

25mmCHI_October.out

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SSSSS  W  W  M  M  H  H  Y  Y  M  M  000      222    000    11
77777  =====
S      W  W  W  MM MM  H  H  Y  Y  MM MM  0  0      2    0  0    11  7
7
SSSSS  W  W  W  M  M  M  H  H  H  H  Y  M  M  M  0  0      2    0  0    11
7 Ver4.05.0
S      W  W  M  M  H  H  Y  M  M  0  0      222    0  0    11
7 APR 2017
SSSSS  W  W  M  M  H  H  Y  M  M  000      2      0  0    11
7  =====
                                           2      0  0    11
7  # 3556411
      StormWater Management HYdrologic Model      222    000    11
7  =====
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***** SWMHYMO Ver4.05.0
*****
***** A single event and continuous hydrologic simulation model
*****
***** based on the principles of HYMO and its successors
*****
***** OTTHYMO-83 and OTTHYMO-89.
*****
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***** Distributed by: J.F. Sabourin and Associates Inc.
*****
***** Ottawa, Ontario: (613) 836-3884
*****
***** Gatineau, Quebec: (819) 243-6858
*****
***** E-Mail: swmhymo@jfsa.com
*****
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25mmCHI_October.out

+++++ Licensed user: AHYDTECH Geomorphic Ltd.

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+++++

Guelph

SERIAL#:3556411

+++++

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+++++

+++++ PROGRAM ARRAY DIMENSIONS +++++

Maximum value for ID numbers : 11

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

*

RUN DATE: 2018-10-22

TIME: 08:39:35

RUN COUNTER: 000001

*

R0001:C00001

*#*****

*# Project Name: [50 Point EA] Project Number: [42]

*# Date : April 03, 2018

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*# Modeller : [Dr. Bahar SM, P. Geo.(Ltd), P. Eng.]

*# Company : [AHYDTECH Geomorphic Ltd., 22 Zecca Drive, Guelph, ON, N1L1T1]

*# License # : 3556411

*#*****

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-----
| START          | Project
dir.:C:\AHYD_Dell2\AHYD_CAN\Project_List\42_50Point_EA_All\EA_Report\
----- Rainfall
dir.:C:\AHYD_Dell2\AHYD_CAN\Project_List\42_50Point_EA_All\EA_Report\
  TZERO = .00 hrs on 0
  METOUT= 2 (output = METRIC)
  NRUN = 0001
  NSTORM= 0
-----

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R0001:C00002-----

*#*****

*#***** EXISTING CONDITION *****

*#***** 25mm 4 HOUR CHICAGO Storm *****

*#*****

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-----
| READ STORM     | Filename:
C:\AHYD_Dell2\AHYD_CAN\Project_List\42_50Point_EA_All\EA_Report\HCA_Comments\October

```

| Ptotal= 25.00 mm| Comments: 25mm, 4HR Chicago Storm

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hh:mm	mm/hr	hh:mm	mm/hr	hh:mm	mm/hr	hh:mm	mm/hr	hh:mm	mm/hr
0:10	1.423	0:50	2.389	1:30	13.337	2:10	5.294	2:50	2.459
3:30	1.664	1:00	2.933	1:40	61.503	2:20	4.057	3:00	2.189
3:40	1.545	1:10	3.859	1:50	15.650	2:30	3.314	3:10	1.977
3:50	1.444	1:20	5.821	2:00	7.793	2:40	2.817	3:20	1.805
4:00	1.356								

R0001:C00003

CALIB NASHYD	Area (ha)=	3.153	Loss Coefficient =	.22
01:SB1 DT= 5.00	Ia (mm)=	6.450	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	.320		

Unit Hyd Qpeak (cms)= .376

PEAK FLOW (cms)= .038 (i)

TIME TO PEAK (hrs)= 1.917

DURATION (hrs)= 6.583, (dddd|hh:mm:)= 0|06:35

AVERAGE FLOW (cms)= .005

RUNOFF VOLUME (mm)= 4.081

TOTAL RAINFALL (mm)= 25.000

RUNOFF COEFFICIENT = .163

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

R0001:C00004

| ROUTE CHANNEL | Routing time step = 5.00 min

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```
| IN> 01:SB1      |      Number of SEGMENTS = 3
| OUT< 02:CH_SB2 |      Slopes (%), CHANNEL=1.00  FLOODPLAIN=1.00
-----|      LENGTH = 264.10    (m)
```

<----- DATA FOR SECTION (5.1) ----->

Distance	Elevation	Manning	
.00	80.77	.0600	
7.99	80.30	.0600 / .0400	Main Channel
10.01	79.95	.0400	Main Channel
14.05	80.20	.0400 / .0600	Main Channel
14.94	80.50	.0600	
18.10	80.80	.0600	

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

DEPTH (m)	ELEV (m)	X-VOLUME (cu.m.)	S-VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)	D x V (m2/s)
.042	79.992	.503E+01	.397E-01	.004	.189	23.34	.008
.083	80.033	.201E+02	.317E+00	.023	.299	14.70	.025
.125	80.075	.452E+02	.107E+01	.067	.392	11.22	.049
.167	80.117	.804E+02	.254E+01	.145	.475	9.26	.079
.208	80.158	.126E+03	.496E+01	.262	.552	7.98	.115
.250	80.200	.181E+03	.856E+01	.427	.623	7.07	.156
.294	80.244	.247E+03	.137E+02	.691	.739	5.95	.217
.338	80.288	.317E+03	.203E+02	1.009	.841	5.23	.284
.382	80.332	.393E+03	.284E+02	1.405	.944	4.66	.360
.425	80.375	.479E+03	.386E+02	1.872	1.032	4.26	.439
.469	80.419	.575E+03	.511E+02	2.405	1.105	3.98	.518
.513	80.463	.681E+03	.662E+02	3.009	1.167	3.77	.599
.557	80.507	.798E+03	.841E+02	3.683	1.219	3.61	.679
.601	80.551	.927E+03	.105E+03	4.428	1.262	3.49	.758
.645	80.595	.107E+04	.131E+03	5.259	1.298	3.39	.837
.688	80.638	.123E+04	.160E+03	6.180	1.330	3.31	.916
.732	80.682	.140E+04	.194E+03	7.195	1.360	3.24	.996
.776	80.726	.158E+04	.233E+03	8.308	1.386	3.17	1.076
.820	80.770	.178E+04	.277E+03	9.524	1.412	3.12	1.158

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.

channel->

AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX
(ha)	(cms)	(hrs)	(mm)	(m)	
INFLOW : ID= 1: SB1	3.153	.038	1.917	4.081	.098
.326					

OUTFLOW: ID= 2: CH_SB2 3.153 .031 2.167 4.081 .091
.314

R0001:C00005-----

| CALIB NASHYD | Area (ha)= 4.010 Loss Coefficient = .37
| 03:SB2 DT= 5.00 | Ia (mm)= 5.700 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= .460

Unit Hyd Qpeak (cms)= .333

PEAK FLOW (cms)= .065 (i)
TIME TO PEAK (hrs)= 2.083
DURATION (hrs)= 7.500, (dddd|hh:mm:)= 0|07:30
AVERAGE FLOW (cms)= .011
RUNOFF VOLUME (mm)= 7.141
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = .286

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

R0001:C00006-----

| CALIB NASHYD | Area (ha)= 3.439 Loss Coefficient = .16
| 04:SB3 DT= 5.00 | Ia (mm)= 7.900 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= .430

Unit Hyd Qpeak (cms)= .305

PEAK FLOW (cms)= .022 (i)
TIME TO PEAK (hrs)= 2.083
DURATION (hrs)= 7.333, (dddd|hh:mm:)= 0|07:20
AVERAGE FLOW (cms)= .004
RUNOFF VOLUME (mm)= 2.736
TOTAL RAINFALL (mm)= 25.000
RUNOFF COEFFICIENT = .109

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

R0001:C00007-----

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-----
| ADD HYD          |
| 05:JNC_1        | ID:NHYD      AREA      QPEAK    TPEAK    R.V.
DWF
-----
                    (ha)      (cms)    (hrs)    (mm)
(cms)
          ID 1 02:CH_SB2      3.153    .031    2.167    4.081
.000
        +ID 2 03:SB2        4.010    .065    2.083    7.141
.000
        +ID 3 04:SB3        3.439    .022    2.083    2.736
.000
=====
          SUM 05:JNC_1      10.602    .117    2.083    4.802
.000

