	.282E+03	.841E+03*	4.112	1.094	1.14	1.224		
1.184	247.614	.316E+03	.998E+03*	4.788	1.137	1.10	1.346		
1.250	247.680	.352E+03	.117E+04*	5.529	1.178	1.06	1.473		

X-VOLUME= Total X-Section volume over given CHANNEL LENGTH at specified DEPTH.
S-VOLUME= Volume that can be stored in channel at specified ELEVATION.
(*) Actual value may be less due to limited CHANNEL LENGTH for given SLOPE.

<---- hydrograph ---->					<-pipe / channel->	
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL	
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)	
INFLOW : ID= 2:CULV	27.58	.985	2.23 25.519	.653	.765	
OUTFLOW: ID= 3:CHAN	27.58	.984	2.20 25.519	.653	.765	

001:0006-----

*#EXTERNAL FARMLAND THAT WILL ENTER PROPOSED SWM FACILITY

*

CALIB NASHYD	Area	(ha)=	.62	Curve Number (CN)=	84.00
04:CAT102 DT= 1.00	Ia	(mm)=	7.000	# of Linear Res.(N)=	3.00

U.H. Tp(hrs)= .207

Unit Hyd Qpeak (cms)= .114

PEAK FLOW (cms)= .067 (i)
TIME TO PEAK (hrs)= 1.400
RUNOFF VOLUME (mm)= 28.001
TOTAL RAINFALL (mm)= 60.380
RUNOFF COEFFICIENT = .464

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0007-----

*#CONVEYING EXTERNAL FLOWS TO SWM FACILITY

*

ROUTE CHANNEL	Routing time step (min) = 1.00
IN> 04:CAT102	Number of SEGMENTS = 3
OUT< 05:EX2SWM	Slopes (%), CHANNEL=1.75 FLOODPLAIN=1.75
	LENGTH = 218.70 (m)

<----- DATA FOR SECTION (1.0) ----->			
Distance	Elevation	Manning	
.00	251.44	.0300	
.49	251.30	.0300 / .0300	Main Channel
.50	251.30	.0300 / .0300	Main Channel
3.00	251.45	.0300	

<----- TRAVEL TIME TABLE ----->									
DEPTH	ELEV	X-VOLUME	S-VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	D x V		
(m)	(m)	(cu.m.)	(cu.m.)	(cms)	(m/s)	(min)	(m2/s)		
.007	251.307	.120E+00	.115E-03	.000	.105	34.85	.001		
.015	251.315	.511E+00	.984E-03	.000	.172	21.16	.003		
.022	251.322	.113E+01	.325E-02	.001	.223	16.33	.005		
.029	251.329	.198E+01	.762E-02	.002	.269	13.57	.008		
.037	251.337	.307E+01	.148E-01	.004	.311	11.73	.011		
.044	251.344	.441E+01	.254E-01	.007	.350	10.42	.015		
.052	251.352	.598E+01	.403E-01	.011	.387	9.42	.020		
.059	251.359	.779E+01	.600E-01	.015	.423	8.63	.025		
.066	251.366	.984E+01	.852E-01	.021	.457	7.98	.030		
.074	251.374	.121E+02	.117E+00	.027	.489	7.45	.036		
.081	251.381	.147E+02	.155E+00	.035	.521	6.99	.042		
.088	251.388	.174E+02	.201E+00	.044	.552	6.60	.049		
.096	251.396	.204E+02	.256E+00	.054	.582	6.26	.056		
.103	251.403	.237E+02	.319E+00	.066	.611	5.96	.063		
.111	251.411	.272E+02	.392E+00	.079	.640	5.70	.071		
.118	251.418	.309E+02	.476E+00	.094	.667	5.46	.079		
.125	251.425	.349E+02	.570E+00	.111	.695	5.25	.087		
.133	251.433	.391E+02	.677E+00	.129	.722	5.05	.096		
.140	251.440	.435E+02	.796E+00	.149	.748	4.87	.105		

X-VOLUME= Total X-Section volume over given CHANNEL LENGTH at specified DEPTH.
S-VOLUME= Volume that can be stored in channel at specified ELEVATION.

<---- hydrograph ---->					<-pipe / channel->	
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL	
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)	
INFLOW : ID= 4:CAT102	.62	.067	1.40 28.001	.103	.612	
OUTFLOW: ID= 5:EX2SWM	.62	.061	1.50 28.000	.100	.597	

001:0008-----

*#RIGHT-OF-WAY AND LOTS DRAINING AT GRASSED LEVELS

*

*
CALIB STANDHYD
06:CAT 1 DT= 1.00
Area (ha)= 2.69
Total Imp(%)= 21.47
Dir. Conn.(%)= 19.64

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= .58 2.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.90 2.00
Length (m)= 218.70 28.00
Mannings n = .015 .250
Max.eff.Inten.(mm/hr)= 220.22 98.48
over (min)= 3.00 8.00
Storage Coeff. (min)= 2.68 (ii) 8.41 (ii)
Unit Hyd. Tpeak (min)= 3.00 8.00
Unit Hyd. peak (cms)= .40 .14
TOTALS
PEAK FLOW (cms)= .27 .36 .498 (iii)
TIME TO PEAK (hrs)= 1.18 1.28 1.250
RUNOFF VOLUME (mm)= 58.38 32.11 37.271
TOTAL RAINFALL (mm)= 60.38 60.38 60.380
RUNOFF COEFFICIENT = .97 .53 .617

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0009-
*
*#COMBINED FLOWS TRIBUTARY TO SWM FACILITY
*
*
| ADD HYD (2POND) | ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 05:EX2SWMF .62 .061 1.50 28.00 .000
+ID2 06:CAT 1 2.69 .498 1.25 37.27 .000
=====
SUM 07:2POND 3.31 .518 1.27 35.53 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0010-
*
*#PROPOSED DRY POND SWM FACILITY STAGE-STORAGE-DISCHARGE
*
*
Requested routing time step = 1.0 min.
===== OUTFLOW STORAGE TABLE =====
OUTFLOW STORAGE OUTFLOW STORAGE
(cms) (ha.m.) (cms) (ha.m.)
.000 .0000E+00 .100 .4172E-01
.001 .5000E-04 .148 .4975E-01
.009 .1310E-02 .175 .5835E-01
.028 .4800E-02 .197 .6754E-01
.037 .9680E-02 .216 .7735E-01
.045 .1504E-01 .234 .8778E-01
.052 .2092E-01 .250 .9888E-01
.054 .2405E-01 .265 .1107E+00
.059 .2732E-01 .280 .1231E+00
.076 .3425E-01 .000 .0000E+00

ROUTING RESULTS AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW >07: (2POND) 3.31 .518 1.267 35.534
OUTFLOW<08: (SWMF) 3.31 .169 1.717 35.534

PEAK FLOW REDUCTION [Qout/Qin](%)= 32.621
TIME SHIFT OF PEAK FLOW (min)= 27.00
MAXIMUM STORAGE USED (ha.m.)= .5646E-01

001:0011-
*
*#FLOWS FROM THE REAR OF LOT 12 AND 13 TO BE UNCONTROLLED AT GRASSED LEVELS
*
*
CALIB NASHYD Area (ha)= .54 Curve Number (CN)=86.50
09:CAT 2 DT= 1.00 Ia (mm)= 4.940 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .116
Unit Hyd Qpeak (cms)= .178
PEAK FLOW (cms)= .098 (i)
TIME TO PEAK (hrs)= 1.283
RUNOFF VOLUME (mm)= 32.325
TOTAL RAINFALL (mm)= 60.380
RUNOFF COEFFICIENT = .535
(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0012-
*
*#COMBINED DIVERTED FLOW THORUGH THE SITE TO THE SOUTHWEST
*
*
| ADD HYD (BYPASS) | ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 09:CAT 2 .54 .098 1.28 32.33 .000
+ID2 03:CHAN 27.58 .984 2.20 25.52 .000
=====
SUM 10:BYPASS 28.12 .993 2.20 25.65 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0013-
*
*#COMBINED POST DEVELOPMENT DISCHARGE LEAVING THE SITE TO THE SOUTHWEST
*
*
| ADD HYD (EXIT) | ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 10:BYPASS 28.12 .993 2.20 25.65 .000
+ID2 08:SWMF 3.31 .169 1.72 35.53 .000
=====
SUM 01:EXIT 31.43 1.128 2.18 26.69 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0014-
FINISH

WARNINGS / ERRORS / NOTES

Simulation ended on 2020-05-26 at 10:24:12

=====

50 Year Storm

ROUTE RESERVOIR		Requested routing time step = 1.0 min.			
IN<01: (CAT 10)					
OUT<02: (CULV)					
OUTFLOW	OUTFLOW STORAGE	OUTFLOW	STORAGE	OUTFLOW	STORAGE
(cms)	(ha.m.)	(cms)	(ha.m.)	(cms)	(ha.m.)
.000	.0000E+00	.810	.1036E-02		
.005	.4000E-05	1.270	.2234E-02		
.130	.9100E-04	1.730	.4254E-02		
.400	.3810E-03	2.115	.7169E-02		
ROUTING RESULTS		AREA	OPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)

INFLOW >01: (CAT 10) 27.58 1.151 2.217 29.815
OUTFLOW<02: (CULV) 27.58 1.151 2.217 29.815

PEAK FLOW REDUCTION [Qout/Qin](%)= 100.000
TIME SHIFT OF PEAK FLOW (min)= .00
MAXIMUM STORAGE USED (ha.m.)=.1923E-02

001:0005-----

*#ROUTING PROPOSED CONVEYANCE CHANNEL TO SUBDIVISION LIMIT

*

ROUTE CHANNEL	Routing time step (min) = 1.00
IN> 02:CULV	Number of SEGMENTS = 3
OUT< 03:CHAN	Slopes (%), CHANNEL= .25 FLOODPLAIN= .25
	LENGTH = 75.00 (m)

<----- DATA FOR SECTION (.9) ----->			
Distance	Elevation	Manning	
.00	247.68	.0300	
3.74	246.43	.0300 / .0300	Main Channel
3.76	246.43	.0300 / .0300	Main Channel
7.50	247.68	.0300	

<----- TRAVEL TIME TABLE ----->									
DEPTH	ELEV	X-VOLUME	S-VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	D x V		
(m)	(m)	(cu.m.)	(cu.m.)	(cms)	(m/s)	(min)	(m2/s)		
.066	246.496	.102E+01	.179E+00	.002	.170	7.34	.011		
.132	246.562	.399E+01	.140E+01	.014	.266	4.69	.035		
.197	246.627	.890E+01	.468E+01*	.041	.347	3.60	.069		
.263	246.693	.158E+02	.111E+02*	.088	.420	2.98	.110		
.329	246.759	.246E+02	.215E+02*	.159	.486	2.57	.160		
.395	246.825	.353E+02	.372E+02*	.258	.548	2.28	.216		
.460	246.890	.480E+02	.589E+02*	.389	.607	2.06	.280		
.526	246.956	.626E+02	.879E+02*	.554	.663	1.88	.349		
.592	247.022	.792E+02	.125E+03*	.758	.717	1.74	.425		
.658	247.088	.977E+02	.171E+03*	1.002	.769	1.63	.506		
.724	247.154	.118E+03	.228E+03*	1.291	.819	1.53	.593		
.789	247.219	.141E+03	.296E+03*	1.628	.868	1.44	.685		
.855	247.285	.165E+03	.376E+03*	2.014	.916	1.37	.783		
.921	247.351	.191E+03	.470E+03*	2.453	.962	1.30	.886		
.987	247.417	.220E+03	.578E+03*	2.947	1.007	1.24	.994		
1.053	247.483	.250E+03	.701E+03*	3.499	1.051	1.19	1.106		
1.118	247.548	.282E+03	.841E+03*	4.112	1.094	1.14	1.224		
1.184	247.614	.316E+03	.998E+03*	4.788	1.137	1.10	1.346		
1.250	247.680	.352E+03	.117E+04*	5.529	1.178	1.06	1.473		

X-VOLUME= Total X-Section volume over given CHANNEL LENGTH at specified DEPTH.
S-VOLUME= Volume that can be stored in channel at specified ELEVATION.
(*) Actual value may be less due to limited CHANNEL LENGTH for given SLOPE.

<---- hydrograph ---->					<-pipe / channel->	
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL	
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)	
INFLOW : ID= 2:CULV	27.58	1.151	2.22 29.815	.692	.794	
OUTFLOW: ID= 3:CHAN	27.58	1.150	2.23 29.815	.689	.792	

001:0006-----

*#EXTERNAL FARMLAND THAT WILL ENTER PROPOSED SWM FACILITY

*

CALIB NASHYD	Area	(ha)=	.62	Curve Number (CN)=	84.00
04:CAT102 DT= 1.00	Ia	(mm)=	7.000	# of Linear Res.(N)=	3.00

U.H. Tp(hrs)= .207

Unit Hyd Qpeak (cms)= .114

PEAK FLOW (cms)= .078 (i)
TIME TO PEAK (hrs)= 1.400
RUNOFF VOLUME (mm)= 32.513
TOTAL RAINFALL (mm)= 66.120
RUNOFF COEFFICIENT = .492

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0007-----

*#CONVEYING EXTERNAL FLOWS TO SWM FACILITY

*

ROUTE CHANNEL	Routing time step (min) = 1.00
IN> 04:CAT102	Number of SEGMENTS = 3
OUT< 05:EX2SWM	Slopes (%), CHANNEL=1.75 FLOODPLAIN=1.75
	LENGTH = 218.70 (m)

<----- DATA FOR SECTION (1.0) ----->			
Distance	Elevation	Manning	
.00	251.44	.0300	
.49	251.30	.0300 / .0300	Main Channel
.50	251.30	.0300 / .0300	Main Channel
3.00	251.45	.0300	

<----- TRAVEL TIME TABLE ----->									
DEPTH	ELEV	X-VOLUME	S-VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	D x V		
(m)	(m)	(cu.m.)	(cu.m.)	(cms)	(m/s)	(min)	(m2/s)		
.007	251.307	.120E+00	.115E-03	.000	.105	34.85	.001		
.015	251.315	.511E+00	.984E-03	.000	.172	21.16	.003		
.022	251.322	.113E+01	.325E-02	.001	.223	16.33	.005		
.029	251.329	.198E+01	.762E-02	.002	.269	13.57	.008		
.037	251.337	.307E+01	.148E-01	.004	.311	11.73	.011		
.044	251.344	.441E+01	.254E-01	.007	.350	10.42	.015		
.052	251.352	.598E+01	.403E-01	.011	.387	9.42	.020		
.059	251.359	.779E+01	.600E-01	.015	.423	8.63	.025		
.066	251.366	.984E+01	.852E-01	.021	.457	7.98	.030		
.074	251.374	.121E+02	.117E+00	.027	.489	7.45	.036		
.081	251.381	.147E+02	.155E+00	.035	.521	6.99	.042		
.088	251.388	.174E+02	.201E+00	.044	.552	6.60	.049		
.096	251.396	.204E+02	.256E+00	.054	.582	6.26	.056		
.103	251.403	.237E+02	.319E+00	.066	.611	5.96	.063		
.111	251.411	.272E+02	.392E+00	.079	.640	5.70	.071		
.118	251.418	.309E+02	.476E+00	.094	.667	5.46	.079		
.125	251.425	.349E+02	.570E+00	.111	.695	5.25	.087		
.133	251.433	.391E+02	.677E+00	.129	.722	5.05	.096		
.140	251.440	.435E+02	.796E+00	.149	.748	4.87	.105		

X-VOLUME= Total X-Section volume over given CHANNEL LENGTH at specified DEPTH.
S-VOLUME= Volume that can be stored in channel at specified ELEVATION.

