Appendix D

Stormwater Drainage and Management

Appendix D1

Target Release Rates

Vaughan Metropolitan Centre

Project #: 08104

Date: April 2012

Target Release Rates

Catchment ID	Area (ha)	Unit Flow (L/s/ha)						Target Release Rates (m^3/s)					
		2-year	5-year	10-year	25-year	50-year	100-year	2-year	5-year	10-year	25-year	50-year	100-year
NE Corner of Millway Avenue and Hwy 7	54.43	4.699	6.979	8.513	10.626	12.278	13.956	0.256	0.380	0.463	0.578	0.668	0.760
SE Corner of Jane Street and Hwy 7	31.88	5.107	7.580	9.231	11.530	13.334	15.163	0.163	0.242	0.294	0.368	0.425	0.483
SW Corner of Jane Street and Hwy 7	73.62	4.469	6.640	8.108	10.116	11.682	13.275	0.329	0.489	0.597	0.745	0.860	0.977
NW Corner of Millway Avenue and Hwy 7	46.38	4.821	7.159	8.728	10.897	12.594	14.317	0.224	0.332	0.405	0.505	0.584	0.664

Note:

Unit Flow Equation for Humber River Watershed

- $Q_{2\text{-year}} = 7.745-0.762\ln(A)$
- $Q_{5\text{-year}} = 11.468-1.123\ln(A)$
- $Q_{10\text{-year}} = 13.877-1.342\ln(A)$
- $Q_{25\text{-year}} = 17.381-1.690\ln(A)$
- $Q_{50\text{-year}} = 20.164-1.973\ln(A)$
- $Q_{100\text{-year}} = 22.973-2.256\ln(A)$

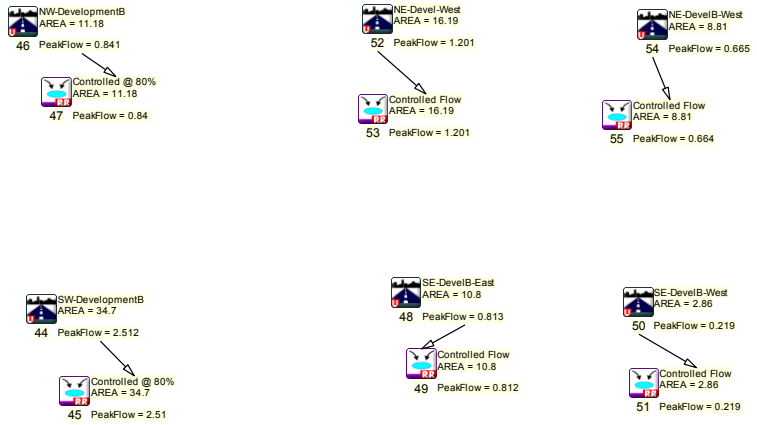
where Q = unit flow in L/s/ha; A = area in ha

*Note : The total area contributing to the pond in the NW corner of Millway Avenue and Hwy 7 is 46.38ha as per the Black Creek Optimization Study.

Appendix D2

Target Release Rates for On-Site Controlled Areas

ON SITE CONTROLS



2 YR RELEASE RATE FROM SITES

Summary Hydrograph Data

Run Number : 2

NHYD	DT [hr]	AREA [ha]	Peak flow [m³/s]	TP [hr]	Runoff Vol. [mm]	DWF [m³/s]
44	0.083	34.700	2.512	2.750	30.315	0.000
46	0.083	11.180	0.841	2.750	30.314	0.000
48	0.083	10.800	0.813	2.750	30.313	0.000
50	0.083	2.860	0.219	2.750	30.310	0.000
52	0.083	16.190	1.201	2.750	30.314	0.000
54	0.083	8.810	0.665	2.750	30.313	0.000

100 YR RELEASE RATE FROM ON SITE CONTROLS

Summary Hydrograph Data

Run Number : 7

NHYD	DT [hr]	AREA [ha]	Peak flow [m³/s]	TP [hr]	Runoff Vol. [mm]	DWF [m³/s]
45	0.083	34.700	2.510	3.083	72.353	0.000
47	0.083	11.180	0.840	3.000	72.346	0.000
49	0.083	10.800	0.812	3.000	72.346	0.000
51	0.083	2.860	0.219	2.917	72.316	0.000
53	0.083	16.190	1.201	3.000	72.349	0.000
55	0.083	8.810	0.664	3.000	72.343	0.000

```
================================================================================
==============

       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
         V V    I      SS   U   U  A   A  L
          VV    I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM, Version 2.0
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O   Licensed To: TMIG
        OOO     T      T    H   H    Y    M   M   OOO                vo2-0145

Developed and Distributed by Greenland International Consulting Inc.
Copyright 1996, 2001 Schaeffer & Associates Ltd.
All rights reserved.


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


  Input   filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat
  Output  filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final submission\100-
YE~1\Targets for Controlled 80%.out
  Summary filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final submission\100-
YE~1\Targets for Controlled 80%.sum


DATE: 4/10/2012                          TIME: 12:42:33 PM

USER:


COMMENTS: _____________________________________________________

--------------------------------------------------------------------------------
---------------
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 36.00 mm |    Comments: 2yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   12.24 |  3.75    5.04 |  5.50     .72
                 .50     .72 |  2.25   12.24 |  4.00    2.88 |  5.75     .72
                 .75     .72 |  2.50   33.12 |  4.25    2.88 |  6.00     .72
                1.00     .72 |  2.75   33.12 |  4.50    1.44 |  6.25     .72
                1.25     .72 |  3.00    9.36 |  4.75    1.44 |
                1.50    4.32 |  3.25    9.36 |  5.00     .72 |
                1.75    4.32 |  3.50    5.04 |  5.25     .72 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0044) |   Area     (ha)=  34.70
```