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

R0001:C00008

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-----
| ROUTE CHANNEL    | Routing time step = 5.00 min
| IN> 05:JNC_1     | Number of SEGMENTS = 3
| OUT< 06:CH_SB5  | Slopes (%), CHANNEL=1.00 FLOODPLAIN=1.00
                    LENGTH = 264.10 (m)
-----

```

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<----- DATA FOR SECTION ( 5.1) ----->
Distance      Elevation      Manning
.00           78.93          .0600
8.00          77.56          .0600 / .0400 Main Channel
10.95         77.97          .0400 Main Channel
14.50         78.17          .0400 / .0600 Main Channel
15.30         78.13          .0600
17.50         78.02          .0600

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<----- 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)
.024       77.584    .101E+01      .463E-02      .000           .111         39.55         .003
.048       77.608    .404E+01      .370E-01      .003           .177         24.92         .009
.073       77.633    .908E+01      .125E+00      .008           .231         19.01         .017
.097       77.657    .161E+02      .296E+00      .017           .280         15.70         .027
.121       77.681    .252E+02      .578E+00      .031           .325         13.53         .039
.145       77.705    .363E+02      .999E+00      .051           .367         11.98         .053

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.169	77.729	.494E+02	.159E+01	.076	.407	10.81	.069
.194	77.754	.646E+02	.237E+01	.109	.445	9.89	.086
.218	77.778	.817E+02	.337E+01	.149	.482	9.14	.105
.242	77.802	.101E+03	.463E+01	.197	.517	8.52	.125
.266	77.826	.122E+03	.616E+01	.254	.550	8.00	.147
.291	77.851	.145E+03	.799E+01	.321	.583	7.55	.169
.315	77.875	.171E+03	.102E+02	.397	.615	7.15	.194
.339	77.899	.198E+03	.127E+02	.484	.646	6.81	.219
.363	77.923	.227E+03	.156E+02	.582	.677	6.50	.246
.387	77.947	.258E+03	.189E+02	.691	.707	6.23	.274
.412	77.972	.292E+03	.227E+02	.811	.734	6.00	.302
.436	77.996	.328E+03	.271E+02	.918	.740	5.95	.322
.460	78.020	.368E+03	.320E+02	1.046	.751	5.86	.346

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.

<----- hydrographs -----> <-pipe /

channel->

VEL	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX
(m/s)	(ha)	(cms)	(hrs)	(mm)	(m)	
INFLOW : ID= 5: JNC_1	10.602	.117	2.083	4.802	.199	
.452						
OUTFLOW: ID= 6: CH_SB5	10.602	.110	2.250	4.802	.194	
.446						

R0001:C00009

CALIB NASHYD	Area (ha)=	1.202	Loss Coefficient =	.35
07:SB4 DT= 5.00	Ia (mm)=	5.350	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	.210		

Unit Hyd Qpeak (cms)= .219

PEAK FLOW (cms)= .034 (i)

TIME TO PEAK (hrs)= 1.833

DURATION (hrs)= 5.750, (dddd|hh:mm:)= 0|05:45

AVERAGE FLOW (cms)= .004

RUNOFF VOLUME (mm)= 6.878

TOTAL RAINFALL (mm)= 25.000

RUNOFF COEFFICIENT = .275

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

 R0001:C00010-----

CALIB NASHYD		Area (ha)=	.737	Loss Coefficient =	.18
08:SB5	DT= 5.00	Ia (mm)=	7.250	# of Linear Res.(N)=	3.00
-----		U.H. Tp(hrs)=	.240		

Unit Hyd Qpeak (cms)= .117

PEAK FLOW (cms)= .008 (i)
 TIME TO PEAK (hrs)= 1.833
 DURATION (hrs)= 6.000, (dddd|hh:mm:)= 0|06:00
 AVERAGE FLOW (cms)= .001
 RUNOFF VOLUME (mm)= 3.195
 TOTAL RAINFALL (mm)= 25.000
 RUNOFF COEFFICIENT = .128

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

 R0001:C00011-----

ADD HYD		ID:NHYD	AREA	QPEAK	TPEAK	R.V.
09:JNC_2			(ha)	(cms)	(hrs)	(mm)
DWF						
(cms)						
		ID 1 06:CH_SB5	10.602	.110	2.250	4.802
.000		+ID 2 07:SB4	1.202	.034	1.833	6.878
.000		+ID 3 08:SB5	.737	.008	1.833	3.195
.000						
=====						
		SUM 09:JNC_2	12.541	.125	2.167	4.907
.000						

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

R0001:C00012-----

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-----
| ROUTE CHANNEL      | Routing time step = 5.00 min
| IN> 09:JNC_2      | Number of SEGMENTS = 3
| OUT< 10:CH_SB7    | Slopes (%), CHANNEL= .21  FLOODPLAIN= .21
-----
                        LENGTH = 175.00 (m)

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```

<----- DATA FOR SECTION ( 7.1) ----->
Distance      Elevation      Manning
      .00          78.26          .0600
      8.00          76.07          .0600 / .0400  Main Channel
     10.95          76.03          .0400          Main Channel
     14.50          77.21          .0400 / .0600  Main Channel
     15.30          77.21          .0600
     17.50          77.00          .0600

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<----- 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)
.040  76.070  .107E+02  .585E+00  .005  .084  34.60  .003
.089  76.119  .384E+02  .465E+01  .041  .186  15.70  .017
.138  76.168  .689E+02  .129E+02  .101  .257  11.33  .036
.187  76.217  .102E+03  .260E+02  .184  .315  9.25   .059
.236  76.266  .138E+03  .444E+02  .288  .365  7.99   .086
.285  76.315  .177E+03  .686E+02  .413  .408  7.14   .116
.334  76.364  .219E+03  .993E+02  .559  .447  6.52   .149
.383  76.413  .263E+03  .137E+03*  .726  .483  6.04   .185
.432  76.462  .311E+03  .182E+03*  .914  .515  5.66   .222
.481  76.511  .361E+03  .236E+03*  1.124  .546  5.35   .262
.529  76.559  .413E+03  .298E+03*  1.356  .574  5.08   .304
.578  76.608  .469E+03  .369E+03*  1.610  .601  4.85   .348
.627  76.657  .527E+03  .450E+03*  1.888  .626  4.66   .393
.676  76.706  .589E+03  .542E+03*  2.189  .651  4.48   .440
.725  76.755  .653E+03  .644E+03*  2.514  .674  4.33   .489
.774  76.804  .719E+03  .758E+03*  2.863  .696  4.19   .539
.823  76.853  .789E+03  .884E+03*  3.238  .718  4.06   .591
.872  76.902  .861E+03  .102E+04*  3.638  .739  3.95   .645
.921  76.951  .937E+03  .117E+04*  4.064  .759  3.84   .699

```

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.

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channel-> <---- hydrographs ----> <-pipe /
          AREA  QPEAK  TPEAK  R.V.  MAX DEPTH  MAX

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VEL	(ha)	(cms)	(hrs)	(mm)	(m)
(m/s)					
INFLOW : ID= 9: JNC_2	12.541	.125	2.167	4.907	.152
.272					
OUTFLOW: ID=10: CH_SB7	12.541	.118	2.333	4.906	.148
.267					

R0001:C00013

CALIB NASHYD	Area (ha)=	2.170	Loss Coefficient =	.17
01:SB7 DT= 5.00	Ia (mm)=	7.500	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	.250		

Unit Hyd Qpeak (cms)= .332

PEAK FLOW (cms)= .022 (i)

TIME TO PEAK (hrs)= 1.833

DURATION (hrs)= 6.000, (dddd|hh:mm:)= 0|06:00

AVERAGE FLOW (cms)= .003

RUNOFF VOLUME (mm)= 2.975

TOTAL RAINFALL (mm)= 25.000

RUNOFF COEFFICIENT = .119

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

R0001:C00014

ADD HYD	ID:NHYD	AREA	QPEAK	TPEAK	R.V.
DWF		(ha)	(cms)	(hrs)	(mm)
02:JNC_3	ID 1 01:SB7	2.170	.022	1.833	2.975
.000					
	+ID 2 10:CH_SB7	12.541	.118	2.333	4.906
.000					
	SUM 02:JNC_3	14.711	.127	2.333	4.622
.000					

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 R0001:C00015-----

SAVE HYD	AREA	(ha)=	14.711
ID=02:JNC_3	QPEAK	(cms)=	.127 (i)
DT= 5.00 PCYC=-1	TPEAK	(hrs)=	2.333
-----	VOLUME	(mm)=	4.622