<---- hydrograph ---->					<-pipe / channel->	
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL	
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)	
INFLOW : ID= 4:CAT102	.62	.078	1.40 32.513	.110	.637	
OUTFLOW: ID= 5:EX2SWM	.62	.071	1.48 32.512	.106	.621	

001:0008-----

*#RIGHT-OF-WAY AND LOTS DRAINING AT GRASSED LEVELS

*

*
CALIB STANDHYD
06:CAT 1 DT= 1.00
Area (ha)= 2.69
Total Imp(%)= 21.47
Dir. Conn.(%)= 19.64

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= .58 2.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.90 2.00
Length (m)= 218.70 28.00
Mannings n = .015 .250
Max.eff.Inten.(mm/hr)= 249.21 116.15
over (min)= 3.00 8.00
Storage Coeff. (min)= 2.55 (ii) 7.92 (ii)
Unit Hyd. Tpeak (min)= 3.00 8.00
Unit Hyd. peak (cms)= .42 .14
TOTALS
PEAK FLOW (cms)= .30 .43 .585 (iii)
TIME TO PEAK (hrs)= 1.18 1.28 1.250
RUNOFF VOLUME (mm)= 64.12 36.89 42.238
TOTAL RAINFALL (mm)= 66.12 66.12 66.120
RUNOFF COEFFICIENT = .97 .56 .639

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0009-
*
*#COMBINED FLOWS TRIBUTARY TO SWM FACILITY
*
*
| ADD HYD (2POND) | ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 05:EX2SWMF .62 .071 1.48 32.51 .000
+ID2 06:CAT 1 2.69 .585 1.25 42.24 .000
=====
SUM 07:2POND 3.31 .609 1.27 40.42 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0010-
*
*#PROPOSED DRY POND SWM FACILITY STAGE-STORAGE-DISCHARGE
*
*
Requested routing time step = 1.0 min.
===== OUTFLOW STORAGE TABLE =====
OUTFLOW STORAGE OUTFLOW STORAGE
(cms) (ha.m.) (cms) (ha.m.)
.000 .0000E+00 .100 .4172E-01
.001 .5000E-04 .148 .4975E-01
.009 .1310E-02 .175 .5835E-01
.028 .4800E-02 .197 .6754E-01
.037 .9680E-02 .216 .7735E-01
.045 .1504E-01 .234 .8778E-01
.052 .2092E-01 .250 .9888E-01
.054 .2405E-01 .265 .1107E+00
.059 .2732E-01 .280 .1231E+00
.076 .3425E-01 .000 .0000E+00

ROUTING RESULTS AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW >07: (2POND) 3.31 .609 1.267 40.416
OUTFLOW<08: (SWMF) 3.31 .189 1.700 40.416
PEAK FLOW REDUCTION [Qout/Qin](%)= 30.992
TIME SHIFT OF PEAK FLOW (min)= 26.00
MAXIMUM STORAGE USED (ha.m.)=.6422E-01

001:0011-
*
*#FLOWS FROM THE REAR OF LOT 12 AND 13 TO BE UNCONTROLLED AT GRASSED LEVELS
*
*
CALIB NASHYD Area (ha)= .54 Curve Number (CN)=86.50
09:CAT 2 DT= 1.00 Ia (mm)= 4.940 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .116
Unit Hyd Qpeak (cms)= .178
PEAK FLOW (cms)= .115 (i)
TIME TO PEAK (hrs)= 1.283
RUNOFF VOLUME (mm)= 37.125
TOTAL RAINFALL (mm)= 66.120
RUNOFF COEFFICIENT = .561
(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0012-
*
*#COMBINED DIVERTED FLOW THORUGH THE SITE TO THE SOUTHWEST
*
*
| ADD HYD (BYPASS) | ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 09:CAT 2 .54 .115 1.28 37.12 .000
+ID2 03:CHAN 27.58 1.150 2.23 29.82 .000
=====
SUM 10:BYPASS 28.12 1.161 2.22 29.96 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0013-
*
*#COMBINED POST DEVELOPMENT DISCHARGE LEAVING THE SITE TO THE SOUTHWEST
*
*
| ADD HYD (EXIT) | ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 10:BYPASS 28.12 1.161 2.22 29.96 .000
+ID2 08:SWMF 3.31 .189 1.70 40.42 .000
=====
SUM 01:EXIT 31.43 1.320 2.20 31.06 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0014-
FINISH

WARNINGS / ERRORS / NOTES

Simulation ended on 2020-05-26 at 10:24:19

=====

100 Year Storm

SSSSS W W M M H H Y Y M M 000 999 999 =====
S W W W M M M H H Y Y M M 0 0 9 9 9 9
SSSSS W W W M M M H H H H Y M M M 0 0 ## 9 9 9 9 Ver 4.05
S W W M M H H Y M M 0 0 9999 9999 Sept 2011
SSSSS W W M M H H Y M M 000 9 9 9
StormWater Management Hydrologic Model 999 999 # 2957874
=====

***** SWHMYMO Ver/4.05 *****
***** A single event and continuous hydrologic simulation model *****
***** based on the principles of HYMO and its successors *****
***** OTTHYMO-83 and OTTHYMO-89. *****
***** Distributed by: J.F. Sabourin and Associates Inc. *****
***** Ottawa, Ontario: (613) 836-3884 *****
***** Gatineau, Quebec: (819) 243-6858 *****
***** E-Mail: swmhymo@jfsa.Com *****

++++++ Licensed user: AGM Engineering Ltd. ++++++
++++++ London SERIAL#:2957874 ++++++
++++++

***** +++++ PROGRAM ARRAY DIMENSIONS +++++ *****
***** Maximum value for ID numbers : 10 *****
***** Max. number of rainfall points: 105408 *****
***** Max. number of flow points : 105408 *****

***** D E T A I L E D O U T P U T *****

* DATE: 2020-05-26 TIME: 10:24:26 RUN COUNTER: 000531 *

* Input filename: G:\CLIENT\1430\1\SWHMYMO\Post\overall\pst100yr.dat *
* Output filename: G:\CLIENT\1430\1\SWHMYMO\Post\overall\pst100yr.out *
* Summary filename: G:\CLIENT\1430\1\SWHMYMO\Post\overall\pst100yr.sum *
* User comments: *
* 1: *
* 2: *
* 3: *

001:0001-----
*# Project Name: [10283 ILDERTON ROAD] Project Number: [1430-1]
*# Date : 05-06-2020
*# Modeller : [LRG]
*# Company : AGM Engineering Ltd.
*# License # : 2957874
*#

| START | Project dir.: G:\CLIENT\1430\1\SWHMYMO\Post\overall\
| Rainfall dir.: G:\CLIENT\1430\1\SWHMYMO\Post\overall\
TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 001
NSTORM= 0

001:0002-----
* [" "] <--storm filename, one per line for NSTORM time
*

*#
*# MODEL ASSESSING INTERNAL AND EXTERNAL FLOWS WITH EXTERNAL AREAS #
*# PASSING THROUGH THE PROPOSED DIVERSION CHANNEL #
*# #
*#####
*
*

| CHICAGO STORM | IDF curve parameters: A=1499.530
| Ptotal= 71.80 mm | B= 3.297
C= .794
used in: INTENSITY = A / (t + B)^C
Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = .38

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.08	5.550	.83	16.054	1.58	19.524	2.33	7.799
.17	5.944	.92	21.315	1.67	16.513	2.42	7.351
.25	6.407	1.00	32.597	1.75	14.357	2.50	6.956
.33	6.959	1.08	75.188	1.83	12.735	2.58	6.606
.42	7.631	1.17	279.468	1.92	11.468	2.67	6.293
.50	8.468	1.25	90.785	2.00	10.450	2.75	6.011
.58	9.542	1.33	46.616	2.08	9.612	2.83	5.757
.67	10.974	1.42	31.567	2.17	8.911	2.92	5.525
.75	12.990	1.50	24.038	2.25	8.314	3.00	5.313

001:0003-----
*
*#REAR YARDS AND EXTERNAL AREA DRAINING UNCONTROLLED THROUGH CHANNEL, LOTS 1TO6
*
*

| CALIB NASHYD | Area (ha)= 27.58 Curve Number (CN)=82.00
| 01:CAT 10 DT= 1.00 | Ia (mm)= 7.800 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .835

Unit Hyd Qpeak (cms)= 1.262
PEAK FLOW (cms)= 1.315 (i)
TIME TO PEAK (hrs)= 2.200
RUNOFF VOLUME (mm)= 34.202
TOTAL RAINFALL (mm)= 71.799
RUNOFF COEFFICIENT = .476

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0004-----
*#800x1350 ELIPTICAL CULVERT CROSSING STREET 'A' STAGE-STORAGE-PERFORMANCE
*
*

| ROUTE RESERVOIR | Requested routing time step = 1.0 min.
| IN>01:(CAT 10) |
| OUT<02:(CULV) |
===== OUTFLOW STORAGE TABLE =====
OUTFLOW STORAGE OUTFLOW STORAGE
(cms) (ha.m.) (cms) (ha.m.)
.000 .0000E+00 .810 .1036E-02
.005 .4000E-05 1.270 .2234E-02
.130 .9100E-04 1.730 .4254E-02
.400 .3810E-03 2.115 .7169E-02

ROUTING RESULTS AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)

INFLOW >01: (CAT 10) 27.58 1.315 2.200 34.202
OUTFLOW<02: (CULV) 27.58 1.315 2.217 34.202

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.987
TIME SHIFT OF PEAK FLOW (min)= 1.00
MAXIMUM STORAGE USED (ha.m.)=.2431E-02

001:0005-----

*#ROUTING PROPOSED CONVEYANCE CHANNEL TO SUBDIVISION LIMIT

*

ROUTE CHANNEL	Routing time step (min) = 1.00
IN> 02:CULV	Number of SEGMENTS = 3
OUT< 03:CHAN	Slopes (%), CHANNEL= .25 FLOODPLAIN= .25
	LENGTH = 75.00 (m)

<----- DATA FOR SECTION (.9) ----->			
Distance	Elevation	Manning	
.00	247.68	.0300	
3.74	246.43	.0300 / .0300	Main Channel
3.76	246.43	.0300 / .0300	Main Channel
7.50	247.68	.0300	

<----- TRAVEL TIME TABLE ----->									
DEPTH	ELEV	X-VOLUME	S-VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	D x V		
(m)	(m)	(cu.m.)	(cu.m.)	(cms)	(m/s)	(min)	(m2/s)		
.066	246.496	.102E+01	.179E+00	.002	.170	7.34	.011		
.132	246.562	.399E+01	.140E+01	.014	.266	4.69	.035		
.197	246.627	.890E+01	.468E+01*	.041	.347	3.60	.069		
.263	246.693	.158E+02	.111E+02*	.088	.420	2.98	.110		
.329	246.759	.246E+02	.215E+02*	.159	.486	2.57	.160		
.395	246.825	.353E+02	.372E+02*	.258	.548	2.28	.216		
.460	246.890	.480E+02	.589E+02*	.389	.607	2.06	.280		
.526	246.956	.626E+02	.879E+02*	.554	.663	1.88	.349		
.592	247.022	.792E+02	.125E+03*	.758	.717	1.74	.425		
.658	247.088	.977E+02	.171E+03*	1.002	.769	1.63	.506		
.724	247.154	.118E+03	.228E+03*	1.291	.819	1.53	.593		
.789	247.219	.141E+03	.296E+03*	1.628	.868	1.44	.685		
.855	247.285	.165E+03	.376E+03*	2.014	.916	1.37	.783		
.921	247.351	.191E+03	.470E+03*	2.453	.962	1.30	.886		
.987	247.417	.220E+03	.578E+03*	2.947	1.007	1.24	.994		
1.053	247.483	.250E+03	.701E+03*	3.499	1.051	1.19	1.106		
1.118	247.548	.282E+03	.841E+03*	4.112	1.094	1.14	1.224		
1.184	247.614	.316E+03	.998E+03*	4.788	1.137	1.10	1.346		
1.250	247.680	.352E+03	.117E+04*	5.529	1.178	1.06	1.473		

X-VOLUME= Total X-Section volume over given CHANNEL LENGTH at specified DEPTH.
S-VOLUME= Volume that can be stored in channel at specified ELEVATION.
(*) Actual value may be less due to limited CHANNEL LENGTH for given SLOPE.