|ID= 1 DT= 5.0 min | Total Imp(%)= 80.00 Dir. Conn.(%)= 80.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	27.76	6.94
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	481.00	40.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.00	1.667	4.32	3.250	9.36	4.83	.72
.167	.00	1.750	4.32	3.333	5.04	4.92	.72
.250	.00	1.833	12.24	3.417	5.04	5.00	.72
.333	.72	1.917	12.24	3.500	5.04	5.08	.72
.417	.72	2.000	12.24	3.583	5.04	5.17	.72
.500	.72	2.083	12.24	3.667	5.04	5.25	.72
.583	.72	2.167	12.24	3.750	5.04	5.33	.72
.667	.72	2.250	12.24	3.833	2.88	5.42	.72
.750	.72	2.333	33.12	3.917	2.88	5.50	.72
.833	.72	2.417	33.12	4.000	2.88	5.58	.72
.917	.72	2.500	33.12	4.083	2.88	5.67	.72
1.000	.72	2.583	33.12	4.167	2.88	5.75	.72
1.083	.72	2.667	33.12	4.250	2.88	5.83	.72
1.167	.72	2.750	33.12	4.333	1.44	5.92	.72
1.250	.72	2.833	9.36	4.417	1.44	6.00	.72
1.333	4.32	2.917	9.36	4.500	1.44	6.08	.72
1.417	4.32	3.000	9.36	4.583	1.44	6.17	.72
1.500	4.32	3.083	9.36	4.667	1.44	6.25	.72
1.583	4.32	3.167	9.36	4.750	1.44		

Max.Eff.Inten.	(mm/hr)=	33.12	13.05	
over	(min)	10.00	30.00	
Storage Coeff.	(min)=	10.20 (ii)	29.82 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	30.00	
Unit Hyd. peak	(cms)=	.11	.04	
				TOTALS
PEAK FLOW	(cms)=	2.44	.13	2.512 (iii)
TIME TO PEAK	(hrs)=	2.75	3.17	2.75
RUNOFF VOLUME	(mm)=	35.00	11.57	30.31
TOTAL RAINFALL	(mm)=	36.00	36.00	36.00
RUNOFF COEFFICIENT	=	.97	.32	.84

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 83.0 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.

RESERVOIR (0045)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	2.5120	1.1572

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0044)	34.70	2.51	2.75	30.31
OUTFLOW: ID= 1 (0045)	34.70	1.04	3.17	30.31

PEAK FLOW REDUCTION [Qout/Qin](%)= 41.29
TIME SHIFT OF PEAK FLOW (min)= 25.00
MAXIMUM STORAGE USED (ha.m.)= .4782

CALIB	
STANDHYD (0046)	Area (ha)= 11.18
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 80.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	8.94	2.24
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	273.00	40.00
Mannings n	=	.013	.250

Max.Eff.Inten.	(mm/hr)=	33.12	13.05	
over	(min)	5.00	30.00	
Storage Coeff.	(min)=	7.26 (ii)	26.88 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	30.00	
Unit Hyd. peak	(cms)=	.17	.04	
				TOTALS
PEAK FLOW	(cms)=	.81	.05	.841 (iii)
TIME TO PEAK	(hrs)=	2.75	3.08	2.75
RUNOFF VOLUME	(mm)=	35.00	11.57	30.31
TOTAL RAINFALL	(mm)=	36.00	36.00	36.00
RUNOFF COEFFICIENT	=	.97	.32	.84

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 83.0 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.

RESERVOIR (0047)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.8410	.3698

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0046)	11.18	.84	2.75	30.31
OUTFLOW: ID= 1 (0047)	11.18	.35	3.00	30.30

PEAK FLOW REDUCTION [Qout/Qin](%)= 41.40
TIME SHIFT OF PEAK FLOW (min)= 15.00
MAXIMUM STORAGE USED (ha.m.)= .1531

CALIB	
STANDHYD (0048)	Area (ha)= 10.80
ID= 1 DT= 5.0 min	Total Imp(%)= 80.00 Dir. Conn.(%)= 80.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	8.64	2.16
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	268.30	40.00
Mannings n	=	.013	.250