Filename: JNC_3.0001

Comments: CH SB7

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

 R0001:C00016-----

ROUTE CHANNEL	Routing time step =	5.00 min
IN> 02:JNC_3	Number of SEGMENTS =	3
OUT< 03:CH_SB9	Slopes (%), CHANNEL=1.00	FLOODPLAIN=1.00
-----	LENGTH =	264.10 (m)

<----- DATA FOR SECTION (9.1) ----->

Distance	Elevation	Manning	
.00	78.26	.0600	
8.00	76.07	.0600 / .0400	Main Channel
10.95	76.03	.0400	Main Channel
14.50	77.21	.0400 / .0600	Main Channel
15.30	77.21	.0600	
17.50	77.00	.0600	

<----- 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)
.040	76.070	.162E+02	.123E+00	.011	.184	23.93	.007
.089	76.119	.580E+02	.977E+00	.089	.405	10.86	.036
.138	76.168	.104E+03	.272E+01	.221	.562	7.83	.077
.187	76.217	.154E+03	.546E+01	.402	.688	6.39	.129
.236	76.266	.209E+03	.932E+01	.629	.796	5.53	.188
.285	76.315	.267E+03	.144E+02	.902	.891	4.94	.254
.334	76.364	.330E+03	.209E+02	1.220	.976	4.51	.326
.383	76.413	.397E+03	.288E+02	1.584	1.053	4.18	.403
.432	76.462	.469E+03	.383E+02	1.995	1.124	3.91	.485

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.481	76.511	.544E+03	.495E+02	2.453	1.191	3.70	.572
.529	76.559	.624E+03	.625E+02	2.959	1.253	3.51	.663
.578	76.608	.708E+03	.775E+02	3.514	1.311	3.36	.758
.627	76.657	.796E+03	.945E+02	4.120	1.367	3.22	.858
.676	76.706	.888E+03	.114E+03	4.777	1.420	3.10	.960
.725	76.755	.985E+03	.135E+03	5.486	1.471	2.99	1.067
.774	76.804	.109E+04	.159E+03	6.248	1.520	2.90	1.177
.823	76.853	.119E+04	.186E+03	7.065	1.567	2.81	1.290
.872	76.902	.130E+04	.215E+03	7.938	1.613	2.73	1.406
.921	76.951	.141E+04	.246E+03	8.868	1.657	2.66	1.526

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.

channel->	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX
VEL	(ha)	(cms)	(hrs)	(mm)	(m)	
INFLOW : ID= 2: JNC_3	14.711	.127	2.333	4.622	.103	
OUTFLOW: ID= 3: CH_SB9	14.711	.124	2.417	4.622	.102	

R0001:C00017

CALIB STANDHYD	Area (ha)=	.57		
04:SB9 DT= 1.00	Total Imp(%)=	45.00	Dir. Conn.(%)=	45.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.26	.32
Dep. Storage (mm)=	1.50	8.00
Average Slope (%)=	.50	.40
Length (m)=	85.00	40.00
Mannings n =	.013	.300
Max.eff.Inten.(mm/hr)=	61.50	6.68
over (min)	3.00	41.00
Storage Coeff. (min)=	3.47 (ii)	41.12 (ii)
Unit Hyd. Tpeak (min)=	3.00	41.00
Unit Hyd. peak (cms)=	.34	.03

TOTALS
 .041 (iii)

PEAK FLOW (cms)=	.04	.00
------------------	-----	-----

		25mmCHI_October.out		
TIME TO PEAK	(hrs)=	1.67	2.48	1.667
RUNOFF VOLUME	(mm)=	23.50	2.12	11.739
TOTAL RAINFALL	(mm)=	25.00	25.00	25.000
RUNOFF COEFFICIENT	=	.94	.08	.470

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 68.0 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.

 R0001:C00018-----

FINISH

WARNINGS / ERRORS / NOTES

Simulation ended on 2018-10-22 at 08:39:35

=====
 =====

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=====

```

SSSSS  W  W  M  M  H  H  Y  Y  M  M  000      222    000    11
77777  =====
S      W  W  W  MM MM  H  H  Y  Y  MM MM  0  0      2    0  0    11  7
7
SSSSS  W  W  W  M  M  M  HHHHH  Y  M  M  M  0  0      2    0  0    11
7 Ver4.05.0
S      W  W  M  M  H  H  Y  M  M  0  0      222    0  0    11
7 APR 2017
SSSSS  W  W  M  M  H  H  Y  M  M  000      2    0  0    11
7  =====
2    0  0    11
7  # 3556411
StormWater Management HYdrologic Model      222    000    11
7  =====

```


```

***** SWMHYMO Ver4.05.0
*****
***** A single event and continuous hydrologic simulation model
*****
***** based on the principles of HYMO and its successors
*****
***** OTTHYMO-83 and OTTHYMO-89.
*****

```


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***** Distributed by: J.F. Sabourin and Associates Inc.
*****
***** Ottawa, Ontario: (613) 836-3884
*****
***** Gatineau, Quebec: (819) 243-6858
*****
***** E-Mail: swmhymo@jfsa.com
*****

```


+++++
+++++

100_CHI_October.out

++++++ Licensed user: AHYDTECH Geomorphic Ltd.

++++++

++++++

Guelph

SERIAL#:3556411

++++++

++++++

++++++

++++++ PROGRAM ARRAY DIMENSIONS ++++++

Maximum value for ID numbers : 11

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

*

RUN DATE: 2018-10-21

TIME: 09:37:45

RUN COUNTER: 000001

*

R0001:C00001-----

*#*****

*# Project Name: [50 Point EA] Project Number: [42]

*# Date : April 03, 2018

100_CHI_October.out

*# Modeller : [Dr. Bahar SM, P. Geo.(Ltd), P. Eng.]

*# Company : [AHYDTECH Geomorphic Ltd., 22 Zecca Drive, Guelph, ON, N1L1T1]

*# License # : 3556411

*#*****

```

-----
| START          | Project
dir.:C:\AHYD_Dell2\AHYD_CAN\Project_List\42_50Point_EA_All\EA_Report\
----- Rainfall
dir.:C:\AHYD_Dell2\AHYD_CAN\Project_List\42_50Point_EA_All\EA_Report\
  TZERO = .00 hrs on 0
  METOUT= 2 (output = METRIC)
  NRUN = 0001
  NSTORM= 0
-----

```

R0001:C00002-----

*#*****

*#***** EXISTING CONDITION *****

*#***** 100-YEAR CHICAGO Storm MOUNT HOPE *****

*#*****