<---- hydrograph ---->					<-pipe / channel->	
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL	
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)	
INFLOW : ID= 2:CULV	27.58	1.315	2.22	34.202	.728	.823
OUTFLOW: ID= 3:CHAN	27.58	1.313	2.25	34.202	.728	.823

001:0006-----

*#EXTERNAL FARMLAND THAT WILL ENTER PROPOSED SWM FACILITY

*

CALIB NASHYD	Area	(ha)=	.62	Curve Number (CN)=	84.00
04:CAT102 DT= 1.00	Ia	(mm)=	7.000	# of Linear Res.(N)=	3.00

U.H. Tp(hrs)= .207

Unit Hyd Qpeak (cms)= .114

PEAK FLOW (cms)= .090 (i)
TIME TO PEAK (hrs)= 1.400
RUNOFF VOLUME (mm)= 37.099
TOTAL RAINFALL (mm)= 71.799
RUNOFF COEFFICIENT = .517

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0007-----

*#CONVEYING EXTERNAL FLOWS TO SWM FACILITY

*

ROUTE CHANNEL	Routing time step (min) = 1.00
IN> 04:CAT102	Number of SEGMENTS = 3
OUT< 05:EX2SWM	Slopes (%), CHANNEL=1.75 FLOODPLAIN=1.75
	LENGTH = 218.70 (m)

<----- DATA FOR SECTION (1.0) ----->			
Distance	Elevation	Manning	
.00	251.44	.0300	
.49	251.30	.0300 / .0300	Main Channel
.50	251.30	.0300 / .0300	Main Channel
3.00	251.45	.0300	

<----- TRAVEL TIME TABLE ----->									
DEPTH	ELEV	X-VOLUME	S-VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	D x V		
(m)	(m)	(cu.m.)	(cu.m.)	(cms)	(m/s)	(min)	(m2/s)		
.007	251.307	.120E+00	.115E-03	.000	.105	34.85	.001		
.015	251.315	.511E+00	.984E-03	.000	.172	21.16	.003		
.022	251.322	.113E+01	.325E-02	.001	.223	16.33	.005		
.029	251.329	.198E+01	.762E-02	.002	.269	13.57	.008		
.037	251.337	.307E+01	.148E-01	.004	.311	11.73	.011		
.044	251.344	.441E+01	.254E-01	.007	.350	10.42	.015		
.052	251.352	.598E+01	.403E-01	.011	.387	9.42	.020		
.059	251.359	.779E+01	.600E-01	.015	.423	8.63	.025		
.066	251.366	.984E+01	.852E-01	.021	.457	7.98	.030		
.074	251.374	.121E+02	.117E+00	.027	.489	7.45	.036		
.081	251.381	.147E+02	.155E+00	.035	.521	6.99	.042		
.088	251.388	.174E+02	.201E+00	.044	.552	6.60	.049		
.096	251.396	.204E+02	.256E+00	.054	.582	6.26	.056		
.103	251.403	.237E+02	.319E+00	.066	.611	5.96	.063		
.111	251.411	.272E+02	.392E+00	.079	.640	5.70	.071		
.118	251.418	.309E+02	.476E+00	.094	.667	5.46	.079		
.125	251.425	.349E+02	.570E+00	.111	.695	5.25	.087		
.133	251.433	.391E+02	.677E+00	.129	.722	5.05	.096		
.140	251.440	.435E+02	.796E+00	.149	.748	4.87	.105		

X-VOLUME= Total X-Section volume over given CHANNEL LENGTH at specified DEPTH.
S-VOLUME= Volume that can be stored in channel at specified ELEVATION.

<---- hydrograph ---->					<-pipe / channel->	
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL	
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)	
INFLOW : ID= 4:CAT102	.62	.090	1.40	37.099	.116	.659
OUTFLOW: ID= 5:EX2SWM	.62	.082	1.48	37.099	.111	.643

001:0008-----

*#RIGHT-OF-WAY AND LOTS DRAINING AT GRASSED LEVELS

*

*
CALIB STANDHYD
06:CAT 1 DT= 1.00
Area (ha)= 2.69
Total Imp(%)= 21.47
Dir. Conn.(%)= 19.64

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= .58 2.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.90 2.00
Length (m)= 218.70 28.00
Mannings n = .015 .250
Max.eff.Inten.(mm/hr)= 279.47 143.44
over (min)= 2.00 7.00
Storage Coeff. (min)= 2.43 (ii) 7.37 (ii)
Unit Hyd. Tpeak (min)= 2.00 7.00
Unit Hyd. peak (cms)= .49 .16
PEAK FLOW (cms)= .36 .52
TIME TO PEAK (hrs)= 1.17 1.27
RUNOFF VOLUME (mm)= 69.80 41.72
TOTAL RAINFALL (mm)= 71.80 71.80
RUNOFF COEFFICIENT = .97 .58

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0009-
*
*#COMBINED FLOWS TRIBUTARY TO SWM FACILITY
*
*
ADD HYD (2POND) ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 05:EX2SWMF .62 .082 1.48 37.10 .000
+ID2 06:CAT 1 2.69 .688 1.25 47.23 .000
SUM 07:2POND 3.31 .715 1.25 45.34 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0010-
*
*#PROPOSED DRY POND SWM FACILITY STAGE-STORAGE-DISCHARGE
*
*
Requested routing time step = 1.0 min.
ROUTE RESERVOIR
IN>07:(2POND)
OUT<08:(SWMF)
===== OUTFLOW STORAGE TABLE =====
OUTFLOW STORAGE OUTFLOW STORAGE
(cms) (ha.m.) (cms) (ha.m.)
.000 .0000E+00 .100 .4172E-01
.001 .5000E-04 .148 .4975E-01
.009 .1310E-02 .175 .5835E-01
.028 .4800E-02 .197 .6754E-01
.037 .9680E-02 .216 .7735E-01
.045 .1504E-01 .234 .8778E-01
.052 .2092E-01 .250 .9888E-01
.054 .2405E-01 .265 .1107E+00
.059 .2732E-01 .280 .1231E+00
.076 .3425E-01 .000 .0000E+00

ROUTING RESULTS AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW >07:(2POND) 3.31 .715 1.250 45.336
OUTFLOW<08:(SWMF) 3.31 .206 1.700 45.336

PEAK FLOW REDUCTION [Qout/Qin](%)= 28.765
TIME SHIFT OF PEAK FLOW (min)= 27.00
MAXIMUM STORAGE USED (ha.m.)=.7210E-01

001:0011-
*
*#FLOWS FROM THE REAR OF LOT 12 AND 13 TO BE UNCONTROLLED AT GRASSED LEVELS
*
CALIB NASHYD Area (ha)= .54 Curve Number (CN)=86.50
09:CAT 2 DT= 1.00 Ia (mm)= 4.940 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .116
Unit Hyd Qpeak (cms)= .178
PEAK FLOW (cms)= .131 (i)
TIME TO PEAK (hrs)= 1.267
RUNOFF VOLUME (mm)= 41.973
TOTAL RAINFALL (mm)= 71.799
RUNOFF COEFFICIENT = .585
(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0012-
*
*#COMBINED DIVERTED FLOW THORUGH THE SITE TO THE SOUTHWEST
*
*
ADD HYD (BYPASS) ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 09:CAT 2 .54 .131 1.27 41.97 .000
+ID2 03:CHAN 27.58 1.313 2.25 34.20 .000
SUM 10:BYPASS 28.12 1.325 2.18 34.35 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0013-
*
*#COMBINED POST DEVELOPMENT DISCHARGE LEAVING THE SITE TO THE SOUTHWEST
*
*
ADD HYD (EXIT) ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 10:BYPASS 28.12 1.325 2.18 34.35 .000
+ID2 08:SWMF 3.31 .206 1.70 45.34 .000
SUM 01:EXIT 31.43 1.505 2.18 35.51 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0014-
FINISH

WARNINGS / ERRORS / NOTES

Simulation ended on 2020-05-26 at 10:24:27

=====

250 Year Storm

SSSSS W W M M H H Y Y M M 000 999 999 =====
S W W W M M M H H Y Y M M 0 0 9 9 9 9
SSSSS W W W M M M H H H H Y M M M 0 0 ## 9 9 9 9 Ver 4.05
S W W M M H H Y M M 0 0 9999 9999 Sept 2011
SSSSS W W M M H H Y M M 000 9 9 9
StormWater Management Hydrologic Model 999 999 # 2957874
=====

***** SWHMYO Ver/4.05 *****
***** A single event and continuous hydrologic simulation model *****
***** based on the principles of HYMO and its successors *****
***** OTTHYMO-83 and OTTHYMO-89. *****
***** Distributed by: J.F. Sabourin and Associates Inc. *****
***** Ottawa, Ontario: (613) 836-3884 *****
***** Gatineau, Quebec: (819) 243-6858 *****
***** E-Mail: swmhymo@jfsa.Com *****

++++++ Licensed user: AGM Engineering Ltd. ++++++
++++++ London SERIAL#:2957874 ++++++

***** +++++ PROGRAM ARRAY DIMENSIONS +++++ *****
***** Maximum value for ID numbers : 10 *****
***** Max. number of rainfall points: 105408 *****
***** Max. number of flow points : 105408 *****

***** D E T A I L E D O U T P U T *****

* DATE: 2020-05-26 TIME: 10:24:34 RUN COUNTER: 000532 *

* Input filename: G:\CLIENT\1430\1\SWHMYO\Post\overall\pst250yr.dat *
* Output filename: G:\CLIENT\1430\1\SWHMYO\Post\overall\pst250yr.out *
* Summary filename: G:\CLIENT\1430\1\SWHMYO\Post\overall\pst250yr.sum *
* User comments: *
* 1: *
* 2: *
* 3: *

001:0001-----
*# Project Name: [10283 ILDERTON ROAD] Project Number: [1430-1]
*# Date : 05-06-2020
*# Modeller : [LRG]
*# Company : AGM Engineering Ltd.
*# License # : 2957874
*#
| START | Project dir.: G:\CLIENT\1430\1\SWHMYO\Post\overall\
| Rainfall dir.: G:\CLIENT\1430\1\SWHMYO\Post\overall\
TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 001
NSTORM= 0

001:0002-----
* [" "] <--storm filename, one per line for NSTORM time
*

*#
*# MODEL ASSESSING INTERNAL AND EXTERNAL FLOWS WITH EXTERNAL AREAS #
*# PASSING THROUGH THE PROPOSED DIVERSION CHANNEL #
*#
*#####
*
*

CHICAGO STORM | IDF curve parameters: A=3048.220
| Ptotal= 86.61 mm | B= 10.030
C= .888
used in: INTENSITY = A / (t + B)^C
Duration of storm = 3.00 hrs
Storm time step = 5.00 min
Time to peak ratio = .38

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.08	4.911	.83	20.544	1.58	26.471	2.33	7.766
.17	5.383	.92	29.598	1.67	21.310	2.42	7.167
.25	5.954	1.00	49.310	1.75	17.716	2.50	6.652
.33	6.656	1.08	112.508	1.83	15.092	2.58	6.204
.42	7.541	1.17	274.730	1.92	13.104	2.67	5.811
.50	8.685	1.25	133.591	2.00	11.554	2.75	5.465
.58	10.215	1.33	72.819	2.08	10.315	2.83	5.157
.67	12.349	1.42	47.569	2.17	9.306	2.92	4.882
.75	15.503	1.50	34.367	2.25	8.469	3.00	4.634

001:0003-----
*
*#REAR YARDS AND EXTERNAL AREA DRAINING UNCONTROLLED THROUGH CHANNEL, LOTS 1TO6
*
*

CALIB NASHYD | Area (ha)= 27.58 Curve Number (CN)=82.00
| 01:CAT 10 DT= 1.00 | Ia (mm)= 7.800 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .835

Unit Hyd Qpeak (cms)= 1.262
PEAK FLOW (cms)= 1.861 (i)
TIME TO PEAK (hrs)= 2.183
RUNOFF VOLUME (mm)= 46.155
TOTAL RAINFALL (mm)= 86.609
RUNOFF COEFFICIENT = .533

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0004-----
*#800x1350 ELIPTICAL CULVERT CROSSING STREET 'A' STAGE-STORAGE-PERFORMANCE
*
*

ROUTE RESERVOIR | Requested routing time step = 1.0 min.
| IN>01:(CAT 10) |
| OUT<02:(CULV) |
===== OUTFLOW STORAGE TABLE =====
OUTFLOW STORAGE | OUTFLOW STORAGE
(cms) (ha.m.) | (cms) (ha.m.)
.000 .0000E+00 | .810 .1036E-02
.005 .4000E-05 | 1.270 .2234E-02
.130 .9100E-04 | 1.730 .4254E-02
.400 .3810E-03 | 2.115 .7169E-02

ROUTING RESULTS AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)

INFLOW >01: (CAT 10) 27.58 1.861 2.183 46.155
OUTFLOW<02: (CULV) 27.58 1.860 2.217 46.155

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.954
TIME SHIFT OF PEAK FLOW (min)= 2.00
MAXIMUM STORAGE USED (ha.m.)=.5243E-02

001:0005-----

*#ROUTING PROPOSED CONVEYANCE CHANNEL TO SUBDIVISION LIMIT

*

ROUTE CHANNEL	Routing time step (min) = 1.00
IN> 02:CULV	Number of SEGMENTS = 3
OUT< 03:CHAN	Slopes (%), CHANNEL= .25 FLOODPLAIN= .25
	LENGTH = 75.00 (m)

<----- DATA FOR SECTION (.9) ----->		
Distance	Elevation	Manning
.00	247.68	.0300
3.74	246.43	.0300 / .0300 Main Channel
3.76	246.43	.0300 / .0300 Main Channel
7.50	247.68	.0300

<----- TRAVEL TIME TABLE ----->							
DEPTH	ELEV	X-VOLUME	S-VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	D x V
(m)	(m)	(cu.m.)	(cu.m.)	(cms)	(m/s)	(min)	(m2/s)
.066	246.496	.102E+01	.179E+00	.002	.170	7.34	.011
.132	246.562	.399E+01	.140E+01	.014	.266	4.69	.035
.197	246.627	.890E+01	.468E+01*	.041	.347	3.60	.069
.263	246.693	.158E+02	.111E+02*	.088	.420	2.98	.110
.329	246.759	.246E+02	.215E+02*	.159	.486	2.57	.160
.395	246.825	.353E+02	.372E+02*	.258	.548	2.28	.216
.460	246.890	.480E+02	.589E+02*	.389	.607	2.06	.280
.526	246.956	.626E+02	.879E+02*	.554	.663	1.88	.349
.592	247.022	.792E+02	.125E+03*	.758	.717	1.74	.425
.658	247.088	.977E+02	.171E+03*	1.002	.769	1.63	.506
.724	247.154	.118E+03	.228E+03*	1.291	.819	1.53	.593
.789	247.219	.141E+03	.296E+03*	1.628	.868	1.44	.685
.855	247.285	.165E+03	.376E+03*	2.014	.916	1.37	.783
.921	247.351	.191E+03	.470E+03*	2.453	.962	1.30	.886
.987	247.417	.220E+03	.578E+03*	2.947	1.007	1.24	.994
1.053	247.483	.250E+03	.701E+03*	3.499	1.051	1.19	1.106
1.118	247.548	.282E+03	.841E+03*	4.112	1.094	1.14	1.224
1.184	247.614	.316E+03	.998E+03*	4.788	1.137	1.10	1.346
1.250	247.680	.352E+03	.117E+04*	5.529	1.178	1.06	1.473

X-VOLUME= Total X-Section volume over given CHANNEL LENGTH at specified DEPTH.
S-VOLUME= Volume that can be stored in channel at specified ELEVATION.
(*) Actual value may be less due to limited CHANNEL LENGTH for given SLOPE.