Max.Eff.Inten.	(mm/hr)=	33.12	13.05

```
              over (min)        5.00        30.00
     Storage Coeff.  (min)=     7.19 (ii)   26.81 (ii)
     Unit Hyd. Tpeak (min)=     5.00        30.00
     Unit Hyd. peak  (cms)=      .17          .04
                                                 *TOTALS*
     PEAK FLOW       (cms)=      .79          .04          .813 (iii)
     TIME TO PEAK    (hrs)=     2.75         3.08          2.75
     RUNOFF VOLUME    (mm)=    35.00        11.57         30.31
     TOTAL RAINFALL   (mm)=    36.00        36.00         36.00
     RUNOFF COEFFICIENT   =      .97          .32           .84


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0049) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .8130      .3571

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0048)     10.80       .81      2.75      30.31
     OUTFLOW: ID= 1 (0049)     10.80       .34      3.00      30.30

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.42
                  TIME SHIFT OF PEAK FLOW         (min)= 15.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .1479

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0050) |   Area    (ha)=   2.86
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.29          .57
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     138.10        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      33.12        13.05
               over (min)         5.00        25.00
     Storage Coeff.  (min)=       4.82 (ii)   24.44 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .22          .05
                                                 *TOTALS*
     PEAK FLOW       (cms)=        .21          .01          .219 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00          2.75
     RUNOFF VOLUME    (mm)=      35.00        11.57         30.31
     TOTAL RAINFALL   (mm)=      36.00        36.00         36.00
     RUNOFF COEFFICIENT   =        .97          .32           .84

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0051) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .2190      .0960

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0050)     2.86       .22      2.75      30.31
     OUTFLOW: ID= 1 (0051)     2.86       .09      2.92      30.27

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.53
                  TIME SHIFT OF PEAK FLOW         (min)= 10.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .0398

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0052) |   Area    (ha)=  16.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.95         3.24
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     328.50        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      33.12        13.05
               over (min)        10.00        30.00
     Storage Coeff.  (min)=       8.11 (ii)   27.73 (ii)
     Unit Hyd. Tpeak (min)=      10.00        30.00
     Unit Hyd. peak  (cms)=        .13          .04
                                                 *TOTALS*
     PEAK FLOW       (cms)=       1.16          .06          1.201 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.08          2.75
     RUNOFF VOLUME    (mm)=      35.00        11.57         30.31
     TOTAL RAINFALL   (mm)=      36.00        36.00         36.00
     RUNOFF COEFFICIENT   =        .97          .32           .84


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0053) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   1.2010      .5367

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0052)     16.19      1.20      2.75      30.31
     OUTFLOW: ID= 1 (0053)     16.19       .50      3.08      30.31

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.49
                  TIME SHIFT OF PEAK FLOW         (min)= 20.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .2228
```

```
--------------------
| CALIB            |
| STANDHYD  (0054) |   Area    (ha)=   8.81
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.05         1.76
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     242.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      33.12        13.05
                over (min)        5.00        30.00
     Storage Coeff.  (min)=       6.76 (ii)   26.38 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .18          .04
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .64          .04          .665 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.08          2.75
     RUNOFF VOLUME    (mm)=      35.00        11.57         30.31
     TOTAL RAINFALL   (mm)=      36.00        36.00         36.00
     RUNOFF COEFFICIENT   =        .97          .32           .84


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------
| RESERVOIR (0055) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)      (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .6650      .2915

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0054)      8.81       .66      2.75      30.31
     OUTFLOW: ID= 1 (0055)      8.81       .28      3.00      30.30

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.47
                   TIME SHIFT OF PEAK FLOW         (min)= 15.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .1209

  ***************************
  ** SIMULATION NUMBER:   7 **
  ***************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 80.31 mm |    Comments: 100yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   27.30 |  3.75   11.24 |  5.50    1.61
                 .50    1.61 |  2.25   27.30 |  4.00    6.42 |  5.75    1.61
                 .75    1.61 |  2.50   73.88 |  4.25    6.42 |  6.00    1.61
                1.00    1.61 |  2.75   73.88 |  4.50    3.21 |  6.25    1.61
                1.25    1.61 |  3.00   20.88 |  4.75    3.21 |
                1.50    9.64 |  3.25   20.88 |  5.00    1.61 |
                1.75    9.64 |  3.50   11.24 |  5.25    1.61 |

--------------------
| CALIB            |
| STANDHYD  (0044) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      27.76         6.94
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     481.00        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .083     .00 | 1.667    9.64 | 3.250   20.88 |  4.83    1.61
                .167     .00 | 1.750    9.64 | 3.333   11.24 |  4.92    1.61
                .250     .00 | 1.833   27.30 | 3.417   11.24 |  5.00    1.61
                .333    1.61 | 1.917   27.30 | 3.500   11.24 |  5.08    1.61
                .417    1.61 | 2.000   27.30 | 3.583   11.24 |  5.17    1.61
                .500    1.61 | 2.083   27.30 | 3.667   11.24 |  5.25    1.61
                .583    1.61 | 2.167   27.30 | 3.750   11.24 |  5.33    1.61
                .667    1.61 | 2.250   27.30 | 3.833    6.42 |  5.42    1.61
                .750    1.61 | 2.333   73.88 | 3.917    6.42 |  5.50    1.61
                .833    1.61 | 2.417   73.88 | 4.000    6.42 |  5.58    1.61
                .917    1.61 | 2.500   73.88 | 4.083    6.42 |  5.67    1.61
               1.000    1.61 | 2.583   73.88 | 4.167    6.42 |  5.75    1.61
               1.083    1.61 | 2.667   73.88 | 4.250    6.42 |  5.83    1.61
               1.167    1.61 | 2.750   73.88 | 4.333    3.21 |  5.92    1.61
               1.250    1.61 | 2.833   20.88 | 4.417    3.21 |  6.00    1.61
               1.333    9.64 | 2.917   20.88 | 4.500    3.21 |  6.08    1.61
               1.417    9.64 | 3.000   20.88 | 4.583    3.21 |  6.17    1.61
               1.500    9.64 | 3.083   20.88 | 4.667    3.21 |  6.25    1.61
               1.583    9.64 | 3.167   20.88 | 4.750    3.21 |

     Max.Eff.Inten.(mm/hr)=      73.88        51.42