```

-----
| CHICAGO STORM | IDF curve parameters: A=2317.400
| Ptotal= 91.39 mm | B= 11.000

```

100_CHI_October.out

C= .836

used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 hrs

Storm time step = 5.00 min

Time to peak ratio = .33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hh:mm	mm/hr	hh:mm	mm/hr	hh:mm	mm/hr	hh:mm	mm/hr	hh:mm	mm/hr
0:05	4.891	0:45	10.783	1:25	123.838	2:05	16.745	2:45	8.613
3:25	5.838	0:50	12.760	1:30	74.498	2:10	14.979	2:50	8.124
3:30	5.616	0:55	15.625	1:35	51.732	2:15	13.546	2:55	7.689
3:35	5.411	1:00	20.111	1:40	39.034	2:20	12.362	3:00	7.299
3:40	5.221	1:05	27.996	1:45	31.085	2:25	11.369	3:05	6.949
3:45	5.044	1:10	44.828	1:50	25.704	2:30	10.524	3:10	6.631
3:50	4.880	1:15	98.589	1:55	21.851	2:35	9.797	3:15	6.343
3:55	4.727	1:20	228.222	2:00	18.971	2:40	9.166	3:20	6.079
4:00	4.583								

R0001:C00003

CALIB NASHYD	Area (ha)=	3.153	Loss Coefficient =	.22
01:SB1 DT= 5.00	Ia (mm)=	6.450	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	.320		

Unit Hyd Qpeak (cms)= .376

PEAK FLOW (cms)= .159 (i)

TIME TO PEAK (hrs)= 1.667

DURATION (hrs)= 6.583, (dddd|hh:mm:)= 0|06:35

AVERAGE FLOW (cms)= .025

RUNOFF VOLUME (mm)= 18.687

TOTAL RAINFALL (mm)= 91.393

RUNOFF COEFFICIENT = .204

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

 R0001:C00004-----

ROUTE CHANNEL	Routing time step = 5.00 min
IN> 01:SB1	Number of SEGMENTS = 3
OUT< 02:CH_SB2	Slopes (%), CHANNEL=1.00 FLOODPLAIN=1.00
	LENGTH = 264.10 (m)

<----- DATA FOR SECTION (5.1) ----->

Distance	Elevation	Manning	
.00	80.77	.0600	
7.99	80.30	.0600 / .0400	Main Channel
10.01	79.95	.0400	Main Channel
14.05	80.20	.0400 / .0600	Main Channel
14.94	80.50	.0600	
18.10	80.80	.0600	

<----- 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)
.042	79.992	.503E+01	.397E-01	.004	.189	23.34	.008
.083	80.033	.201E+02	.317E+00	.023	.299	14.70	.025
.125	80.075	.452E+02	.107E+01	.067	.392	11.22	.049
.167	80.117	.804E+02	.254E+01	.145	.475	9.26	.079
.208	80.158	.126E+03	.496E+01	.262	.552	7.98	.115
.250	80.200	.181E+03	.856E+01	.427	.623	7.07	.156
.294	80.244	.247E+03	.137E+02	.691	.739	5.95	.217
.338	80.288	.317E+03	.203E+02	1.009	.841	5.23	.284
.382	80.332	.393E+03	.284E+02	1.405	.944	4.66	.360
.425	80.375	.479E+03	.386E+02	1.872	1.032	4.26	.439
.469	80.419	.575E+03	.511E+02	2.405	1.105	3.98	.518
.513	80.463	.681E+03	.662E+02	3.009	1.167	3.77	.599
.557	80.507	.798E+03	.841E+02	3.683	1.219	3.61	.679
.601	80.551	.927E+03	.105E+03	4.428	1.262	3.49	.758
.645	80.595	.107E+04	.131E+03	5.259	1.298	3.39	.837
.688	80.638	.123E+04	.160E+03	6.180	1.330	3.31	.916
.732	80.682	.140E+04	.194E+03	7.195	1.360	3.24	.996
.776	80.726	.158E+04	.233E+03	8.308	1.386	3.17	1.076
.820	80.770	.178E+04	.277E+03	9.524	1.412	3.12	1.158

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.

<----- hydrographs -----> <-pipe /

100_CHI_October.out

channel->

VEL	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX
(m/s)	(ha)	(cms)	(hrs)	(mm)	(m)	
INFLOW : ID= 1: SB1	3.153	.159	1.667	18.687	.172	
.484						
OUTFLOW: ID= 2: CH_SB2	3.153	.147	1.750	18.687	.167	
.476						

R0001:C00005

CALIB NASHYD	Area (ha)=	4.010	Loss Coefficient =	.37
03:SB2 DT= 5.00	Ia (mm)=	5.700	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	.460		

Unit Hyd Qpeak (cms)= .333

PEAK FLOW (cms)= .268 (i)

TIME TO PEAK (hrs)= 1.833

DURATION (hrs)= 7.500, (dddd|hh:mm:)= 0|07:30

AVERAGE FLOW (cms)= .047

RUNOFF VOLUME (mm)= 31.706

TOTAL RAINFALL (mm)= 91.393

RUNOFF COEFFICIENT = .347

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

R0001:C00006

CALIB NASHYD	Area (ha)=	3.439	Loss Coefficient =	.16
04:SB3 DT= 5.00	Ia (mm)=	7.900	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	.430		

Unit Hyd Qpeak (cms)= .305

PEAK FLOW (cms)= .102 (i)

TIME TO PEAK (hrs)= 1.750

DURATION (hrs)= 7.333, (dddd|hh:mm:)= 0|07:20

AVERAGE FLOW (cms)= .017

RUNOFF VOLUME (mm)= 13.359

TOTAL RAINFALL (mm)= 91.393

RUNOFF COEFFICIENT = 100_CHI_October.out
 = .146

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

R0001:C00007

ADD HYD	ID:NHYD	AREA	QPEAK	TPEAK	R.V.
(cms)		(ha)	(cms)	(hrs)	(mm)
05:JNC_1	ID 1 02:CH_SB2	3.153	.147	1.750	18.687
	+ID 2 03:SB2	4.010	.268	1.833	31.706
	+ID 3 04:SB3	3.439	.102	1.750	13.359
	SUM 05:JNC_1	10.602	.516	1.833	21.883

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

R0001:C00008

ROUTE CHANNEL	Routing time step = 5.00 min
IN> 05:JNC_1	Number of SEGMENTS = 3
OUT< 06:CH_SB5	Slopes (%), CHANNEL=1.00 FLOODPLAIN=1.00
	LENGTH = 264.10 (m)

<----- DATA FOR SECTION (5.1) ----->

Distance	Elevation	Manning	
.00	78.93	.0600	
8.00	77.56	.0600 / .0400	Main Channel
10.95	77.97	.0400	Main Channel
14.50	78.17	.0400 / .0600	Main Channel
15.30	78.13	.0600	
17.50	78.02	.0600	

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

DEPTH	ELEV	X-VOLUME	S-VOLUME	FLOW RATE	VELOCITY	TRAV.TIME	D x V
-------	------	----------	----------	-----------	----------	-----------	-------

100_CHI_October.out

(m)	(m)	(cu.m.)	(cu.m.)	(cms)	(m/s)	(min)	(m2/s)
.024	77.584	.101E+01	.463E-02	.000	.111	39.55	.003
.048	77.608	.404E+01	.370E-01	.003	.177	24.92	.009
.073	77.633	.908E+01	.125E+00	.008	.231	19.01	.017
.097	77.657	.161E+02	.296E+00	.017	.280	15.70	.027
.121	77.681	.252E+02	.578E+00	.031	.325	13.53	.039
.145	77.705	.363E+02	.999E+00	.051	.367	11.98	.053
.169	77.729	.494E+02	.159E+01	.076	.407	10.81	.069
.194	77.754	.646E+02	.237E+01	.109	.445	9.89	.086
.218	77.778	.817E+02	.337E+01	.149	.482	9.14	.105
.242	77.802	.101E+03	.463E+01	.197	.517	8.52	.125
.266	77.826	.122E+03	.616E+01	.254	.550	8.00	.147
.291	77.851	.145E+03	.799E+01	.321	.583	7.55	.169
.315	77.875	.171E+03	.102E+02	.397	.615	7.15	.194
.339	77.899	.198E+03	.127E+02	.484	.646	6.81	.219
.363	77.923	.227E+03	.156E+02	.582	.677	6.50	.246
.387	77.947	.258E+03	.189E+02	.691	.707	6.23	.274
.412	77.972	.292E+03	.227E+02	.811	.734	6.00	.302
.436	77.996	.328E+03	.271E+02	.918	.740	5.95	.322
.460	78.020	.368E+03	.320E+02	1.046	.751	5.86	.346

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.

channel->	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX
VEL	(ha)	(cms)	(hrs)	(mm)	(m)	
INFLOW : ID= 5: JNC_1	10.602	.516	1.833	21.883	.347	
OUTFLOW: ID= 6: CH_SB5	10.602	.502	1.917	21.883	.343	

R0001:C00009

CALIB NASHYD	Area (ha)=	1.202	Loss Coefficient =	.35
07:SB4 DT= 5.00	Ia (mm)=	5.350	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	.210		

Unit Hyd Qpeak (cms)= .219

PEAK FLOW (cms)= .125 (i)

100_CHI_October.out

TIME TO PEAK (hrs)= 1.500
 DURATION (hrs)= 5.750, (dddd|hh:mm:)= 0|05:45
 AVERAGE FLOW (cms)= .017