<---- hydrograph ---->				<-pipe / channel->	
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLW : ID= 2:CULV	27.58	1.860	2.22 46.155	.829	.896
OUTFLOW: ID= 3:CHAN	27.58	1.860	2.22 46.155	.827	.895

001:0006-----

*#EXTERNAL FARMLAND THAT WILL ENTER PROPOSED SWM FACILITY

*

CALIB NASHYD	Area	(ha)=	.62	Curve Number (CN)=	84.00
04:CAT102 DT= 1.00	Ia	(mm)=	7.000	# of Linear Res.(N)=	3.00

U.H. Tp(hrs)= .207

Unit Hyd Qpeak (cms)= .114

PEAK FLOW (cms)= .122 (i)
TIME TO PEAK (hrs)= 1.417
RUNOFF VOLUME (mm)= 49.516
TOTAL RAINFALL (mm)= 86.609
RUNOFF COEFFICIENT = .572

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0007-----

*#CONVEYING EXTERNAL FLOWS TO SWM FACILITY

*

ROUTE CHANNEL	Routing time step (min) = 1.00
IN> 04:CAT102	Number of SEGMENTS = 3
OUT< 05:EX2SWM	Slopes (%), CHANNEL=1.75 FLOODPLAIN=1.75
	LENGTH = 218.70 (m)

<----- DATA FOR SECTION (1.0) ----->		
Distance	Elevation	Manning
.00	251.44	.0300
.49	251.30	.0300 / .0300 Main Channel
.50	251.30	.0300 / .0300 Main Channel
3.00	251.45	.0300

<----- TRAVEL TIME TABLE ----->							
DEPTH	ELEV	X-VOLUME	S-VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	D x V
(m)	(m)	(cu.m.)	(cu.m.)	(cms)	(m/s)	(min)	(m2/s)
.007	251.307	.120E+00	.115E-03	.000	.105	34.85	.001
.015	251.315	.511E+00	.984E-03	.000	.172	21.16	.003
.022	251.322	.113E+01	.325E-02	.001	.223	16.33	.005
.029	251.329	.198E+01	.762E-02	.002	.269	13.57	.008
.037	251.337	.307E+01	.148E-01	.004	.311	11.73	.011
.044	251.344	.441E+01	.254E-01	.007	.350	10.42	.015
.052	251.352	.598E+01	.403E-01	.011	.387	9.42	.020
.059	251.359	.779E+01	.600E-01	.015	.423	8.63	.025
.066	251.366	.984E+01	.852E-01	.021	.457	7.98	.030
.074	251.374	.121E+02	.117E+00	.027	.489	7.45	.036
.081	251.381	.147E+02	.155E+00	.035	.521	6.99	.042
.088	251.388	.174E+02	.201E+00	.044	.552	6.60	.049
.096	251.396	.204E+02	.256E+00	.054	.582	6.26	.056
.103	251.403	.237E+02	.319E+00	.066	.611	5.96	.063
.111	251.411	.272E+02	.392E+00	.079	.640	5.70	.071
.118	251.418	.309E+02	.476E+00	.094	.667	5.46	.079
.125	251.425	.349E+02	.570E+00	.111	.695	5.25	.087
.133	251.433	.391E+02	.677E+00	.129	.722	5.05	.096
.140	251.440	.435E+02	.796E+00	.149	.748	4.87	.105

X-VOLUME= Total X-Section volume over given CHANNEL LENGTH at specified DEPTH.
S-VOLUME= Volume that can be stored in channel at specified ELEVATION.

<---- hydrograph ---->				<-pipe / channel->	
AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLW : ID= 4:CAT102	.62	.122	1.42 49.516	.130	.711
OUTFLOW: ID= 5:EX2SWM	.62	.114	1.48 49.516	.126	.699

001:0008-----

*#RIGHT-OF-WAY AND LOTS DRAINING AT GRASSED LEVELS

*

*
CALIB STANDHYD
06:CAT 1 DT= 1.00
Area (ha)= 2.69
Total Imp(%)= 21.47
Dir. Conn.(%)= 19.64

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= .58 2.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.90 2.00
Length (m)= 218.70 28.00
Mannings n = .015 .250
Max.eff.Inten.(mm/hr)= 274.73 164.33
over (min)= 2.00 7.00
Storage Coeff. (min)= 2.45 (ii) 7.12 (ii)
Unit Hyd. Tpeak (min)= 2.00 7.00
Unit Hyd. peak (cms)= .49 .16
TOTALS
PEAK FLOW (cms)= .36 .65 .861 (iii)
TIME TO PEAK (hrs)= 1.17 1.27 1.250
RUNOFF VOLUME (mm)= 84.61 54.68 60.562
TOTAL RAINFALL (mm)= 86.61 86.61 86.609
RUNOFF COEFFICIENT = .98 .63 .699

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0009-----

*
*#COMBINED FLOWS TRIBUTARY TO SWM FACILITY
*
*

| ADD HYD (2POND) | ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 05:EX2SWMF .62 .114 1.48 49.52 .000
+ID2 06:CAT 1 2.69 .861 1.25 60.56 .000
=====
SUM 07:2POND 3.31 .901 1.25 58.49 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0010-----

*
*#PROPOSED DRY POND SWM FACILITY STAGE-STORAGE-DISCHARGE
*
*

| ROUTE RESERVOIR | Requested routing time step = 1.0 min.
| IN>07:(2POND) |
| OUT<08:(SWMF) |
===== OUTFLOW STORAGE TABLE =====
OUTFLOW STORAGE OUTFLOW STORAGE
(cms) (ha.m.) (cms) (ha.m.)
.000 .0000E+00 .100 .4172E-01
.001 .5000E-04 .148 .4975E-01
.009 .1310E-02 .175 .5835E-01
.028 .4800E-02 .197 .6754E-01
.037 .9680E-02 .216 .7735E-01
.045 .1504E-01 .234 .8778E-01
.052 .2092E-01 .250 .9888E-01
.054 .2405E-01 .265 .1107E+00
.059 .2732E-01 .280 .1231E+00
.076 .3425E-01 .000 .0000E+00

ROUTING RESULTS AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
INFLOW >07:(2POND) 3.31 .901 1.250 58.493
OUTFLOW<08:(SWMF) 3.31 .252 1.750 58.493

PEAK FLOW REDUCTION [Qout/Qin](%)= 27.986
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)=.1005E+00

001:0011-----

*#FLOWS FROM THE REAR OF LOT 12 AND 13 TO BE UNCONTROLLED AT GRASSED LEVELS
*
*

CALIB NASHYD Area (ha)= .54 Curve Number (CN)=86.50
09:CAT 2 DT= 1.00 Ia (mm)= 4.940 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .116

Unit Hyd Qpeak (cms)= .178

PEAK FLOW (cms)= .165 (i)
TIME TO PEAK (hrs)= 1.283
RUNOFF VOLUME (mm)= 54.981
TOTAL RAINFALL (mm)= 86.609
RUNOFF COEFFICIENT = .635

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0012-----

*
*#COMBINED DIVERTED FLOW THORUGH THE SITE TO THE SOUTHWEST
*
*

| ADD HYD (BYPASS) | ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 09:CAT 2 .54 .165 1.28 54.98 .000
+ID2 03:CHAN 27.58 1.860 2.22 46.15 .000
=====
SUM 10:BYPASS 28.12 1.874 2.22 46.32 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0013-----

*
*#COMBINED POST DEVELOPMENT DISCHARGE LEAVING THE SITE TO THE SOUTHWEST
*
*

| ADD HYD (EXIT) | ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 10:BYPASS 28.12 1.874 2.22 46.32 .000
+ID2 08:SWMF 3.31 .252 1.75 58.49 .000
=====
SUM 01:EXIT 31.43 2.104 2.20 47.61 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0014-----

FINISH

WARNINGS / ERRORS / NOTES

Simulation ended on 2020-05-26 at 10:24:34

=====

250 Year SCS Type II Storm

```
=====
SSSSS W W M M H H Y Y M M 000      999 999 =====
S      W W W M M M H H Y Y M M 0 0    9 9 9 9
SSSSS W W W M M M H H H H Y M M M 0 0 ## 9 9 9 9 Ver 4.05
S      W W M M H H Y M M M 0 0      9999 9999 Sept 2011
SSSSS W W M M H H Y M M 000      9 9 9 9 =====
                        9 9 9 9 # 2957874
StormWater Management Hydrologic Model      999 999 =====
```

```
*****
***** SWHMYMO Ver/4.05 *****
***** A single event and continuous hydrologic simulation model *****
***** based on the principles of HYMO and its successors *****
***** OTTHYMO-83 and OTTHYMO-89. *****
*****
***** Distributed by: J.F. Sabourin and Associates Inc. *****
***** Ottawa, Ontario: (613) 836-3884 *****
***** Gatineau, Quebec: (819) 243-6858 *****
***** E-Mail: swmhymo@jfsa.Com *****
*****
```

```
+++++
+++++ Licensed user: AGM Engineering Ltd. +++++
+++++ London SERIAL#:2957874 +++++
+++++
```

```
*****
***** +++++ PROGRAM ARRAY DIMENSIONS +++++ *****
***** Maximum value for ID numbers : 10 *****
***** Max. number of rainfall points: 105408 *****
***** Max. number of flow points : 105408 *****
*****
```

```
***** D E T A I L E D O U T P U T *****
*****
* DATE: 2020-05-26 TIME: 10:24:42 RUN COUNTER: 000533 *
*****
* Input filename: G:\CLIENT\1430\1\SWHMYMO\Post\overall\ps250SCS.dat *
* Output filename: G:\CLIENT\1430\1\SWHMYMO\Post\overall\ps250SCS.out *
* Summary filename: G:\CLIENT\1430\1\SWHMYMO\Post\overall\ps250SCS.sum *
* User comments: *
* 1: *
* 2: *
* 3: *
*****
```

```
-----
001:0001-----
*****
*# Project Name: [10283 ILDERTON ROAD] Project Number: [1430-1]
*# Date : 05-06-2020
*# Modeller : [LRG]
*# Company : AGM Engineering Ltd.
*# License # : 2957874
*****
| START | Project dir.: G:\CLIENT\1430\1\SWHMYMO\Post\overall\
|-----| RainFall dir.: G:\CLIENT\1430\1\SWHMYMO\Post\overall\
TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 001
NSTORM= 0
-----
```

```
001:0002-----
* [ " " ] <--storm filename, one per line for NSTORM time
*
*****
```

```
*# #
*# MODEL ASSESSING INTERNAL AND EXTERNAL FLOWS WITH EXTERNAL AREAS #
*# PASSING THROUGH THE PROPOSED DIVERSION CHANNEL #
*# #
*#####
*
*-----
```

```
| MASS STORM | Filename: c:\storms\scs24h.mst
| Ptotal=119.00 mm | Comments: SCS Type II 24 HR MASS CURVE
*-----
```

```
Duration of storm = 24.00 hrs
Mass curve time step = 15.00 min
Selected storm time step = 1.00 min
Volume of derived storm = 119.00 mm
```

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.02	1.428	6.02	1.904	12.02	17.136	18.02	2.380
.03	1.428	6.03	1.904	12.03	17.136	18.03	2.380
.05	1.428	6.05	1.904	12.05	17.136	18.05	2.380
.07	1.428	6.07	1.904	12.07	17.136	18.07	2.380
.08	1.428	6.08	1.904	12.08	17.136	18.08	2.380
.10	1.428	6.10	1.904	12.10	17.136	18.10	2.380
.12	1.428	6.12	1.904	12.12	17.136	18.12	2.380
.13	1.428	6.13	1.904	12.13	17.136	18.13	2.380
.15	1.428	6.15	1.904	12.15	17.136	18.15	2.380
.17	1.428	6.17	1.904	12.17	17.136	18.17	2.380
.18	1.428	6.18	1.904	12.18	17.136	18.18	2.380
.20	1.428	6.20	1.904	12.20	17.136	18.20	2.380
.22	1.428	6.22	1.904	12.22	17.136	18.22	2.380
.23	1.428	6.23	1.904	12.23	17.136	18.23	2.380
.25	1.428	6.25	1.904	12.25	17.136	18.25	2.380
.27	1.428	6.27	2.380	12.27	17.136	18.27	1.904
.28	1.428	6.28	2.380	12.28	17.136	18.28	1.904
.30	1.428	6.30	2.380	12.30	17.136	18.30	1.904
.32	1.428	6.32	2.380	12.32	17.136	18.32	1.904
.33	1.428	6.33	2.380	12.33	17.136	18.33	1.904
.35	1.428	6.35	2.380	12.35	17.136	18.35	1.904
.37	1.428	6.37	2.380	12.37	17.136	18.37	1.904
.38	1.428	6.38	2.380	12.38	17.136	18.38	1.904
.40	1.428	6.40	2.380	12.40	17.136	18.40	1.904
.42	1.428	6.42	2.380	12.42	17.136	18.42	1.904
.43	1.428	6.43	2.380	12.43	17.136	18.43	1.904
.45	1.428	6.45	2.380	12.45	17.136	18.45	1.904
.47	1.428	6.47	2.380	12.47	17.136	18.47	1.904
.48	1.428	6.48	2.380	12.48	17.136	18.48	1.904
.50	1.428	6.50	2.380	12.50	17.136	18.50	1.904
.52	.952	6.52	1.904	12.52	9.044	18.52	2.380
.53	.952	6.53	1.904	12.53	9.044	18.53	2.380
.55	.952	6.55	1.904	12.55	9.044	18.55	2.380
.57	.952	6.57	1.904	12.57	9.044	18.57	2.380
.58	.952	6.58	1.904	12.58	9.044	18.58	2.380
.60	.952	6.60	1.904	12.60	9.044	18.60	2.380
.62	.952	6.62	1.904	12.62	9.044	18.62	2.380
.63	.952	6.63	1.904	12.63	9.044	18.63	2.380
.65	.952	6.65	1.904	12.65	9.044	18.65	2.380
.67	.952	6.67	1.904	12.67	9.044	18.67	2.380
.68	.952	6.68	1.904	12.68	9.044	18.68	2.380
.70	.952	6.70	1.904	12.70	9.044	18.70	2.380
.72	.952	6.72	1.904	12.72	9.044	18.72	2.380
.73	.952	6.73	1.904	12.73	9.044	18.73	2.380
.75	.952	6.75	1.904	12.75	9.044	18.75	2.380
.77	1.428	6.77	2.380	12.77	8.568	18.77	1.904
.78	1.428	6.78	2.380	12.78	8.568	18.78	1.904
.80	1.428	6.80	2.380	12.80	8.568	18.80	1.904
.82	1.428	6.82	2.380	12.82	8.568	18.82	1.904
.83	1.428	6.83	2.380	12.83	8.568	18.83	1.904
.85	1.428	6.85	2.380	12.85	8.568	18.85	1.904