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       7.40 (ii)   18.74 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .17          .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=       5.63          .68          6.242 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92          2.75
     RUNOFF VOLUME    (mm)=      79.31        44.54         72.36
     TOTAL RAINFALL   (mm)=      80.31        80.31         80.31
     RUNOFF COEFFICIENT   =        .99          .55           .90


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------
| RESERVOIR (0045) |
| IN= 2---> OUT= 1 |
```

```
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |  2.5120     1.1572

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0044)      34.70      6.24      2.75      72.36
     OUTFLOW: ID= 1 (0045)      34.70      2.51      3.08      72.35

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.21
                   TIME SHIFT OF PEAK FLOW         (min)= 20.00
                   MAXIMUM  STORAGE   USED       (ha.m.)= 1.1573

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0046) |   Area    (ha)=  11.18
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.94         2.24
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     273.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      73.88        51.42
                 over (min)       5.00        20.00
     Storage Coeff.  (min)=       5.27 (ii)   16.61 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .21          .06
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.83          .23        2.038 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92         2.75
     RUNOFF VOLUME    (mm)=      79.31        44.54        72.36
     TOTAL RAINFALL   (mm)=      80.31        80.31        80.31
     RUNOFF COEFFICIENT   =        .99          .55          .90


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0047) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   .8410      .3698

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0046)      11.18      2.04      2.75      72.36
     OUTFLOW: ID= 1 (0047)      11.18       .84      3.00      72.35

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.20
                   TIME SHIFT OF PEAK FLOW         (min)= 15.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .3698

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0048) |   Area    (ha)=  10.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.64         2.16
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     268.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      73.88        51.42
                 over (min)       5.00        20.00
     Storage Coeff.  (min)=       5.21 (ii)   16.55 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .21          .06
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.77          .22        1.970 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92         2.75
     RUNOFF VOLUME    (mm)=      79.31        44.54        72.36
     TOTAL RAINFALL   (mm)=      80.31        80.31        80.31
     RUNOFF COEFFICIENT   =        .99          .55          .90


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0049) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   .8130      .3571

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0048)      10.80      1.97      2.75      72.36
     OUTFLOW: ID= 1 (0049)      10.80       .81      3.00      72.35

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.23
                   TIME SHIFT OF PEAK FLOW         (min)= 15.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .3571

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0050) |   Area    (ha)=   2.86
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.29          .57
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     138.10        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      73.88        51.42
                 over (min)       5.00        15.00
     Storage Coeff.  (min)=       3.50 (ii)   14.84 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .26          .08
                                                        *TOTALS*
     PEAK FLOW       (cms)=        .47          .06          .530 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83         2.75
     RUNOFF VOLUME    (mm)=      79.31        44.54        72.35
     TOTAL RAINFALL   (mm)=      80.31        80.31        80.31
```

```
     RUNOFF COEFFICIENT   =        .99          .55           .90

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0051) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .2190      .0960

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0050)      2.86       .53      2.75      72.35
     OUTFLOW: ID= 1 (0051)      2.86       .22      2.92      72.32

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.27
                   TIME SHIFT OF PEAK FLOW         (min)= 10.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .0960

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0052) |   Area     (ha)=  16.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.95         3.24
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     328.50        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      73.88        51.42
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       5.89 (ii)   17.22 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .19          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.65          .33      2.942 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92       2.75
     RUNOFF VOLUME    (mm)=      79.31        44.54      72.36
     TOTAL RAINFALL   (mm)=      80.31        80.31      80.31
     RUNOFF COEFFICIENT   =        .99          .55        .90


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0053) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   1.2010      .5367

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0052)      16.19      2.94      2.75      72.36
     OUTFLOW: ID= 1 (0053)      16.19      1.20      3.00      72.35

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.82
                   TIME SHIFT OF PEAK FLOW         (min)= 15.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .5369

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0054) |   Area     (ha)=   8.81
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.05         1.76
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     242.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      73.88        51.42
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       4.90 (ii)   16.24 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .22          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.44          .18       1.609 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92        2.75
     RUNOFF VOLUME    (mm)=      79.31        44.54       72.36
     TOTAL RAINFALL   (mm)=      80.31        80.31       80.31
     RUNOFF COEFFICIENT   =        .99          .55         .90

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0055) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .6650      .2915

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0054)      8.81      1.61      2.75      72.36
     OUTFLOW: ID= 1 (0055)      8.81       .66      3.00      72.34

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.26
                   TIME SHIFT OF PEAK FLOW         (min)= 15.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .2915

--------------------------------------------------------------------------------

 FINISH
================================================================================
===============
```