 RUNOFF VOLUME (mm)= 30.115
 TOTAL RAINFALL (mm)= 91.393
 RUNOFF COEFFICIENT = .330

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

 R0001:C00010-----

CALIB NASHYD		Area (ha)=	.737	Loss Coefficient =	.18
08:SB5	DT= 5.00	Ia (mm)=	7.250	# of Linear Res.(N)=	3.00
-----		U.H. Tp(hrs)=	.240		

Unit Hyd Qpeak (cms)= .117

PEAK FLOW (cms)= .036 (i)
 TIME TO PEAK (hrs)= 1.583
 DURATION (hrs)= 6.000, (dddd|hh:mm:)= 0|06:00
 AVERAGE FLOW (cms)= .005
 RUNOFF VOLUME (mm)= 15.146
 TOTAL RAINFALL (mm)= 91.393
 RUNOFF COEFFICIENT = .166

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

 R0001:C00011-----

ADD HYD		ID:NHYD	AREA	QPEAK	TPEAK	R.V.
09:JNC_2			(ha)	(cms)	(hrs)	(mm)
DWF						
(cms)						
		ID 1 06:CH_SB5	10.602	.502	1.917	21.883
.000		+ID 2 07:SB4	1.202	.125	1.500	30.115
.000		+ID 3 08:SB5	.737	.036	1.583	15.146
.000						

100_CHI_October.out

.000 SUM 09:JNC_2 12.541 .589 1.833 22.276

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

R0001:C00012-----

ROUTE CHANNEL		Routing time step = 5.00 min
IN> 09:JNC_2		Number of SEGMENTS = 3
OUT< 10:CH_SB7		Slopes (%), CHANNEL= .21 FLOODPLAIN= .21
		LENGTH = 175.00 (m)

<----- DATA FOR SECTION (7.1) ----->

Distance	Elevation	Manning	
.00	78.26	.0600	
8.00	76.07	.0600 / .0400	Main Channel
10.95	76.03	.0400	Main Channel
14.50	77.21	.0400 / .0600	Main Channel
15.30	77.21	.0600	
17.50	77.00	.0600	

<----- 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)
.040	76.070	.107E+02	.585E+00	.005	.084	34.60	.003
.089	76.119	.384E+02	.465E+01	.041	.186	15.70	.017
.138	76.168	.689E+02	.129E+02	.101	.257	11.33	.036
.187	76.217	.102E+03	.260E+02	.184	.315	9.25	.059
.236	76.266	.138E+03	.444E+02	.288	.365	7.99	.086
.285	76.315	.177E+03	.686E+02	.413	.408	7.14	.116
.334	76.364	.219E+03	.993E+02	.559	.447	6.52	.149
.383	76.413	.263E+03	.137E+03*	.726	.483	6.04	.185
.432	76.462	.311E+03	.182E+03*	.914	.515	5.66	.222
.481	76.511	.361E+03	.236E+03*	1.124	.546	5.35	.262
.529	76.559	.413E+03	.298E+03*	1.356	.574	5.08	.304
.578	76.608	.469E+03	.369E+03*	1.610	.601	4.85	.348
.627	76.657	.527E+03	.450E+03*	1.888	.626	4.66	.393
.676	76.706	.589E+03	.542E+03*	2.189	.651	4.48	.440
.725	76.755	.653E+03	.644E+03*	2.514	.674	4.33	.489
.774	76.804	.719E+03	.758E+03*	2.863	.696	4.19	.539
.823	76.853	.789E+03	.884E+03*	3.238	.718	4.06	.591
.872	76.902	.861E+03	.102E+04*	3.638	.739	3.95	.645
.921	76.951	.937E+03	.117E+04*	4.064	.759	3.84	.699

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

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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.

channel->	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX
VEL	(ha)	(cms)	(hrs)	(mm)	(m)	
INFLOW : ID= 9: JNC_2	12.541	.589	1.833	22.276	.342	
.453						
OUTFLOW: ID=10: CH_SB7	12.541	.571	1.917	22.276	.337	
.450						

R0001:C00013

CALIB NASHYD	Area (ha)=	2.170	Loss Coefficient =	.17
01:SB7 DT= 5.00	Ia (mm)=	7.500	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	.250		

Unit Hyd Qpeak (cms)= .332

PEAK FLOW (cms)= .098 (i)

TIME TO PEAK (hrs)= 1.583

DURATION (hrs)= 6.000, (dddd|hh:mm:)= 0|06:00

AVERAGE FLOW (cms)= .014

RUNOFF VOLUME (mm)= 14.262

TOTAL RAINFALL (mm)= 91.393

RUNOFF COEFFICIENT = .156

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

R0001:C00014

ADD HYD	ID:NHYD	AREA	QPEAK	TPEAK	R.V.
DWF		(ha)	(cms)	(hrs)	(mm)
02:JNC_3	ID 1 01:SB7	2.170	.098	1.583	14.262
(cms)					
.000					

100_CHI_October.out
 +ID 2 10:CH_SB7 12.541 .571 1.917 22.276
 .000

=====

SUM	02:JNC_3	14.711	.628	1.833	21.094
-----	----------	--------	------	-------	--------

.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 R0001:C00015-----

SAVE HYD	AREA	(ha)=	14.711
ID=02:JNC_3	QPEAK	(cms)=	.628 (i)
DT= 5.00 PCYC=-1	TPEAK	(hrs)=	1.833
	VOLUME	(mm)=	21.094

Filename: JNC_3.0001

Comments: CH SB7

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

 R0001:C00016-----

ROUTE CHANNEL	Routing time step =	5.00 min
IN> 02:JNC_3	Number of SEGMENTS =	3
OUT< 03:CH_SB9	Slopes (%), CHANNEL=1.00	FLOODPLAIN=1.00
	LENGTH =	264.10 (m)

<----- DATA FOR SECTION (9.1) ----->

Distance	Elevation	Manning	
.00	78.26	.0600	
8.00	76.07	.0600 / .0400	Main Channel
10.95	76.03	.0400	Main Channel
14.50	77.21	.0400 / .0600	Main Channel
15.30	77.21	.0600	
17.50	77.00	.0600	

<----- 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)
.040	76.070	.162E+02	.123E+00	.011	.184	23.93	.007
.089	76.119	.580E+02	.977E+00	.089	.405	10.86	.036

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.138	76.168	.104E+03	.272E+01	.221	.562	7.83	.077
.187	76.217	.154E+03	.546E+01	.402	.688	6.39	.129
.236	76.266	.209E+03	.932E+01	.629	.796	5.53	.188
.285	76.315	.267E+03	.144E+02	.902	.891	4.94	.254
.334	76.364	.330E+03	.209E+02	1.220	.976	4.51	.326
.383	76.413	.397E+03	.288E+02	1.584	1.053	4.18	.403
.432	76.462	.469E+03	.383E+02	1.995	1.124	3.91	.485
.481	76.511	.544E+03	.495E+02	2.453	1.191	3.70	.572
.529	76.559	.624E+03	.625E+02	2.959	1.253	3.51	.663
.578	76.608	.708E+03	.775E+02	3.514	1.311	3.36	.758
.627	76.657	.796E+03	.945E+02	4.120	1.367	3.22	.858
.676	76.706	.888E+03	.114E+03	4.777	1.420	3.10	.960
.725	76.755	.985E+03	.135E+03	5.486	1.471	2.99	1.067
.774	76.804	.109E+04	.159E+03	6.248	1.520	2.90	1.177
.823	76.853	.119E+04	.186E+03	7.065	1.567	2.81	1.290
.872	76.902	.130E+04	.215E+03	7.938	1.613	2.73	1.406
.921	76.951	.141E+04	.246E+03	8.868	1.657	2.66	1.526

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.

channel->	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX
VEL	(ha)	(cms)	(hrs)	(mm)	(m)	
INFLOW : ID= 2: JNC_3	14.711	.628	1.833	21.094	.235	
.795						
OUTFLOW: ID= 3: CH_SB9	14.711	.625	1.917	21.094	.235	
.793						

R0001:C00017

CALIB STANDHYD	Area (ha)=	.57		
04:SB9 DT= 1.00	Total Imp(%)=	45.00	Dir. Conn.(%)=	45.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.26	.32
Dep. Storage (mm)=	1.50	8.00
Average Slope (%)=	.50	.40
Length (m)=	85.00	40.00
Mannings n =	.013	.300

		100_CHI_October.out		
Max.eff.Inten.(mm/hr)=	228.22	48.45		
over (min)	2.00	19.00		
Storage Coeff. (min)=	2.05 (ii)	19.10 (ii)		
Unit Hyd. Tpeak (min)=	2.00	19.00		
Unit Hyd. peak (cms)=	.55	.06		
				TOTALS
PEAK FLOW (cms)=	.15	.03	.156 (iii)	
TIME TO PEAK (hrs)=	1.33	1.72	1.333	
RUNOFF VOLUME (mm)=	89.89	34.27	59.301	
TOTAL RAINFALL (mm)=	91.39	91.39	91.393	
RUNOFF COEFFICIENT =	.98	.37	.649	

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN* = 68.0 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.

R0001:C00018-----

FINISH

WARNINGS / ERRORS / NOTES

Simulation ended on 2018-10-21 at 09:37:45
=====

=====
=====