.87	1.428	6.87	2.380	12.87	8.568	18.87	1.904
.88	1.428	6.88	2.380	12.88	8.568	18.88	1.904
.90	1.428	6.90	2.380	12.90	8.568	18.90	1.904
.92	1.428	6.92	2.380	12.92	8.568	18.92	1.904
.93	1.428	6.93	2.380	12.93	8.568	18.93	1.904
.95	1.428	6.95	2.380	12.95	8.568	18.95	1.904
.97	1.428	6.97	2.380	12.97	8.568	18.97	1.904
.98	1.428	6.98	2.380	12.98	8.568	18.98	1.904
1.00	1.428	7.00	2.380	13.00	8.568	19.00	1.904
1.02	1.428	7.02	2.380	13.02	6.664	19.02	2.380
1.03	1.428	7.03	2.380	13.03	6.664	19.03	2.380
1.05	1.428	7.05	2.380	13.05	6.664	19.05	2.380
1.07	1.428	7.07	2.380	13.07	6.664	19.07	2.380
1.08	1.428	7.08	2.380	13.08	6.664	19.08	2.380
1.10	1.428	7.10	2.380	13.10	6.664	19.10	2.380
1.12	1.428	7.12	2.380	13.12	6.664	19.12	2.380
1.13	1.428	7.13	2.380	13.13	6.664	19.13	2.380
1.15	1.428	7.15	2.380	13.15	6.664	19.15	2.380
1.17	1.428	7.17	2.380	13.17	6.664	19.17	2.380
1.18	1.428	7.18	2.380	13.18	6.664	19.18	2.380
1.20	1.428	7.20	2.380	13.20	6.664	19.20	2.380
1.22	1.428	7.22	2.380	13.22	6.664	19.22	2.380
1.23	1.428	7.23	2.380	13.23	6.664	19.23	2.380
1.25	1.428	7.25	2.380	13.25	6.664	19.25	2.380
1.27	1.428	7.27	2.856	13.27	6.188	19.27	1.904
1.28	1.428	7.28	2.856	13.28	6.188	19.28	1.904
1.30	1.428	7.30	2.856	13.30	6.188	19.30	1.904
1.32	1.428	7.32	2.856	13.32	6.188	19.32	1.904
1.33	1.428	7.33	2.856	13.33	6.188	19.33	1.904
1.35	1.428	7.35	2.856	13.35	6.188	19.35	1.904
1.37	1.428	7.37	2.856	13.37	6.188	19.37	1.904
1.38	1.428	7.38	2.856	13.38	6.188	19.38	1.904
1.40	1.428	7.40	2.856	13.40	6.188	19.40	1.904
1.42	1.428	7.42	2.856	13.42	6.188	19.42	1.904
1.43	1.428	7.43	2.856	13.43	6.188	19.43	1.904
1.45	1.428	7.45	2.856	13.45	6.188	19.45	1.904
1.47	1.428	7.47	2.856	13.47	6.188	19.47	1.904
1.48	1.428	7.48	2.856	13.48	6.188	19.48	1.904
1.50	1.428	7.50	2.856	13.50	6.188	19.50	1.904
1.52	.952	7.52	2.380	13.52	5.236	19.52	2.380
1.53	.952	7.53	2.380	13.53	5.236	19.53	2.380
1.55	.952	7.55	2.380	13.55	5.236	19.55	2.380
1.57	.952	7.57	2.380	13.57	5.236	19.57	2.380
1.58	.952	7.58	2.380	13.58	5.236	19.58	2.380
1.60	.952	7.60	2.380	13.60	5.236	19.60	2.380
1.62	.952	7.62	2.380	13.62	5.236	19.62	2.380
1.63	.952	7.63	2.380	13.63	5.236	19.63	2.380
1.65	.952	7.65	2.380	13.65	5.236	19.65	2.380
1.67	.952	7.67	2.380	13.67	5.236	19.67	2.380
1.68	.952	7.68	2.380	13.68	5.236	19.68	2.380
1.70	.952	7.70	2.380	13.70	5.236	19.70	2.380
1.72	.952	7.72	2.380	13.72	5.236	19.72	2.380
1.73	.952	7.73	2.380	13.73	5.236	19.73	2.380
1.75	.952	7.75	2.380	13.75	5.236	19.75	2.380
1.77	1.428	7.77	2.856	13.77	4.760	19.77	1.904
1.78	1.428	7.78	2.856	13.78	4.760	19.78	1.904
1.80	1.428	7.80	2.856	13.80	4.760	19.80	1.904
1.82	1.428	7.82	2.856	13.82	4.760	19.82	1.904
1.83	1.428	7.83	2.856	13.83	4.760	19.83	1.904
1.85	1.428	7.85	2.856	13.85	4.760	19.85	1.904
1.87	1.428	7.87	2.856	13.87	4.760	19.87	1.904
1.88	1.428	7.88	2.856	13.88	4.760	19.88	1.904
1.90	1.428	7.90	2.856	13.90	4.760	19.90	1.904
1.92	1.428	7.92	2.856	13.92	4.760	19.92	1.904
1.93	1.428	7.93	2.856	13.93	4.760	19.93	1.904
1.95	1.428	7.95	2.856	13.95	4.760	19.95	1.904
1.97	1.428	7.97	2.856	13.97	4.760	19.97	1.904
1.98	1.428	7.98	2.856	13.98	4.760	19.98	1.904
2.00	1.428	8.00	2.856	14.00	4.760	20.00	1.904

2.02	1.428	8.02	2.856	14.02	3.808	20.02	1.428
2.03	1.428	8.03	2.856	14.03	3.808	20.03	1.428
2.05	1.428	8.05	2.856	14.05	3.808	20.05	1.428
2.07	1.428	8.07	2.856	14.07	3.808	20.07	1.428
2.08	1.428	8.08	2.856	14.08	3.808	20.08	1.428
2.10	1.428	8.10	2.856	14.10	3.808	20.10	1.428
2.12	1.428	8.12	2.856	14.12	3.808	20.12	1.428
2.13	1.428	8.13	2.856	14.13	3.808	20.13	1.428
2.15	1.428	8.15	2.856	14.15	3.808	20.15	1.428
2.17	1.428	8.17	2.856	14.17	3.808	20.17	1.428
2.18	1.428	8.18	2.856	14.18	3.808	20.18	1.428
2.20	1.428	8.20	2.856	14.20	3.808	20.20	1.428
2.22	1.428	8.22	2.856	14.22	3.808	20.22	1.428
2.23	1.428	8.23	2.856	14.23	3.808	20.23	1.428
2.25	1.428	8.25	2.856	14.25	3.808	20.25	1.428
2.27	1.904	8.27	3.332	14.27	3.332	20.27	1.428
2.28	1.904	8.28	3.332	14.28	3.332	20.28	1.428
2.30	1.904	8.30	3.332	14.30	3.332	20.30	1.428
2.32	1.904	8.32	3.332	14.32	3.332	20.32	1.428
2.33	1.904	8.33	3.332	14.33	3.332	20.33	1.428
2.35	1.904	8.35	3.332	14.35	3.332	20.35	1.428
2.37	1.904	8.37	3.332	14.37	3.332	20.37	1.428
2.38	1.904	8.38	3.332	14.38	3.332	20.38	1.428
2.40	1.904	8.40	3.332	14.40	3.332	20.40	1.428
2.42	1.904	8.42	3.332	14.42	3.332	20.42	1.428
2.43	1.904	8.43	3.332	14.43	3.332	20.43	1.428
2.45	1.904	8.45	3.332	14.45	3.332	20.45	1.428
2.47	1.904	8.47	3.332	14.47	3.332	20.47	1.428
2.48	1.904	8.48	3.332	14.48	3.332	20.48	1.428
2.50	1.904	8.50	3.332	14.50	3.332	20.50	1.428
2.52	1.428	8.52	3.332	14.52	3.808	20.52	1.428
2.53	1.428	8.53	3.332	14.53	3.808	20.53	1.428
2.55	1.428	8.55	3.332	14.55	3.808	20.55	1.428
2.57	1.428	8.57	3.332	14.57	3.808	20.57	1.428
2.58	1.428	8.58	3.332	14.58	3.808	20.58	1.428
2.60	1.428	8.60	3.332	14.60	3.808	20.60	1.428
2.62	1.428	8.62	3.332	14.62	3.808	20.62	1.428
2.63	1.428	8.63	3.332	14.63	3.808	20.63	1.428
2.65	1.428	8.65	3.332	14.65	3.808	20.65	1.428
2.67	1.428	8.67	3.332	14.67	3.808	20.67	1.428
2.68	1.428	8.68	3.332	14.68	3.808	20.68	1.428
2.70	1.428	8.70	3.332	14.70	3.808	20.70	1.428
2.72	1.428	8.72	3.332	14.72	3.808	20.72	1.428
2.73	1.428	8.73	3.332	14.73	3.808	20.73	1.428
2.75	1.428	8.75	3.332	14.75	3.808	20.75	1.428
2.77	1.428	8.77	3.332	14.77	3.332	20.77	1.428
2.78	1.428	8.78	3.332	14.78	3.332	20.78	1.428
2.80	1.428	8.80	3.332	14.80	3.332	20.80	1.428
2.82	1.428	8.82	3.332	14.82	3.332	20.82	1.428
2.83	1.428	8.83	3.332	14.83	3.332	20.83	1.428
2.85	1.428	8.85	3.332	14.85	3.332	20.85	1.428
2.87	1.428	8.87	3.332	14.87	3.332	20.87	1.428
2.88	1.428	8.88	3.332	14.88	3.332	20.88	1.428
2.90	1.428	8.90	3.332	14.90	3.332	20.90	1.428
2.92	1.428	8.92	3.332	14.92	3.332	20.92	1.428
2.93	1.428	8.93	3.332	14.93	3.332	20.93	1.428
2.95	1.428	8.95	3.332	14.95	3.332	20.95	1.428
2.97	1.428	8.97	3.332	14.97	3.332	20.97	1.428
2.98	1.428	8.98	3.332	14.98	3.332	20.98	1.428
3.00	1.428	9.00	3.332	15.00	3.332	21.00	1.428
3.02	1.428	9.02	3.808	15.02	3.808	21.02	1.428
3.03	1.428	9.03	3.808	15.03	3.808	21.03	1.428
3.05	1.428	9.05	3.808	15.05	3.808	21.05	1.428
3.07	1.428	9.07	3.808	15.07	3.808	21.07	1.428
3.08	1.428	9.08	3.808	15.08	3.808	21.08	1.428
3.10	1.428	9.10	3.808	15.10	3.808	21.10	1.428
3.12	1.428	9.12	3.808	15.12	3.808	21.12	1.428
3.13	1.428	9.13	3.808	15.13	3.808	21.13	1.428
3.15	1.428	9.15	3.808	15.15	3.808	21.15	1.428