Appendix D3

VO2 Calibration and Parameter Adjustment

SUMMARY OF VO2 MODEL AND SWM POND 18.0 DEVELOPMENT

April, 2012
TMIG File 08104

AECOM SWMHYMO MODEL CONNECTIVITY

Using the SWMHYMO 'Existing Conditions Model', prepared by Aecom, January 2008, the connectivity of the model was followed from START to FINISH at NODE 47.20.

The outlet of Pond 18.0, at Regional Rd. 7 is Node 46.30.

No problems were found. All ID numbers were accounted for, with no IDs overwritten.

CALIBRATION OF VO2 MODEL TO PREVIOUS SWMHYMO MODEL

To calibrate the VO2 model to the SWMHYMO model, the watershed was considered as two catchments. The area upstream of Jane Street (576.91 ha) was represented by the SWMHYMO hydrograph at Jane Street.

The remaining 190 ha, from Jane Street to Regional Road 7, was modelled as one catchment. The area of Pond 18.0 was assumed to be included in the 190 ha.

Parameters were adjusted to provide the best match of SWMHYMO and VO2 peak discharge and runoff volume for the 190 ha at Pond 18.0.

The following table summarizes the parameter changes.

Parameter	SWMHYMO Value	VO2 Value
AREA	190	190
XIMP	0.90	0.79
TIMP	0.91	0.83
CN	76	76
IA	4.7	4.7
SLPP	2.0	0.4
LGP	40	200
DPSI	0.5	0.5
SLPI	1.0	0.3
LGI	1125.5 *	1800
MNI	0.013	0.016

* LGI based on A=1.5L

Peak flow and runoff volumes from SWMHYMO and the calibrated VO2 models, for the existing (Dec, 2011) development of the 190 ha, are summarized below.

	SWMHYMO	VO2	SWMHYMO	VO2
Ret. Per.	Qp	Qp	R.V.	R.V.
6 hour				
2yr	8.25	8.31	30.50	30.29
5yr	11.60	11.65	41.57	41.11
10yr	13.94	13.97	49.01	48.44
25yr	17.06	16.98	58.43	57.75
50yr	19.34	19.23	65.50	64.77
100yr	21.61	22.01	72.50	71.74

The VMC lands to the west and east of Pond 18.0 were then separated from the 190 ha to be calibrated and modelled individually. The hydrograph from west of Jane Street was added to the model, to compare the total flow and runoff volume to Pond 18.0.

The calibration results, to Pond 18.0, are summarized below.

	SWMHYMO	VO2	SWMHYMO	VO2
Ret. Per.	Qp	Qp	R.V.	R.V.
6 hour				
2yr	15.03	15.07	27.92	27.41
5yr	21.49	21.77	38.56	37.91
10yr	25.94	26.27	45.81	45.07
25yr	31.81	32.18	55.03	54.26
50yr	36.29	36.39	62.01	62.22
100yr	40.81	41.94	68.95	68.15
100 Year Pond Outflow	19.06	23.00	68.95	68.14

The MUNICIPAL INFRASTRUCTURE Group

DATE:	JULY 27, 2012	PROJECT NO: 08104
TO:	FILE	
FROM:		
SUBJECT:	SUMMARY OF VO2 MODEL AND SWM POND 18.0 DEVELOPMENT	

INTRODUCTION

The purpose of this memo is to summarize the findings of TMIG's analysis for the existing SWM Pond 18.0. SWM Pond 18.0 is an online pond and a total drainage area of 767ha is routed through this pond. As per previous reports, the pond is designed as a dry pond providing attenuation of all storms including the Regional Storm event.

Flooding problems are encountered around Jane Street and Hwy 7 Area and downstream Pond 18.0, therefore the necessity to retrofit the pond is considered.

The documents / information used during this exercise are:

- "Black Creek Optimization Study" (includes SWMHYMO modeling for Black Creek) completed by AECOM, May 2011;
- Existing topographic information of the site available to date;
- "Hydrological Analysis of Black Creek Watershed" Report by Ander Engineering and Associates Limited dated January 1986.

METHODOLOGY

The main steps followed during our analysis are as follow:

- Analyze the AECOM SWMHYMO modeling, assumptions made and connectivity;
- Create and Calibrate an existing VO2 model based on the previous SWMMHYMO Model;
- Conceptually design the proposed retrofitted pond 18.0;
- Create VO2 modeling for the proposed conditions, to account for the future redevelopment of VMC lands. This model includes two scenarios:
  1. Proposed conditions with proposed VMC lands without an impervious reduction.
  2. Proposed conditions with proposed VMC lands with an impervious reduction. Impervious reduction is justified by applying a 15mm reduction from the overall rainfall on designated areas (residential lots, commercial and mixed use).

AECOM SWMHYMO MODEL CONNECTIVITY

Using the SWMHYMO 'Existing Conditions Model', prepared by Aecom, January 2008, the connectivity of the model was followed from START to FINISH at NODE 47.20.

The outlet of Pond 18.0, at Regional Rd. 7 is Node 46.30.