```

SSSSS  W  W  M  M  H  H  Y  Y  M  M  000      222    000    11
77777  =====
S      W  W  W  MM MM  H  H  Y  Y  MM MM  0  0      2    0  0    11  7
7
SSSSS  W  W  W  M  M  M  HHHHH  Y  M  M  M  0  0      2    0  0    11
7 Ver4.05.0
S      W  W  M  M  H  H  Y  M  M  0  0      222    0  0    11
7 APR 2017
SSSSS  W  W  M  M  H  H  Y  M  M  000      2    0  0    11
7  =====
2    0  0    11
7  # 3556411
StormWater Management HYdrologic Model      222    000    11
7  =====

```


```

***** SWMHYMO Ver4.05.0
*****
***** 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
*****

```


+++++
+++++

100_SCS_October.out

+++++ Licensed user: AHYDTECH Geomorphic Ltd.

+++++

+++++

Guelph

SERIAL#:3556411

+++++

+++++

+++++

+++++ PROGRAM ARRAY DIMENSIONS +++++

Maximum value for ID numbers : 11

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

*

RUN DATE: 2018-10-22

TIME: 08:40:35

RUN COUNTER: 000002

*

R0001:C00001-----

*#*****

*# Project Name: [50 Point EA] Project Number: [42]

*# Date : April 03, 2018

100_SCS_October.out

*# Modeller : [Dr. Bahar SM, P. Geo.(Ltd), P. Eng.]

*# Company : [AHYDTECH Geomorphic Ltd., 22 Zecca Drive, Guelph, ON, N1L1T1]

*# License # : 3556411

*#*****

| START | Project
dir.:C:\AHYD_Dell12\AHYD_CAN\Project_List\42_50Point_EA_All\EA_Report\
----- Rainfall
dir.:C:\AHYD_Dell12\AHYD_CAN\Project_List\42_50Point_EA_All\EA_Report\
TZERO = .00 hrs on 0
METOUT= 2 (output = METRIC)
NRUN = 0001
NSTORM= 0

R0001:C00002-----

*#*****

*#***** EXISTING CONDITION *****

*#***** 100-YEAR SCS 24 Hour Storm*****

*#*****

100_SCS_October.out

| READ STORM | Filename:
 C:\AHYD_De112\AHYD_CAN\Project_List\42_50Point_EA_All\EA_Report\HCA_Comments\October
 2018\Hydrology_rerun\100YR_SCS_Model_V2\100SCS24.STM

| Ptotal= 122.89 mm | Comments: 100yr 24hr SCS

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hh:mm	mm/hr	hh:mm	mm/hr	hh:mm	mm/hr	hh:mm	mm/hr	hh:mm	mm/hr	hh:mm	mm/hr
0:10	1.350	4:10	1.970	8:10	3.320	12:10	17.700	16:10	2.210		
20:10	1.470										
0:20	1.350	4:20	1.970	8:20	3.320	12:20	17.700	16:20	2.210		
20:20	1.470										
0:30	1.350	4:30	1.970	8:30	3.320	12:30	17.700	16:30	2.210		
20:30	1.470										
0:40	1.350	4:40	1.970	8:40	3.320	12:40	9.090	16:40	2.210		
20:40	1.470										
0:50	1.350	4:50	1.970	8:50	3.320	12:50	9.090	16:50	2.210		
20:50	1.470										
1:00	1.350	5:00	1.970	9:00	3.320	13:00	9.090	17:00	2.210		
21:00	1.470										
1:10	1.350	5:10	1.970	9:10	3.930	13:10	1.720	17:10	2.210		
21:10	1.470										
1:20	1.350	5:20	1.970	9:20	3.930	13:20	1.720	17:20	2.210		
21:20	1.470										
1:30	1.350	5:30	1.970	9:30	3.930	13:30	1.720	17:30	2.210		
21:30	1.470										
1:40	1.350	5:40	1.970	9:40	4.420	13:40	10.080	17:40	2.210		
21:40	1.470										
1:50	1.350	5:50	1.970	9:50	4.420	13:50	10.080	17:50	2.210		
21:50	1.470										
2:00	1.350	6:00	1.970	10:00	4.420	14:00	10.080	18:00	2.210		
22:00	1.470										
2:10	1.600	6:10	2.460	10:10	5.650	14:10	3.690	18:10	2.210		
22:10	1.470										
2:20	1.600	6:20	2.460	10:20	5.650	14:20	3.690	18:20	2.210		
22:20	1.470										
2:30	1.600	6:30	2.460	10:30	5.650	14:30	3.690	18:30	2.210		
22:30	1.470										
2:40	1.600	6:40	2.460	10:40	7.620	14:40	3.690	18:40	2.210		
22:40	1.470										
2:50	1.600	6:50	2.460	10:50	7.620	14:50	3.690	18:50	2.210		
22:50	1.470										

100_SCS_October.out

23:00	3:00	1.600	7:00	2.460	11:00	7.620	15:00	3.690	19:00	2.210
		1.470								
23:10	3:10	1.600	7:10	2.460	11:10	11.800	15:10	3.690	19:10	2.210
		1.470								
23:20	3:20	1.600	7:20	2.460	11:20	11.800	15:20	3.690	19:20	2.210
		1.470								
23:30	3:30	1.600	7:30	2.460	11:30	11.800	15:30	3.690	19:30	2.210
		1.470								
23:40	3:40	1.600	7:40	2.460	11:40	51.130	15:40	3.690	19:40	2.210
		1.470								
23:50	3:50	1.600	7:50	2.460	11:50	93.400	15:50	3.690	19:50	2.210
		1.470								
24:00	4:00	1.600	8:00	2.460	12:00	135.680	16:00	3.690	20:00	2.210
		1.470								

 R0001:C00003-----

CALIB NASHYD	Area (ha)=	3.153	Loss Coefficient =	.22
01:SB1 DT= 5.00	Ia (mm)=	6.450	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	.320		

Unit Hyd Qpeak (cms)= .376

PEAK FLOW (cms)= .140 (i)

TIME TO PEAK (hrs)= 12.167

DURATION (hrs)= 26.583, (dddd|hh:mm:)= 1|02:35

AVERAGE FLOW (cms)= .008

RUNOFF VOLUME (mm)= 25.616

TOTAL RAINFALL (mm)= 122.887

RUNOFF COEFFICIENT = .208

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

 R0001:C00004-----

ROUTE CHANNEL	Routing time step =	5.00 min
IN> 01:SB1	Number of SEGMENTS =	3
OUT< 02:CH_SB2	Slopes (%), CHANNEL=1.00 FLOODPLAIN=1.00	
	LENGTH =	264.10 (m)

<----- DATA FOR SECTION (5.1) ----->
 Distance Elevation Manning

```

                                100_SCS_October.out
                                .00      80.77      .0600
                                7.99     80.30     .0600 / .0400  Main Channel
                                10.01    79.95     .0400      Main Channel
                                14.05    80.20     .0400 / .0600  Main Channel
                                14.94    80.50     .0600
                                18.10    80.80     .0600

```

```

<----- 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)
.042      79.992    .503E+01  .397E-01  .004       .189      23.34      .008
.083      80.033    .201E+02  .317E+00  .023       .299      14.70      .025
.125      80.075    .452E+02  .107E+01  .067       .392      11.22      .049
.167      80.117    .804E+02  .254E+01  .145       .475      9.26       .079
.208      80.158    .126E+03  .496E+01  .262       .552      7.98       .115
.250      80.200    .181E+03  .856E+01  .427       .623      7.07       .156
.294      80.244    .247E+03  .137E+02  .691       .739      5.95       .217
.338      80.288    .317E+03  .203E+02  1.009      .841      5.23       .284
.382      80.332    .393E+03  .284E+02  1.405      .944      4.66       .360
.425      80.375    .479E+03  .386E+02  1.872     1.032     4.26       .439
.469      80.419    .575E+03  .511E+02  2.405     1.105     3.98       .518
.513      80.463    .681E+03  .662E+02  3.009     1.167     3.77       .599
.557      80.507    .798E+03  .841E+02  3.683     1.219     3.61       .679
.601      80.551    .927E+03  .105E+03  4.428     1.262     3.49       .758
.645      80.595    .107E+04  .131E+03  5.259     1.298     3.39       .837
.688      80.638    .123E+04  .160E+03  6.180     1.330     3.31       .916
.732      80.682    .140E+04  .194E+03  7.195     1.360     3.24       .996
.776      80.726    .158E+04  .233E+03  8.308     1.386     3.17      1.076
.820      80.770    .178E+04  .277E+03  9.524     1.412     3.12      1.158

```

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.