3.17	1.428	9.17	3.808	15.17	3.808	21.17	1.428
3.18	1.428	9.18	3.808	15.18	3.808	21.18	1.428
3.20	1.428	9.20	3.808	15.20	3.808	21.20	1.428
3.22	1.428	9.22	3.808	15.22	3.808	21.22	1.428
3.23	1.428	9.23	3.808	15.23	3.808	21.23	1.428
3.25	1.428	9.25	3.808	15.25	3.808	21.25	1.428
3.27	1.904	9.27	3.808	15.27	3.332	21.27	1.428
3.28	1.904	9.28	3.808	15.28	3.332	21.28	1.428
3.30	1.904	9.30	3.808	15.30	3.332	21.30	1.428
3.32	1.904	9.32	3.808	15.32	3.332	21.32	1.428
3.33	1.904	9.33	3.808	15.33	3.332	21.33	1.428
3.35	1.904	9.35	3.808	15.35	3.332	21.35	1.428
3.37	1.904	9.37	3.808	15.37	3.332	21.37	1.428
3.38	1.904	9.38	3.808	15.38	3.332	21.38	1.428
3.40	1.904	9.40	3.808	15.40	3.332	21.40	1.428
3.42	1.904	9.42	3.808	15.42	3.332	21.42	1.428
3.43	1.904	9.43	3.808	15.43	3.332	21.43	1.428
3.45	1.904	9.45	3.808	15.45	3.332	21.45	1.428
3.47	1.904	9.47	3.808	15.47	3.332	21.47	1.428
3.48	1.904	9.48	3.808	15.48	3.332	21.48	1.428
3.50	1.904	9.50	3.808	15.50	3.332	21.50	1.428
3.52	1.428	9.52	4.284	15.52	3.808	21.52	1.428
3.53	1.428	9.53	4.284	15.53	3.808	21.53	1.428
3.55	1.428	9.55	4.284	15.55	3.808	21.55	1.428
3.57	1.428	9.57	4.284	15.57	3.808	21.57	1.428
3.58	1.428	9.58	4.284	15.58	3.808	21.58	1.428
3.60	1.428	9.60	4.284	15.60	3.808	21.60	1.428
3.62	1.428	9.62	4.284	15.62	3.808	21.62	1.428
3.63	1.428	9.63	4.284	15.63	3.808	21.63	1.428
3.65	1.428	9.65	4.284	15.65	3.808	21.65	1.428
3.67	1.428	9.67	4.284	15.67	3.808	21.67	1.428
3.68	1.428	9.68	4.284	15.68	3.808	21.68	1.428
3.70	1.428	9.70	4.284	15.70	3.808	21.70	1.428
3.72	1.428	9.72	4.284	15.72	3.808	21.72	1.428
3.73	1.428	9.73	4.284	15.73	3.808	21.73	1.428
3.75	1.428	9.75	4.284	15.75	3.808	21.75	1.428
3.77	1.428	9.77	4.284	15.77	3.332	21.77	1.428
3.78	1.428	9.78	4.284	15.78	3.332	21.78	1.428
3.80	1.428	9.80	4.284	15.80	3.332	21.80	1.428
3.82	1.428	9.82	4.284	15.82	3.332	21.82	1.428
3.83	1.428	9.83	4.284	15.83	3.332	21.83	1.428
3.85	1.428	9.85	4.284	15.85	3.332	21.85	1.428
3.87	1.428	9.87	4.284	15.87	3.332	21.87	1.428
3.88	1.428	9.88	4.284	15.88	3.332	21.88	1.428
3.90	1.428	9.90	4.284	15.90	3.332	21.90	1.428
3.92	1.428	9.92	4.284	15.92	3.332	21.92	1.428
3.93	1.428	9.93	4.284	15.93	3.332	21.93	1.428
3.95	1.428	9.95	4.284	15.95	3.332	21.95	1.428
3.97	1.428	9.97	4.284	15.97	3.332	21.97	1.428
3.98	1.428	9.98	4.284	15.98	3.332	21.98	1.428
4.00	1.428	10.00	4.284	16.00	3.332	22.00	1.428
4.02	1.904	10.02	5.236	16.02	2.380	22.02	1.428
4.03	1.904	10.03	5.236	16.03	2.380	22.03	1.428
4.05	1.904	10.05	5.236	16.05	2.380	22.05	1.428
4.07	1.904	10.07	5.236	16.07	2.380	22.07	1.428
4.08	1.904	10.08	5.236	16.08	2.380	22.08	1.428
4.10	1.904	10.10	5.236	16.10	2.380	22.10	1.428
4.12	1.904	10.12	5.236	16.12	2.380	22.12	1.428
4.13	1.904	10.13	5.236	16.13	2.380	22.13	1.428
4.15	1.904	10.15	5.236	16.15	2.380	22.15	1.428
4.17	1.904	10.17	5.236	16.17	2.380	22.17	1.428
4.18	1.904	10.18	5.236	16.18	2.380	22.18	1.428
4.20	1.904	10.20	5.236	16.20	2.380	22.20	1.428
4.22	1.904	10.22	5.236	16.22	2.380	22.22	1.428
4.23	1.904	10.23	5.236	16.23	2.380	22.23	1.428
4.25	1.904	10.25	5.236	16.25	2.380	22.25	1.428
4.27	1.904	10.27	5.712	16.27	1.904	22.27	1.428
4.28	1.904	10.28	5.712	16.28	1.904	22.28	1.428
4.30	1.904	10.30	5.712	16.30	1.904	22.30	1.428

4.32	1.904	10.32	5.712	16.32	1.904	22.32	1.428
4.33	1.904	10.33	5.712	16.33	1.904	22.33	1.428
4.35	1.904	10.35	5.712	16.35	1.904	22.35	1.428
4.37	1.904	10.37	5.712	16.37	1.904	22.37	1.428
4.38	1.904	10.38	5.712	16.38	1.904	22.38	1.428
4.40	1.904	10.40	5.712	16.40	1.904	22.40	1.428
4.42	1.904	10.42	5.712	16.42	1.904	22.42	1.428
4.43	1.904	10.43	5.712	16.43	1.904	22.43	1.428
4.45	1.904	10.45	5.712	16.45	1.904	22.45	1.428
4.47	1.904	10.47	5.712	16.47	1.904	22.47	1.428
4.48	1.904	10.48	5.712	16.48	1.904	22.48	1.428
4.50	1.904	10.50	5.712	16.50	1.904	22.50	1.428
4.52	1.904	10.52	7.140	16.52	2.380	22.52	1.428
4.53	1.904	10.53	7.140	16.53	2.380	22.53	1.428
4.55	1.904	10.55	7.140	16.55	2.380	22.55	1.428
4.57	1.904	10.57	7.140	16.57	2.380	22.57	1.428
4.58	1.904	10.58	7.140	16.58	2.380	22.58	1.428
4.60	1.904	10.60	7.140	16.60	2.380	22.60	1.428
4.62	1.904	10.62	7.140	16.62	2.380	22.62	1.428
4.63	1.904	10.63	7.140	16.63	2.380	22.63	1.428
4.65	1.904	10.65	7.140	16.65	2.380	22.65	1.428
4.67	1.904	10.67	7.140	16.67	2.380	22.67	1.428
4.68	1.904	10.68	7.140	16.68	2.380	22.68	1.428
4.70	1.904	10.70	7.140	16.70	2.380	22.70	1.428
4.72	1.904	10.72	7.140	16.72	2.380	22.72	1.428
4.73	1.904	10.73	7.140	16.73	2.380	22.73	1.428
4.75	1.904	10.75	7.140	16.75	2.380	22.75	1.428
4.77	1.904	10.77	7.616	16.77	1.904	22.77	1.428
4.78	1.904	10.78	7.616	16.78	1.904	22.78	1.428
4.80	1.904	10.80	7.616	16.80	1.904	22.80	1.428
4.82	1.904	10.82	7.616	16.82	1.904	22.82	1.428
4.83	1.904	10.83	7.616	16.83	1.904	22.83	1.428
4.85	1.904	10.85	7.616	16.85	1.904	22.85	1.428
4.87	1.904	10.87	7.616	16.87	1.904	22.87	1.428
4.88	1.904	10.88	7.616	16.88	1.904	22.88	1.428
4.90	1.904	10.90	7.616	16.90	1.904	22.90	1.428
4.92	1.904	10.92	7.616	16.92	1.904	22.92	1.428
4.93	1.904	10.93	7.616	16.93	1.904	22.93	1.428
4.95	1.904	10.95	7.616	16.95	1.904	22.95	1.428
4.97	1.904	10.97	7.616	16.97	1.904	22.97	1.428
4.98	1.904	10.98	7.616	16.98	1.904	22.98	1.428
5.00	1.904	11.00	7.616	17.00	1.904	23.00	1.428
5.02	1.904	11.02	11.424	17.02	2.380	23.02	1.428
5.03	1.904	11.03	11.424	17.03	2.380	23.03	1.428
5.05	1.904	11.05	11.424	17.05	2.380	23.05	1.428
5.07	1.904	11.07	11.424	17.07	2.380	23.07	1.428
5.08	1.904	11.08	11.424	17.08	2.380	23.08	1.428
5.10	1.904	11.10	11.424	17.10	2.380	23.10	1.428
5.12	1.904	11.12	11.424	17.12	2.380	23.12	1.428
5.13	1.904	11.13	11.424	17.13	2.380	23.13	1.428
5.15	1.904	11.15	11.424	17.15	2.380	23.15	1.428
5.17	1.904	11.17	11.424	17.17	2.380	23.17	1.428
5.18	1.904	11.18	11.424	17.18	2.380	23.18	1.428
5.20	1.904	11.20	11.424	17.20	2.380	23.20	1.428
5.22	1.904	11.22	11.424	17.22	2.380	23.22	1.428
5.23	1.904	11.23	11.424	17.23	2.380	23.23	1.428
5.25	1.904	11.25	11.424	17.25	2.380	23.25	1.428
5.27	1.904	11.27	11.424	17.27	1.904	23.27	1.428
5.28	1.904	11.28	11.424	17.28	1.904	23.28	1.428
5.30	1.904	11.30	11.424	17.30	1.904	23.30	1.428
5.32	1.904	11.32	11.424	17.32	1.904	23.32	1.428
5.33	1.904	11.33	11.424	17.33	1.904	23.33	1.428
5.35	1.904	11.35	11.424	17.35	1.904	23.35	1.428
5.37	1.904	11.37	11.424	17.37	1.904	23.37	1.428
5.38	1.904	11.38	11.424	17.38	1.904	23.38	1.428
5.40	1.904	11.40	11.424	17.40	1.904	23.40	1.428
5.42	1.904	11.42	11.424	17.42	1.904	23.42	1.428
5.43	1.904	11.43	11.424	17.43	1.904	23.43	1.428
5.45	1.904	11.45	11.424	17.45	1.904	23.45	1.428

5.47	1.904	11.47	11.424	17.47	1.904	23.47	1.428
5.48	1.904	11.48	11.424	17.48	1.904	23.48	1.428
5.50	1.904	11.50	11.424	17.50	1.904	23.50	1.428
5.52	1.904	11.52	35.224	17.52	2.380	23.52	1.428
5.53	1.904	11.53	35.224	17.53	2.380	23.53	1.428
5.55	1.904	11.55	35.224	17.55	2.380	23.55	1.428
5.57	1.904	11.57	35.224	17.57	2.380	23.57	1.428
5.58	1.904	11.58	35.224	17.58	2.380	23.58	1.428
5.60	1.904	11.60	35.224	17.60	2.380	23.60	1.428
5.62	1.904	11.62	35.224	17.62	2.380	23.62	1.428
5.63	1.904	11.63	35.224	17.63	2.380	23.63	1.428
5.65	1.904	11.65	35.224	17.65	2.380	23.65	1.428
5.67	1.904	11.67	35.224	17.67	2.380	23.67	1.428
5.68	1.904	11.68	35.224	17.68	2.380	23.68	1.428
5.70	1.904	11.70	35.224	17.70	2.380	23.70	1.428
5.72	1.904	11.72	35.224	17.72	2.380	23.72	1.428
5.73	1.904	11.73	35.224	17.73	2.380	23.73	1.428
5.75	1.904	11.75	35.224	17.75	2.380	23.75	1.428
5.77	1.904	11.77	145.656	17.77	1.904	23.77	1.428
5.78	1.904	11.78	145.656	17.78	1.904	23.78	1.428
5.80	1.904	11.80	145.656	17.80	1.904	23.80	1.428
5.82	1.904	11.82	145.656	17.82	1.904	23.82	1.428
5.83	1.904	11.83	145.656	17.83	1.904	23.83	1.428
5.85	1.904	11.85	145.656	17.85	1.904	23.85	1.428
5.87	1.904	11.87	145.656	17.87	1.904	23.87	1.428
5.88	1.904	11.88	145.656	17.88	1.904	23.88	1.428
5.90	1.904	11.90	145.656	17.90	1.904	23.90	1.428
5.92	1.904	11.92	145.656	17.92	1.904	23.92	1.428
5.93	1.904	11.93	145.656	17.93	1.904	23.93	1.428
5.95	1.904	11.95	145.656	17.95	1.904	23.95	1.428
5.97	1.904	11.97	145.656	17.97	1.904	23.97	1.428
5.98	1.904	11.98	145.656	17.98	1.904	23.98	1.428
6.00	1.904	12.00	145.656	18.00	1.904	24.00	1.428

001:0003-----

*
*#REAR YARDS AND EXTERNAL AREA DRAINING UNCONTROLLED THROUGH CHANNEL, LOTS 1T06
*
*

CALIB NASHYD	Area	(ha)=	27.58	Curve Number	(CN)=82.00
01:CAT 10 DT= 1.00	Ia	(mm)=	7.800	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		.835		

Unit Hyd Qpeak (cms)= 1.262

PEAK FLOW (cms)= 1.958 (1)
TIME TO PEAK (hrs)= 12.783
RUNOFF VOLUME (mm)= 74.064
TOTAL RAINFALL (mm)= 118.999
RUNOFF COEFFICIENT = .622

(1) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0004-----

*#860x1350 ELLIPTICAL CULVERT CROSSING STREET 'A' STAGE-STORAGE-PERFORMANCE
*
*

ROUTE RESERVOIR	Requested routing time step = 1.0 min.				
IN>01:(CAT 10)					
OUT<02:(CULV)					
=====	OUTFLOW STORAGE TABLE				
OUTFLOW	STORAGE	OUTFLOW	STORAGE		
(cms)	(ha.m.)	(cms)	(ha.m.)		
.000	.0000E+00	.810	.1036E-02		
.005	.4000E-05	1.270	.2234E-02		

.130	.9100E-04	1.730	.4254E-02
.400	.3810E-03	2.115	.7169E-02

ROUTING RESULTS	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW >01: (CAT 10)	27.58	1.958	12.783	74.064
OUTFLOW<02: (CULV)	27.58	1.957	12.800	74.064

PEAK FLOW REDUCTION [Qout/Qin](%)= 99.951
TIME SHIFT OF PEAK FLOW (min)= 1.00
MAXIMUM STORAGE USED (ha.m.)= .5975E-02

001:0005-----

*#ROUTING PROPOSED CONVEYANCE CHANNEL TO SUBDIVISION LIMIT
*
*

ROUTE CHANNEL	Routing time step (min) = 1.00
IN> 02:CULV	Number of SEGMENTS = 3
OUT< 03:CHAN	Slopes (%), CHANNEL= .25 FLOODPLAIN= .25
	LENGTH = 75.00 (m)

<----- DATA FOR SECTION (.9) ----->		
Distance	Elevation	Manning
.00	247.68	.0300
3.74	246.43	.0300 / .0300 Main Channel
3.76	246.43	.0300 / .0300 Main Channel
7.50	247.68	.0300

<----- TRAVEL TIME TABLE ----->									
DEPTH	ELEV	X-VOLUME	S-VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	D x V		
(m)	(m)	(cu.m.)	(cu.m.)	(cms)	(m/s)	(min)	(m2/s)		
.066	246.496	.102E+01	.179E+00	.002	.170	7.34	.011		
.132	246.562	.399E+01	.140E+01	.014	.266	4.69	.035		
.197	246.627	.890E+01	.468E+01*	.041	.347	3.60	.069		
.263	246.693	.158E+02	.111E+02*	.088	.420	2.98	.110		
.329	246.759	.246E+02	.215E+02*	.159	.486	2.57	.160		
.395	246.825	.353E+02	.372E+02*	.258	.548	2.28	.216		
.460	246.890	.480E+02	.589E+02*	.389	.607	2.06	.280		
.526	246.956	.626E+02	.879E+02*	.554	.663	1.88	.349		
.592	247.022	.792E+02	.125E+03*	.758	.717	1.74	.425		
.658	247.088	.977E+02	.171E+03*	1.002	.769	1.63	.506		
.724	247.154	.118E+03	.228E+03*	1.291	.819	1.53	.593		
.789	247.219	.141E+03	.296E+03*	1.628	.868	1.44	.685		
.855	247.285	.165E+03	.376E+03*	2.014	.916	1.37	.783		
.921	247.351	.191E+03	.470E+03*	2.453	.962	1.30	.886		
.987	247.417	.220E+03	.578E+03*	2.947	1.007	1.24	.994		
1.053	247.483	.250E+03	.701E+03*	3.499	1.051	1.19	1.106		
1.118	247.548	.282E+03	.841E+03*	4.112	1.094	1.14	1.224		
1.184	247.614	.316E+03	.998E+03*	4.788	1.137	1.10	1.346		
1.250	247.680	.352E+03	.117E+04*	5.529	1.178	1.06	1.473		

X-VOLUME= Total X-Section volume over given CHANNEL LENGTH at specified DEPTH.
S-VOLUME= Volume that can be stored in channel at specified ELEVATION.
(*) Actual value may be less due to limited CHANNEL LENGTH for given SLOPE.