No problems were found. All ID numbers were accounted for, with no IDs overwritten.

The Existing Conditions Release Rates from SMW Pond 18.0, based on AECOM model are summarized as follows:

Event	6 hr AES	12 hr AES
	Release Rate (m3/s)	Release Rate (m3/s)
2 yr	3.526	3.775
5 yr	5.810	6.823
10 yr	8.616	9.185
25 yr	12.675	12.589
50 yr	15.796	15.202
100 yr	19.055	18.016

CALIBRATION OF VO2 MODEL TO PREVIOUS SWMMHYMO MODEL

To calibrate the VO2 model to the SWMMHYMO model, the watershed was considered as two catchments. The area upstream of Jane Street (576.91 ha) was represented by the SWMMHYMO hydrograph at Jane Street.

The remaining 190 ha, from Jane Street to Regional Road 7, was modelled as one catchment. The area of Pond 18.0 was assumed to be included in the 190 ha.

Parameters were adjusted to provide the best match of SWMMHYMO and VO2 peak discharge and runoff volume for the 190 ha at Pond 18.0.

The following table summarizes the parameter changes.

Parameter	SWMMHYMO Value	VO2 Value
AREA	190	190
XIMP	0.90	0.79
TIMP	0.91	0.83
CN	76	76
IA	4.7	4.7
SLPP	2.0	0.4
LGP	40	200
DPSI	0.5	0.5
SLPI	1.0	0.3
LGI	1125.5 *	1800
MNI	0.013	0.016

* LGI based on A=1.5L

Peak flow and runoff volumes from SWMMHYMO and the calibrated VO2 models, for the existing (Dec, 2011) development of the 190 ha, are summarized below.

Retention Period	SWMMHYMO	VO2	SWMMHYMO	VO2
6 Hour	Qp	Qp	R.V.	R.V.
2yr	8.25	8.31	30.50	30.29
5yr	11.60	11.65	41.57	41.11
10yr	13.94	13.97	49.01	48.44
25yr	17.06	16.98	58.43	57.75
50yr	19.34	19.23	65.50	64.77
100yr	21.61	22.01	72.50	71.74

The VMC lands to the west and east of Pond 18.0 were then separated from the 190 ha to be calibrated and modelled individually. The hydrograph from west of Jane Street was added to the model, to compare the total flow and runoff volume to Pond 18.0.

The calibration results, to Pond 18.0, are summarized below, (inflow/runoff before pond reservoir routine).

Retention Period	SWMMHYMO	VO2	SWMMHYMO	VO2
6 Hour	**Qp**	**Qp**	**R.V.**	**R.V.**
2yr	15.03	15.07	27.92	27.41
5yr	21.49	21.77	38.56	37.91
10yr	25.94	26.27	45.81	45.07
25yr	31.81	32.18	55.03	54.26
50yr	36.29	36.39	62.01	62.22
100yr	40.81	41.94	68.95	68.15
100 Year Pond Outflow	19.06	23.00	68.95	68.14

POND 18.0 SCENARIOS

The existing Pond 18.0 was designed and constructed before TRCA unit flow rates were developed. As a result, outflow from the pond far exceeds the TRCA target discharge rates for the total contributing area of 767 ha.

Utilizing the Unit Flow Target Release Rates as per Humber River Subwatershed Study the following would have been the Target Release Rates required for SWM pond 18.0

RETURN PERIOD (Years)	TARGET RELEASE RATE (m^3/s)
2	2.059
5	3.075
10	3.808
25	4.722
50	5.415
100	6.128

We acknowledge the fact that utilizing the same pond block as per existing conditions, retrofitting the swm pond block for sure will improve the provided volumes, hence the discharge release rates from the pond, however reaching the above targets would require a much larger pond block. The following details the options analyzed.

After VO2 modeling was calibrated, as explained in the above paragraph, and VMC drainage areas incorporated in the model, the following scenarios were generated:

Scenario 1: Utilizing existing rating curve for pond 18.0,

Scenario 2: Utilizing Proposed Rating Curve for pond 18.0, and drainage areas for VMC sites use the initial imperviousness (with no reduction due to 15.0mm rainfall retention)

Sceanrio3: Proposed Rating Curve for pond 18.0, and the designated drainage areas for VMC sites use the reduced imperviousness due to 15.0mm rainfall retention.

The following Tables summarize the findings:

RETURN PERIOD			PEAK FLOW WITH PROPOSED VMC DEVELOPMENT			
Years	TARGET DISCHARGE		EXISTING POND	PROPOSED POND	PROPOSED POND W %IMP REDUCTION	APPROXIMATE VOLUME REQUIRED FOR TARGET FLOW
	Unit Q L/s/ha	Release Q m^3/s	m^3/s	m^3/s	m^3/s	ha*m
						**
2	2.683	**2.059**	3.625	3.301	3.212	12.00
5	4.008	**3.075**	7.078	4.713	4.239	15.82
10	4.962	**3.808**	10.274	7.436	5.667	18.40
25	6.155	**4.722**	14.911	11.735	10.716	21.85
50	7.058	**5.415**	18.539	15.091	14.023	24.80 *
100	7.987	**6.128**	24.502	18.436	17.423	28.20 *
	Approx 100 year vol remaining (ha*m)			5.1*	5.2*	-0.9*

* Maximum Proposed Pond Volume = **23.5** ha*m

** Note: 25 mm values in VisualOTTHYMO have been estimated.

As illustrated in the above table the proposed pond will reduce the release rates from the pond for all storm events.