```

<---- hydrographs ----> <-pipe /
channel->
                AREA      QPEAK      TPEAK      R.V.      MAX DEPTH  MAX
VEL
                (ha)      (cms)      (hrs)      (mm)      (m)
(m/s)
  INFLOW : ID= 1: SB1      3.153      .140      12.167    25.616     .164
.469
  OUTFLOW: ID= 2: CH_SB2   3.153      .128      12.250    25.616     .157
.453

```


R0001:C00005-----

100_SCS_October.out

```

-----
-----
| CALIB NASHYD          | Area   (ha)=   4.010  Loss Coefficient   =   .37
| 03:SB2      DT= 5.00 | Ia     (mm)=   5.700  # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)=         .460

```

Unit Hyd Qpeak (cms)= .333

PEAK FLOW (cms)= .235 (i)
 TIME TO PEAK (hrs)= 12.250
 DURATION (hrs)= 27.500, (dddd|hh:mm:)= 1|03:30
 AVERAGE FLOW (cms)= .018
 RUNOFF VOLUME (mm)= 43.359
 TOTAL RAINFALL (mm)= 122.887
 RUNOFF COEFFICIENT = .353

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

R0001:C00006

```

-----
-----
| CALIB NASHYD          | Area   (ha)=   3.439  Loss Coefficient   =   .16
| 04:SB3      DT= 5.00 | Ia     (mm)=   7.900  # of Linear Res.(N)= 3.00
-----
U.H. Tp(hrs)=         .430

```

Unit Hyd Qpeak (cms)= .305

PEAK FLOW (cms)= .092 (i)
 TIME TO PEAK (hrs)= 12.250
 DURATION (hrs)= 27.333, (dddd|hh:mm:)= 1|03:20
 AVERAGE FLOW (cms)= .006
 RUNOFF VOLUME (mm)= 18.398
 TOTAL RAINFALL (mm)= 122.887
 RUNOFF COEFFICIENT = .150

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

R0001:C00007

```

-----
-----
| ADD HYD              | ID:NHYD          AREA      QPEAK      TPEAK      R.V.
| 05:JNC_1            |                  (ha)      (cms)      (hrs)      (mm)
DWF
-----

```

100_SCS_October.out

(cms)	ID	Channel	Flow (cms)	Slope (%)	Length (m)	Area (m ²)
.000	ID 1	02:CH_SB2	3.153	.128	12.250	25.616
.000	+ID 2	03:SB2	4.010	.235	12.250	43.359
.000	+ID 3	04:SB3	3.439	.092	12.250	18.398
=====						
.000	SUM	05:JNC_1	10.602	.454	12.250	29.986

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

R0001:C00008

```

-----
| ROUTE CHANNEL      | Routing time step = 5.00 min
| IN> 05:JNC_1       | Number of SEGMENTS = 3
| OUT< 06:CH_SB5     | Slopes (%), CHANNEL=1.00  FLOODPLAIN=1.00
-----
                        LENGTH = 264.10 (m)
    
```

<----- DATA FOR SECTION (5.1) ----->

Distance	Elevation	Manning	
.00	78.93	.0600	
8.00	77.56	.0600 / .0400	Main Channel
10.95	77.97	.0400	Main Channel
14.50	78.17	.0400 / .0600	Main Channel
15.30	78.13	.0600	
17.50	78.02	.0600	

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

DEPTH (m)	ELEV (m)	X-VOLUME (cu.m.)	S-VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)	D x V (m ² /s)
.024	77.584	.101E+01	.463E-02	.000	.111	39.55	.003
.048	77.608	.404E+01	.370E-01	.003	.177	24.92	.009
.073	77.633	.908E+01	.125E+00	.008	.231	19.01	.017
.097	77.657	.161E+02	.296E+00	.017	.280	15.70	.027
.121	77.681	.252E+02	.578E+00	.031	.325	13.53	.039
.145	77.705	.363E+02	.999E+00	.051	.367	11.98	.053
.169	77.729	.494E+02	.159E+01	.076	.407	10.81	.069
.194	77.754	.646E+02	.237E+01	.109	.445	9.89	.086
.218	77.778	.817E+02	.337E+01	.149	.482	9.14	.105
.242	77.802	.101E+03	.463E+01	.197	.517	8.52	.125
.266	77.826	.122E+03	.616E+01	.254	.550	8.00	.147
.291	77.851	.145E+03	.799E+01	.321	.583	7.55	.169

100_SCS_October.out

.315	77.875	.171E+03	.102E+02	.397	.615	7.15	.194
.339	77.899	.198E+03	.127E+02	.484	.646	6.81	.219
.363	77.923	.227E+03	.156E+02	.582	.677	6.50	.246
.387	77.947	.258E+03	.189E+02	.691	.707	6.23	.274
.412	77.972	.292E+03	.227E+02	.811	.734	6.00	.302
.436	77.996	.328E+03	.271E+02	.918	.740	5.95	.322
.460	78.020	.368E+03	.320E+02	1.046	.751	5.86	.346

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.

channel->	<---- hydrographs ---->				<-pipe /	
VEL	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX
(m/s)	(ha)	(cms)	(hrs)	(mm)	(m)	
INFLOW : ID= 5: JNC_1	10.602	.454	12.250	29.986	.331	
.635						
OUTFLOW: ID= 6: CH_SB5	10.602	.437	12.333	29.986	.326	
.629						

R0001:C00009-----

CALIB NASHYD	Area (ha)=	1.202	Loss Coefficient =	.35
07:SB4 DT= 5.00	Ia (mm)=	5.350	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	.210		

Unit Hyd Qpeak (cms)= .219

PEAK FLOW (cms)= .107 (i)

TIME TO PEAK (hrs)= 12.083

DURATION (hrs)= 25.750, (dddd|hh:mm:)= 1|01:45

AVERAGE FLOW (cms)= .005

RUNOFF VOLUME (mm)= 41.138

TOTAL RAINFALL (mm)= 122.887

RUNOFF COEFFICIENT = .335

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

R0001:C00010-----

100_SCS_October.out

```

-----
| CALIB NASHYD          | Area   (ha)=   .737  Loss Coefficient =   .18
| 08:SB5      DT= 5.00 | Ia     (mm)=   7.250  # of Linear Res.(N)=  3.00
-----
U.H. Tp(hrs)=   .240

```

Unit Hyd Qpeak (cms)= .117

```

PEAK FLOW      (cms)=   .032 (i)
TIME TO PEAK   (hrs)=  12.083
DURATION       (hrs)=  26.000, (dddd|hh:mm:)=  1|02:00
AVERAGE FLOW  (cms)=   .002
RUNOFF VOLUME  (mm)=  20.815
TOTAL RAINFALL (mm)= 122.887
RUNOFF COEFFICIENT =   .169

```

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

R0001:C00011-----

```

-----
| ADD HYD              |
| 09:JNC_2            | ID:NHYD      AREA      QPEAK      TPEAK      R.V.
DWF
-----
(cms)
                                (ha)      (cms)      (hrs)      (mm)
          ID 1 06:CH_SB5      10.602      .437      12.333      29.986
          +ID 2 07:SB4        1.202      .107      12.083      41.138
          +ID 3 08:SB5         .737      .032      12.083      20.815
          -----
          SUM 09:JNC_2        12.541      .512      12.333      30.516
          -----
          .000

```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

R0001:C00012-----