	<---- hydrograph ---->				<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2:CULV	27.58	1.957	12.80	74.064	.845	.908
OUTFLOW: ID= 3:CHAN	27.58	1.957	12.82	74.063	.843	.907

001:0006-----

*#EXTERNAL FARMLAND THAT WILL ENTER PROPOSED SWM FACILITY

*
*

| CALIB NASHYD | Area (ha)= .62 Curve Number (CN)=84.00
| 04:CAT102 DT= 1.00 | Ia (mm)= 7.000 # of Linear Res.(N)= 3.00
| U.H. Tp(hrs)= .207

Unit Hyd Qpeak (cms)= .114
PEAK FLOW (cms)= .126 (i)
TIME TO PEAK (hrs)= 12.100
RUNOFF VOLUME (mm)= 78.213
TOTAL RAINFALL (mm)= 118.999
RUNOFF COEFFICIENT = .657

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0007-----
*
*#CONVEYING EXTERNAL FLOWS TO SWM FACILITY
*
*

| ROUTE CHANNEL | Routing time step (min) = 1.00
| IN> 04:CAT102 | Number of SEGMENTS = 3
| OUT< 05:EX2SWM | Slopes (%), CHANNEL=1.75 FLOODPLAIN=1.75
| LENGTH = 218.70 (m)

<----- DATA FOR SECTION (1.0) ----->
Distance Elevation Manning
.00 251.44 .0300
.49 251.30 .0300 / .0300 Main Channel
.50 251.30 .0300 / .0300 Main Channel
3.00 251.45 .0300

<----- TRAVEL TIME TABLE ----->
DEPTH ELEV X-VOLUME S-VOLUME FLOW RATE VELOCITY TRAV.TIME D x V
(m) (m) (cu.m.) (cu.m.) (cms) (m/s) (min) (m2/s)
.007 251.307 .120E+00 .115E-03 .000 .105 34.85 .001
.015 251.315 .511E+00 .984E-03 .000 .172 21.16 .003
.022 251.322 .113E+01 .325E-02 .001 .223 16.33 .005
.029 251.329 .198E+01 .762E-02 .002 .269 13.57 .008
.037 251.337 .307E+01 .148E-01 .004 .311 11.73 .011
.044 251.344 .441E+01 .254E-01 .007 .350 10.42 .015
.052 251.352 .598E+01 .403E-01 .011 .387 9.42 .020
.059 251.359 .779E+01 .600E-01 .015 .423 8.63 .025
.066 251.366 .984E+01 .852E-01 .021 .457 7.98 .030
.074 251.374 .121E+02 .117E+00 .027 .489 7.45 .036
.081 251.381 .147E+02 .155E+00 .035 .521 6.99 .042
.088 251.388 .174E+02 .201E+00 .044 .552 6.60 .049
.096 251.396 .204E+02 .256E+00 .054 .582 6.26 .056
.103 251.403 .237E+02 .319E+00 .066 .611 5.96 .063
.111 251.411 .272E+02 .392E+00 .079 .640 5.70 .071
.118 251.418 .309E+02 .476E+00 .094 .667 5.46 .079
.125 251.425 .349E+02 .570E+00 .111 .695 5.25 .087
.133 251.433 .391E+02 .677E+00 .129 .722 5.05 .096
.140 251.440 .435E+02 .796E+00 .149 .748 4.87 .105

X-VOLUME= Total X-Section volume over given CHANNEL LENGTH at specified DEPTH.
S-VOLUME= Volume that can be stored in channel at specified ELEVATION.

<---- hydrograph ----> <-pipe / channel->
AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL
(ha) (cms) (hrs) (mm) (m) (m/s)
INFLOW : ID= 4:CAT102 .62 .126 12.10 78.213 .131 .717
OUTFLOW: ID= 5:EX2SWM .62 .116 12.17 78.212 .127 .702

001:0008-----
*
*#RIGHT-OF-WAY AND LOTS DRAINING AT GRASSED LEVELS
*
*

| CALIB STANDHYD | Area (ha)= 2.69
| 06:CAT 1 DT= 1.00 | Total Imp(%)= 21.47 Dir. Conn.(%)= 19.64

IMPERVIOUS PERVIOUS (i)
Surface Area (ha)= .58 2.11
Dep. Storage (mm)= 2.00 5.00
Average Slope (%)= 1.90 2.00
Length (m)= 218.70 28.00
Mannings n = .015 .250

Max.eff.Inten.(mm/hr)= 145.66 126.66
over (min) 3.00 8.00
Storage Coeff. (min)= 3.16 (ii) 8.34 (ii)
Unit Hyd. Tpeak (min)= 3.00 8.00
Unit Hyd. peak (cms)= .36 .14

TOTALS
PEAK FLOW (cms)= .21 .57 .766 (iii)
TIME TO PEAK (hrs)= 12.00 12.03 12.017
RUNOFF VOLUME (mm)= 116.99 84.26 90.701
TOTAL RAINFALL (mm)= 119.00 119.00 118.999
RUNOFF COEFFICIENT = .98 .71 .762

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 86.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0009-----
*
*#COMBINED FLOWS TRIBUTARY TO SWM FACILITY
*
*

| ADD HYD (2POND) | ID: NHYD AREA QPEAK TPEAK R.V. DWF
(ha) (cms) (hrs) (mm) (cms)
ID1 05:EX2SWMF .62 .116 12.17 78.21 .000
+ID2 06:CAT 1 2.69 .766 12.02 90.70 .000
=====
SUM 07:2POND 3.31 .846 12.02 88.36 .000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0010-----
*
*#PROPOSED DRY POND SWM FACILITY STAGE-STORAGE-DISCHARGE
*
*

| ROUTE RESERVOIR | Requested routing time step = 1.0 min.
| IN>07:(2POND) |
| OUT<08:(SWMF) |
===== OUTFLOW STORAGE TABLE =====
OUTFLOW STORAGE OUTFLOW STORAGE
(cms) (ha.m.) (cms) (ha.m.)
.000 .0000E+00 .100 .4172E-01
.001 .5000E-04 .148 .4975E-01
.009 .1310E-02 .175 .5835E-01
.028 .4800E-02 .197 .6754E-01
.037 .9680E-02 .216 .7735E-01
.045 .1504E-01 .234 .8778E-01

.052	.2092E-01		.250	.9888E-01
.054	.2405E-01		.265	.1107E+00
.059	.2732E-01		.280	.1231E+00
.076	.3425E-01		.000	.0000E+00

ROUTING RESULTS

AREA	QPEAK	TPEAK	R.V.
(ha)	(cms)	(hrs)	(mm)
INFLOW >07: (2POND)	3.31	.846	12.017
OUTFLOW<08: (SWMF)	3.31	.247	12.400

PEAK FLOW REDUCTION [Qout/Qin](%)= 29.144
TIME SHIFT OF PEAK FLOW (min)= 23.00
MAXIMUM STORAGE USED (ha.m.)=.9655E-01

001:0011-----
*
*#FLOWS FROM THE REAR OF LOT 12 AND 13 TO BE UNCONTROLLED AT GRASSED LEVELS
*
*

| CALIB NASHYD | Area (ha)= .54 Curve Number (CN)=86.50
| 09:CAT 2 DT= 1.00 | Ia (mm)= 4.940 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= .116

Unit Hyd Qpeak (cms)= .178

PEAK FLOW (cms)= .158 (i)
TIME TO PEAK (hrs)= 12.033
RUNOFF VOLUME (mm)= 84.642
TOTAL RAINFALL (mm)= 118.999
RUNOFF COEFFICIENT = .711

(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

001:0012-----
*
*#COMBINED DIVERTED FLOW THORUGH THE SITE TO THE SOUTHWEST
*
*

| ADD HYD (BYPASS) | ID: NHYD AREA QPEAK TPEAK R.V. DWF

(ha) (cms) (hrs) (mm) (cms)
ID1 09:CAT 2 .54 .158 12.03 84.64 .000
+ID2 03:CHAN 27.58 1.957 12.82 74.06 .000
=====

SUM 10:BYPASS	28.12	1.970	12.82	74.27	.000
---------------	-------	-------	-------	-------	------

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0013-----
*
*#COMBINED POST DEVELOPMENT DISCHARGE LEAVING THE SITE TO THE SOUTHWEST
*
*

| ADD HYD (EXIT) | ID: NHYD AREA QPEAK TPEAK R.V. DWF

(ha) (cms) (hrs) (mm) (cms)
ID1 10:BYPASS 28.12 1.970 12.82 74.27 .000
+ID2 08:SWMF 3.31 .247 12.40 88.36 .000
=====

SUM 01:EXIT	31.43	2.199	12.80	75.75	.000
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NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

001:0014-----

FINISH

WARNINGS / ERRORS / NOTES

Simulation ended on 2020-05-26 at 10:24:43
=====

APPENDIX D

Typical Exfiltration Trench Hard Surface Model

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"      MIDUSS Output ----->"
"      MIDUSS version                Version 2.25 rev. 473"
"      MIDUSS created                February 7, 2010"
"      10 Units used:                ie METRIC"
"      Job folder:                   F:\Projects\L\lobo\LO\Lo-08\LO-08-07\"
"      LO-08-07-1\ENG 1430-1\SWM\Miduss\Typical Exfiltration Trench"
"      Output filename:              250 year typical exfiltration trench.out"
"      Licensee name:                owner"
"      Company                      HP Inc."
"      Date & Time last used:        2020-05-06 at 2:35:59 PM"
"  31 TIME PARAMETERS"
"      5.000 Time Step"
"      180.000 Max. Storm length"
"      1500.000 Max. Hydrograph"
"  32 STORM Chicago storm"
"      1 Chicago storm"
"      3048.220 Coefficient A"
"      10.030 Constant B"
"      0.888 Exponent C"
"      0.380 Fraction R"
"      180.000 Duration"
"      1.000 Time step multiplier"
"      Maximum intensity              254.614 mm/hr"
"      Total depth                    86.611 mm"
"      6 250hyd Hydrograph extension used in this file"
"  33 CATCHMENT 1"
"      1 Triangular SCS"
"      3 Specify values"
"      1 SCS method"
"      1 Lot 1 building area"
"      100.000 % Impervious"
"      0.035 Total Area"
"      5.000 Flow length"
"      2.000 Overland Slope"
"      0.000 Pervious Area"
"      70.000 Pervious length"
"      2.000 Pervious slope"
"      0.035 Impervious Area"
"      5.000 Impervious length"
"      2.000 Impervious slope"
"      0.250 Pervious Manning 'n'"
"      86.000 Pervious SCS Curve No."
"      0.000 Pervious Runoff coefficient"
"      0.100 Pervious Ia/S coefficient"
"      4.135 Pervious Initial abstraction"
"      0.015 Impervious Manning 'n'"
"      98.000 Impervious SCS Curve No."
"      0.844 Impervious Runoff coefficient"
"      0.100 Impervious Ia/S coefficient"
"      0.518 Impervious Initial abstraction"
"      0.021 0.000 0.000 0.000 c.m/sec"
"      Catchment 1 Pervious Impervious Total Area "
"      Surface Area 0.000 0.035 0.035 hectare"
"      Time of concentration 16.599 0.526 0.526 minutes"
"      Rainfall Centroid 109.517 83.061 83.061 minutes"
"      Rainfall depth 86.611 86.611 86.611 mm"
"      Rainfall volume 0.00 30.31 30.31 c.m"
"      Rainfall losses 31.769 13.528 13.528 mm"
"      Runoff depth 54.842 73.083 73.083 mm"
"      Runoff volume 0.00 25.58 25.58 c.m"
"      Runoff coefficient 0.000 0.844 0.844 "
"      Maximum flow 0.000 0.021 0.021 c.m/sec"
"  40 HYDROGRAPH Add Runoff "
"      4 Add Runoff "
"      0.021 0.021 0.000 0.000"
"  57 TRENCH Design d/s of 1"
"      0.021 Peak inflow"
"      25.579 Hydrograph volume"
"      100.000 Ground elevation"

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"      97.500 Downstream trench invert"
"      1.450 Trench height"
"      91.800 Water table elevation"
"      1.500 Trench top width"
"      1.500 Trench bottom width"
"      30.000 Voids ratio (%)"
"      0.010 Hydraulic conductivity"
"      0.000 Trench gradient (%)"
"      35.000 Trench length"
"      1.000 Include base width"
"      18. Number of stages"
"      Level Discharge Volume"
"      97.500 0.000 0.0"
"      97.647 0.000 2.3"
"      97.794 0.000 4.6"
"      97.941 0.000 6.9"
"      98.088 0.000 9.3"
"      98.235 0.000 11.7"
"      98.382 0.000 15.4"
"      98.529 0.000 19.3"
"      98.676 0.000 22.4"
"      98.824 0.000 24.7"
"      98.971 0.001 26.8"
"      99.118 0.009 26.9"
"      99.265 0.014 27.1"
"      99.412 0.017 27.3"
"      99.559 0.020 27.4"
"      99.706 0.023 27.6"
"      99.853 0.025 27.8"
"      100.000 0.028 27.9"
"  1. TRENCH PIPES"
"      Downstream Pipe Pipe Pipe Perf'ted? Offset"
"      Invert length diam. grade% 0=Yes distance"
"      98.200 35.000 0.450 0.000 0.000 0.525"
"  1. MANHOLE"
"      Access"
"      diameter"
"      1.200"
"      Peak outflow 0.000 c.m/sec"
"      Outflow volume 0.839 c.m"
"      Peak exfiltration 0.000 c.m/sec"
"      Exfiltration volume 0.039 c.m"
"      Maximum level 98.857 metre"
"      Maximum storage 25.193 c.m"
"      Centroidal lag 3.320 hours"
"      Infiltration area 2 sides 94.984 sq.metre"
"      Infiltration Base area 52.500 sq.metre"
"      0.021 0.021 0.000 0.000 c.m/sec"