RETURN PERIOD	TARGET RELEASE RATE	EXISTING POND RELEASE RATE	PROPOSED POND RELEASE RATE **	PROPOSED POND VOLUME **	Approximate Water Surface Elevation	% OF TARGET FLOW	% OF EXISTING FLOW
Years	m^3/s	m^3/s	m^3/s	ha m	m	%	%
2	2.059	3.625	**3.21**	**8.81**	200.10	156	89
5	3.075	7.078	**4.24**	**12.74**	201.00	138	60
10	3.808	10.274	**6.64**	**14.31**	201.25	174	65
25	4.722	14.911	**10.72**	**15.89**	201.50	227	72
50	5.415	18.539	**14.02**	**16.97**	201.70	259	76
100	6.128	24.502	**17.42**	**17.99**	201.85	284	71

* Maximum Proposed Pond Volume (ha m) = **23.5**

** With %IMP Reduction

Comparing the target discharge, based on unit flow rates, to the actual discharge from the pond, it was determined that the actual discharge exceeds the targets by 175% to 400% for the 2 year to 100 year design storms.

With some regrading of the pond, the actual discharge can be reduced to 156% to 284 % of the target.

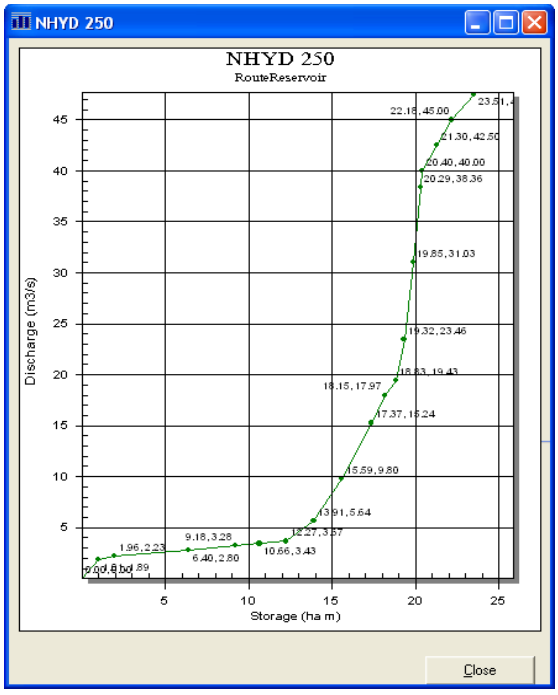
Detailed calculations are attached this memo.

The conceptual design of the SWM pond is based on the existing pond block. Side slopes of 4:1 are used. Two forebays are introduced. One is located on the west side of the pond to accommodate inflows from the west side of the site and the other linear forebay is located on the south east side of the pond to accommodate flows from the east side of the site. Both forebays include a berm on either side to create a separation with the wet cell. It should be noted that the design is preliminary and should be refined during the detail design stage to accommodate the

exact permanent pool requirement and to account for additional design features like using armour stones or retaining walls to maximize the provided volumes. The following table summarizes the provided pond volumes:

Water Surface Elevation (m)	*Existing Peak Outflow (cms)*	*Existing Channel Plus Pond Storage (ha*m)*	Existing Channel Storage (ha*m)	Existing Pond Storage (ha*m)	Proposed Pond Storage (ha*m)	* Proposed Pond+Existing North Channel Storage (ha*m)
197.500	***0.000***	*0.000*	0.000	0.000	**0.000**	**0.000**
198.720	***1.890***	*1.100*	0.000	0.075	**1.008**	**1.008**
199.025	***2.233***	*1.620*	0.180	0.641	**1.783**	**1.963**
199.634	***2.795***	*3.810*	0.552	2.666	**5.850**	**6.402**
200.244	***3.276***	*6.290*	0.949	4.708	**8.234**	**9.183**
200.549	***3.427***	*7.730*	1.194	5.822	**9.467**	**10.661**
200.854	***3.670***	*9.118*	1.522	7.058	**10.745**	**12.267**
201.158	***5.644***	*10.750*	1.858	8.337	**12.048**	**13.906**
201.463	***9.799***	*12.430*	2.204	9.644	**13.382**	**15.586**
201.768	***15.238***	*14.110*	2.605	11.027	**14.766**	**17.371**
201.900	***17.973***	*14.840*	2.780	11.621	**15.367**	**18.147**
202.040	***19.434***	*15.250*	2.817		**16.013**	**18.830**
202.094	***23.459***	*15.579*	3.053	12.526	**16.271**	**19.324**
202.178	***31.034***	*16.111*	3.178	12.933	**16.671**	**19.849**
202.249	***38.361***	*16.560*	3.283		**17.009**	**20.292**
202.266	***40.000***	*16.668*	3.308	13.360	**17.090**	**20.398**
202.411	***42.500***	*17.586*	3.523	14.063	**17.780**	**21.303**
202.556	***45.000***	*18.476*	3.700	14.776	**18.483**	**22.183**
202.701	***47.500***	*19.319*	3.815	15.504	**19.695**	**23.510**
203.000					**20.695**	

*similarly to the existing model the, overall provided volume accounts the north channel storage + swm pond 18.0 storage.