```

-----
| ROUTE CHANNEL        | Routing time step = 5.00 min
| IN> 09:JNC_2        | Number of SEGMENTS = 3
| OUT< 10:CH_SB7      | Slopes (%), CHANNEL= .21  FLOODPLAIN= .21

```

100_SCS_October.out

 LENGTH = 175.00 (m)

<----- DATA FOR SECTION (7.1) ----->

Distance	Elevation	Manning	
.00	78.26	.0600	
8.00	76.07	.0600 / .0400	Main Channel
10.95	76.03	.0400	Main Channel
14.50	77.21	.0400 / .0600	Main Channel
15.30	77.21	.0600	
17.50	77.00	.0600	

<----- 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)
.040	76.070	.107E+02	.585E+00	.005	.084	34.60	.003
.089	76.119	.384E+02	.465E+01	.041	.186	15.70	.017
.138	76.168	.689E+02	.129E+02	.101	.257	11.33	.036
.187	76.217	.102E+03	.260E+02	.184	.315	9.25	.059
.236	76.266	.138E+03	.444E+02	.288	.365	7.99	.086
.285	76.315	.177E+03	.686E+02	.413	.408	7.14	.116
.334	76.364	.219E+03	.993E+02	.559	.447	6.52	.149
.383	76.413	.263E+03	.137E+03*	.726	.483	6.04	.185
.432	76.462	.311E+03	.182E+03*	.914	.515	5.66	.222
.481	76.511	.361E+03	.236E+03*	1.124	.546	5.35	.262
.529	76.559	.413E+03	.298E+03*	1.356	.574	5.08	.304
.578	76.608	.469E+03	.369E+03*	1.610	.601	4.85	.348
.627	76.657	.527E+03	.450E+03*	1.888	.626	4.66	.393
.676	76.706	.589E+03	.542E+03*	2.189	.651	4.48	.440
.725	76.755	.653E+03	.644E+03*	2.514	.674	4.33	.489
.774	76.804	.719E+03	.758E+03*	2.863	.696	4.19	.539
.823	76.853	.789E+03	.884E+03*	3.238	.718	4.06	.591
.872	76.902	.861E+03	.102E+04*	3.638	.739	3.95	.645
.921	76.951	.937E+03	.117E+04*	4.064	.759	3.84	.699

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.

<----- hydrographs -----> <-pipe /

channel->	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX
VEL	(ha)	(cms)	(hrs)	(mm)	(m)	
(m/s)						
INFLOW : ID= 9: JNC_2	12.541	.512	12.333	30.516	.318	
.434						
OUTFLOW: ID=10: CH_SB7	12.541	.496	12.417	30.516	.312	

.429

 R0001:C00013-----

CALIB NASHYD		Area (ha)=	2.170	Loss Coefficient =	.17
01:SB7 DT= 5.00		Ia (mm)=	7.500	# of Linear Res.(N)=	3.00
-----		U.H. Tp(hrs)=	.250		

Unit Hyd Qpeak (cms)= .332

PEAK FLOW (cms)= .087 (i)
 TIME TO PEAK (hrs)= 12.083
 DURATION (hrs)= 26.000, (dddd|hh:mm:)= 1|02:00
 AVERAGE FLOW (cms)= .005
 RUNOFF VOLUME (mm)= 19.616
 TOTAL RAINFALL (mm)= 122.887
 RUNOFF COEFFICIENT = .160

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

 R0001:C00014-----

ADD HYD		ID:NHYD	AREA	QPEAK	TPEAK	R.V.
02:JNC_3			(ha)	(cms)	(hrs)	(mm)
DWF						
(cms)						
		ID 1 01:SB7	2.170	.087	12.083	19.616
.000		+ID 2 10:CH_SB7	12.541	.496	12.417	30.516
.000						
=====						
		SUM 02:JNC_3	14.711	.551	12.333	28.908
.000						

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 R0001:C00015-----

100_SCS_October.out

```

-----
| SAVE HYD          | AREA      (ha)=  14.711
| ID=02:JNC_3      | QPEAK    (cms)=   .551 (i)
| DT= 5.00 PCYC=-1 | TPEAK    (hrs)=  12.333
-----
|                   | VOLUME   (mm)=  28.908

```

Filename: JNC_3.0001

Comments: CH SB7

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

R0001:C00016-----

```

-----
| ROUTE CHANNEL    | Routing time step = 5.00 min
| IN> 02:JNC_3    | Number of SEGMENTS = 3
| OUT< 03:CH_SB9  | Slopes (%), CHANNEL=1.00 FLOODPLAIN=1.00
-----
|                   | LENGTH = 264.10 (m)

```

```

<----- DATA FOR SECTION ( 9.1) ----->
Distance      Elevation      Manning
   .00         78.26         .0600
   8.00         76.07         .0600 / .0400 Main Channel
  10.95         76.03         .0400      Main Channel
  14.50         77.21         .0400 / .0600 Main Channel
  15.30         77.21         .0600
  17.50         77.00         .0600

```

```

<----- 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)
.040    76.070  .162E+02 .123E+00  .011       .184     23.93     .007
.089    76.119  .580E+02 .977E+00  .089       .405     10.86     .036
.138    76.168  .104E+03 .272E+01  .221       .562      7.83     .077
.187    76.217  .154E+03 .546E+01  .402       .688      6.39     .129
.236    76.266  .209E+03 .932E+01  .629       .796      5.53     .188
.285    76.315  .267E+03 .144E+02  .902       .891      4.94     .254
.334    76.364  .330E+03 .209E+02  1.220      .976      4.51     .326
.383    76.413  .397E+03 .288E+02  1.584      1.053     4.18     .403
.432    76.462  .469E+03 .383E+02  1.995      1.124     3.91     .485
.481    76.511  .544E+03 .495E+02  2.453      1.191     3.70     .572
.529    76.559  .624E+03 .625E+02  2.959      1.253     3.51     .663
.578    76.608  .708E+03 .775E+02  3.514      1.311     3.36     .758
.627    76.657  .796E+03 .945E+02  4.120      1.367     3.22     .858
.676    76.706  .888E+03 .114E+03  4.777      1.420     3.10     .960
.725    76.755  .985E+03 .135E+03  5.486      1.471     2.99     1.067

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.774	76.804	.109E+04	.159E+03	6.248	1.520	2.90	1.177
.823	76.853	.119E+04	.186E+03	7.065	1.567	2.81	1.290
.872	76.902	.130E+04	.215E+03	7.938	1.613	2.73	1.406
.921	76.951	.141E+04	.246E+03	8.868	1.657	2.66	1.526

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.

channel->	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX
VEL	(ha)	(cms)	(hrs)	(mm)	(m)	
INFLOW : ID= 2: JNC_3	14.711	.551	12.333	28.908	.219	
OUTFLOW: ID= 3: CH_SB9	14.711	.545	12.417	28.908	.217	

R0001:C00017

CALIB STANDHYD	Area (ha)=	.57		
04:SB9 DT= 1.00	Total Imp(%)=	45.00	Dir. Conn.(%)=	45.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	.26	.32
Dep. Storage (mm)=	1.50	8.00
Average Slope (%)=	.50	.40
Length (m)=	85.00	40.00
Mannings n =	.013	.300

Max.eff.Inten.(mm/hr)=	135.68	62.11
over (min)	3.00	18.00
Storage Coeff. (min)=	2.53 (ii)	17.96 (ii)
Unit Hyd. Tpeak (min)=	3.00	18.00
Unit Hyd. peak (cms)=	.42	.06

			TOTALS
PEAK FLOW (cms)=	.10	.03	.120 (iii)
TIME TO PEAK (hrs)=	12.00	12.20	12.000
RUNOFF VOLUME (mm)=	121.39	56.31	85.592
TOTAL RAINFALL (mm)=	122.89	122.89	122.887
RUNOFF COEFFICIENT =	.99	.46	.697

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

100_SCS_October.out

CN* = 68.0 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.

R0001:C00018-----

FINISH

WARNINGS / ERRORS / NOTES

Simulation ended on 2018-10-22 at 08:40:35
=====

Hydraulic Analysis Result: December 2018

River Station	Existing Condition		Alternative 2		Alternative 5	
	Q Total (m3/s)	W.S. Elevation (m)	Q Total (m3/s)	W.S. Elevation (m)	Q Total (m3/s)	W.S. Elevation (m)
1010	0.16	80.31	0.16	80.31	0.16	80.31
980	0.16	80.22	0.16	80.22	0.16	80.22
925	0.16	80.1	0.16	80.1	0.16	80.1
852	0.16	79.86	0.16	79.86	0.16	79.86
840	0.16	79.57	0.16	79.57	0.16	79.57
793	0.16	79.4	0.16	79.4	0.16	79.4
755	0.52	79.37	0.52	79.37	0.52	79.37
694	0.52	79.21	0.52	79.21	0.52	79.21
637	0.52	78.31	0.52	78.3	0.52	78.3
570	0.52	78.22	0.52	78.14	0.52	78.14
489	0.55	77.85	0.04	77.77	0.04	77.77
386	0.55	77.01	0.04	76.98	0.04	76.98
311	0.13	76.93	0.13	76.93	0.13	76.93
248	0.59	76.76	0.16	76.38	0.13	76.33
246.5	Culvert		Culvert		Culvert	
237	0.59	76.48	0.16	76.32	0.13	76.27
220.5	0.59	76.48	0.16	76.32	0.13	76.27
218.5	Culvert		Culvert		Culvert	
210	0.59	76.42	0.16	76.31	0.1	76.27
155	0.59	76.38	0.16	76.26	0.1	76.23
109	0.59	76.15	0.16	76.04	0.1	76.01
78	0.63	76.14	0.26	76.03	0.1	76
72	Culvert		Culvert		Culvert	
35	0.63	76.11	0.26	76.02	0.1	76
27	Culvert		Culvert		Culvert	
1	0.63	76	0.26	76	0.1	76