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APPENDIX E

Stormwater Management Stormceptor Report

Detailed Stormceptor Sizing Report – 10283 Ilderton Road

Project Information & Location			
Project Name	10283 Ilderton Road	Project Number	1430-1
City	London	State/ Province	Ontario
Country	Canada	Date	4/20/2020
Designer Information		EOR Information (optional)	
Name	Lukas Grabowski	Name	
Company	AGM Engineering Ltd.	Company	
Phone #	519-685-5300	Phone #	
Email	lgrabowski@agm.on.ca	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	10283 Ilderton Road
Recommended Stormceptor Model	STC 2000
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	82
PSD	Fine Distribution
Rainfall Station	LONDON A

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 300	67
STC 750	77
STC 1000	78
STC 1500	79
STC 2000	82
STC 3000	84
STC 4000	87
STC 5000	87
STC 6000	89
STC 9000	92
STC 10000	92
STC 14000	94
StormceptorMAX	Custom

Stormceptor

The Stormceptor oil and sediment separator is sized to treat stormwater runoff by removing pollutants through gravity separation and flotation. Stormceptor's patented design generates positive TSS removal for each rainfall event, including large storms. Significant levels of pollutants such as heavy metals, free oils and nutrients are prevented from entering natural water resources and the re-suspension of previously captured sediment (scour) does not occur. Stormceptor provides a high level of TSS removal for small frequent storm events that represent the majority of annual rainfall volume and pollutant load. Positive treatment continues for large infrequent events, however, such events have little impact on the average annual TSS removal as they represent a small percentage of the total runoff volume and pollutant load.

Design Methodology

Stormceptor is sized using PCSWMM for Stormceptor, a continuous simulation model based on US EPA SWMM. The program calculates hydrology using local historical rainfall data and specified site parameters. With US EPA SWMM's precision, every Stormceptor unit is designed to achieve a defined water quality objective. The TSS removal data presented follows US EPA guidelines to reduce the average annual TSS load. The Stormceptor's unit process for TSS removal is settling. The settling model calculates TSS removal by analyzing:

- Site parameters
- Continuous historical rainfall data, including duration, distribution, peaks & inter-event dry periods
- Particle size distribution, and associated settling velocities (Stokes Law, corrected for drag)
- TSS load
- Detention time of the system

Hydrology Analysis

PCSWMM for Stormceptor calculates annual hydrology with the US EPA SWMM and local continuous historical rainfall data. Performance calculations of Stormceptor are based on the average annual removal of TSS for the selected site parameters. The Stormceptor is engineered to capture sediment particles by treating the required average annual runoff volume, ensuring positive removal efficiency is maintained during each rainfall event, and preventing negative removal efficiency (scour). Smaller recurring storms account for the majority of rainfall events and average annual runoff volume, as observed in the historical rainfall data analyses presented in this section.

Rainfall Station

State/Province	Ontario	Total Number of Rainfall Events	5513
Rainfall Station Name	LONDON A	Total Rainfall (mm)	28681.4
Station ID #	4475	Average Annual Rainfall (mm)	667.0
Coordinates	43°02'00"N, 81°09'00"W	Total Evaporation (mm)	674.9
Elevation (ft)	912	Total Infiltration (mm)	20979.7
Years of Rainfall Data	43	Total Rainfall that is Runoff (mm)	7026.8

Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
- For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

Drainage Area		Up Stream Storage	
Total Area (ha)	2.09	Storage (ha-m)	Discharge (cms)
Imperviousness %	26.70	0.000	0.000
Water Quality Objective		Up Stream Flow Diversion	
TSS Removal (%)	80.0	Max. Flow to Stormceptor (cms)	
Runoff Volume Capture (%)		Design Details	
Oil Spill Capture Volume (L)		Stormceptor Inlet Invert Elev (m)	
Peak Conveyed Flow Rate (L/s)		Stormceptor Outlet Invert Elev (m)	
Water Quality Flow Rate (L/s)		Stormceptor Rim Elev (m)	
		Normal Water Level Elevation (m)	
		Pipe Diameter (mm)	
		Pipe Material	
		Multiple Inlets (Y/N)	No
		Grate Inlet (Y/N)	No

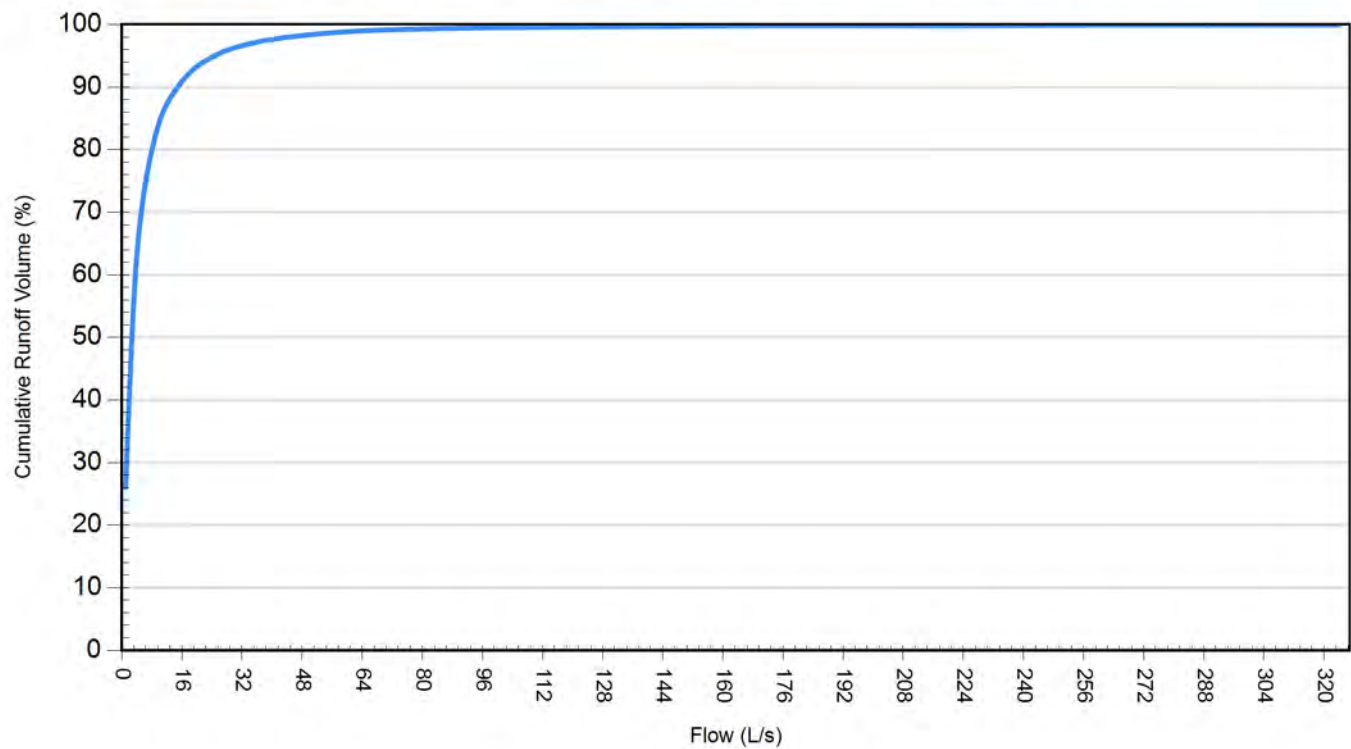
Particle Size Distribution (PSD)		
Removing the smallest fraction of particulates from runoff ensures the majority of pollutants, such as metals, hydrocarbons and nutrients are captured. The table below identifies the Particle Size Distribution (PSD) that was selected to define TSS removal for the Stormceptor design.		
Fine Distribution		
Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

Site Name		10283 Ilderton Road	
Site Details			
Drainage Area		Infiltration Parameters	
Total Area (ha)	2.09	Horton's equation is used to estimate infiltration	
Imperviousness %	26.70	Max. Infiltration Rate (mm/hr)	61.98
Surface Characteristics		Min. Infiltration Rate (mm/hr)	10.16
Width (m)	289.00	Decay Rate (1/sec)	0.00055
Slope %	2	Regeneration Rate (1/sec)	0.01
Impervious Depression Storage (mm)	0.508	Evaporation	
Pervious Depression Storage (mm)	5.08	Daily Evaporation Rate (mm/day)	2.54
Impervious Manning's n	0.015	Dry Weather Flow	
Pervious Manning's n	0.25	Dry Weather Flow (lps)	0
Maintenance Frequency		Winter Months	
Maintenance Frequency (months) >	12	Winter Infiltration	0
TSS Loading Parameters			
TSS Loading Function			
Buildup/Wash-off Parameters		TSS Availability Parameters	
Target Event Mean Conc. (EMC) mg/L		Availability Constant A	
Exponential Buildup Power		Availability Factor B	
Exponential Washoff Exponent		Availability Exponent C	
		Min. Particle Size Affected by Availability (micron)	

Cumulative Runoff Volume by Runoff Rate			
Runoff Rate (L/s)	Runoff Volume (m³)	Volume Over (m³)	Cumulative Runoff Volume (%)
1	38578	110051	26.0
4	93744	54872	63.1
9	122387	26243	82.4
16	135129	13481	90.9
25	141318	7297	95.1
36	144451	4161	97.2
49	146142	2470	98.3
64	147079	1533	99.0
81	147580	1033	99.3
100	147873	739	99.5
121	148064	549	99.6
144	148208	404	99.7
169	148296	316	99.8
196	148347	266	99.8
225	148386	227	99.8
256	148423	189	99.9
289	148461	152	99.9
324	148488	124	99.9

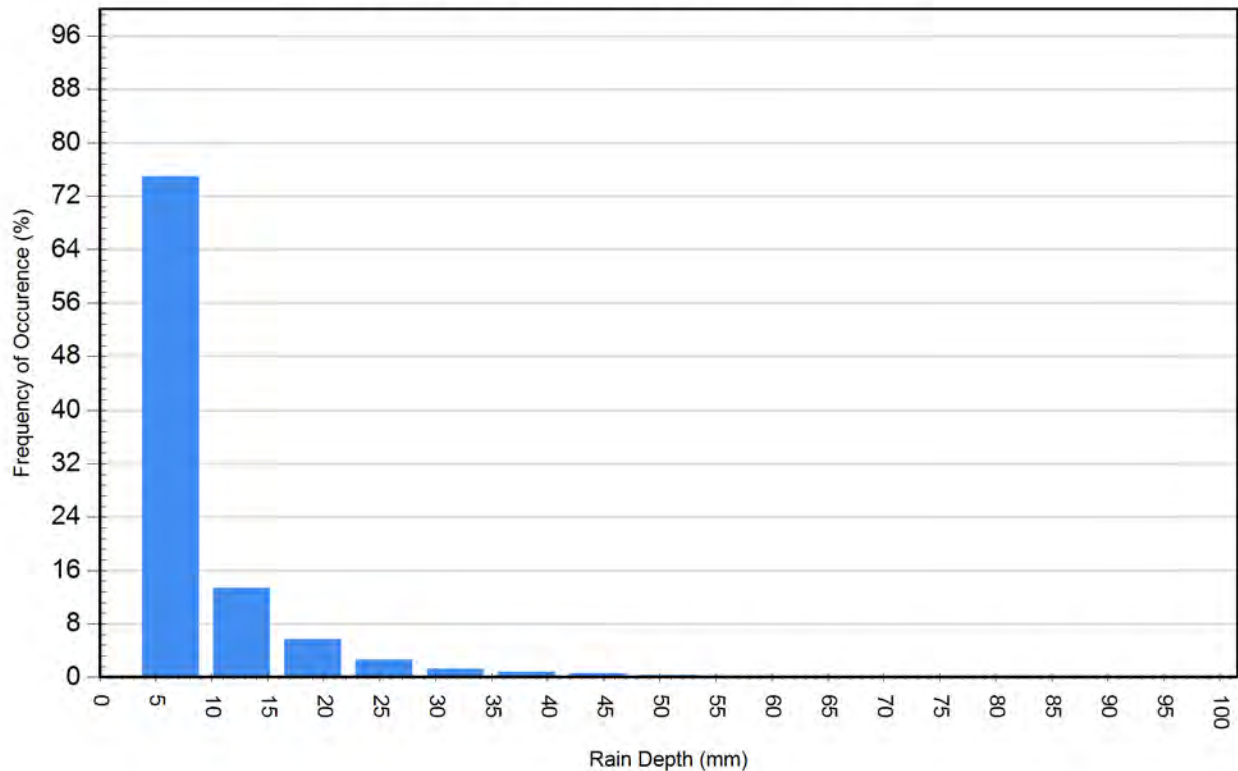
Cumulative Runoff Volume by Runoff Rate

For area: 2.09(ha), imperviousness: 26.70%, rainfall station: LONDON A



Rainfall Event Analysis				
Rainfall Depth (mm)	No. of Events	Percentage of Total Events (%)	Total Volume (mm)	Percentage of Annual Volume (%)
6.35	4133	75.0	7031	24.5
12.70	739	13.4	6819	23.8
19.05	313	5.7	4859	16.9
25.40	146	2.6	3251	11.3
31.75	72	1.3	2047	7.1
38.10	42	0.8	1464	5.1
44.45	33	0.6	1353	4.7
50.80	18	0.3	850	3.0
57.15	9	0.2	488	1.7
63.50	5	0.1	303	1.1
69.85	1	0.0	65	0.2
76.20	1	0.0	70	0.2
82.55	1	0.0	83	0.3
88.90	0	0.0	0	0.0
95.25	0	0.0	0	0.0

Frequency of Occurrence by Rainfall Depths



For Stormceptor Specifications and Drawings Please Visit:
<http://www.imbriumsystems.com/technical-specifications>