CONSIDERATIONS AND CONCLUSIONS

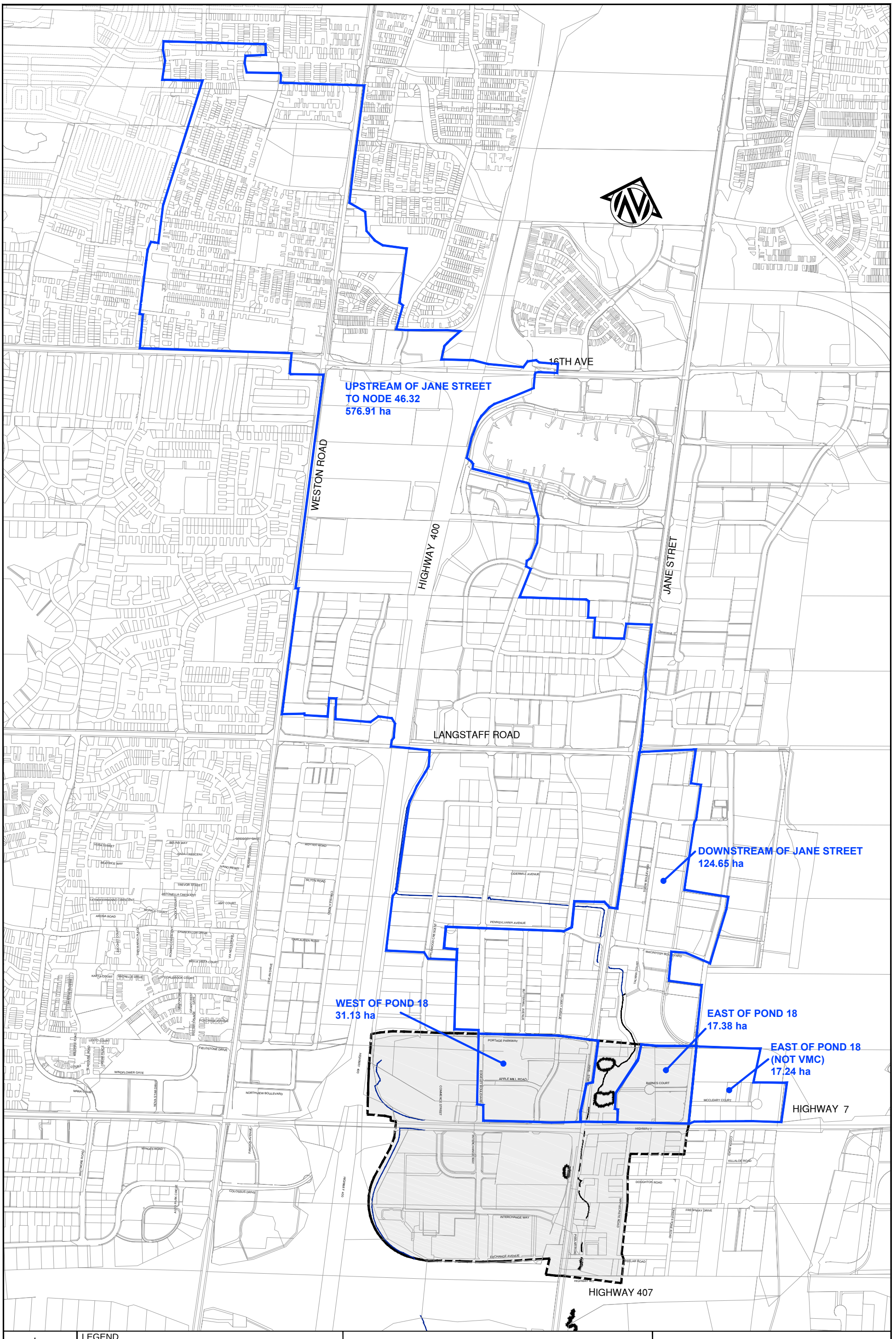
SWM pond 18.0 is an online pond. Therefore the construction staging should be emphasized and looked into detail. In addition, the erosion control during construction is very important and should be specific for this type of pond. Pond inlet and outlet conditions need to be analyzed in detail, to add additional benefits into the retrofitting process. The existing sanitary sewers crossing the pond block are taken into account; however during detailed design, final verification of the sewer location might be required.

In conclusion, the pond retrofitting will improve the release rates from the pond and hence reduce the flooding issues downstream. Water quality improvement are expected from introducing the forebay cells. The pond embankment will be nicely planted to account for any loss in existing natural features.

Link: g:\projects\2008\08104 - vaughan corporate centre - master servicing strategy\design\swm\2012 02 final submission\vo2 calibration summary+additional info (ept) - for appendix july 2012.docx

Appendix D4

North-East SWM Pond Calculations



LEGEND

STUDY AREA

BLACK CREEK WATERSHED CATCHMENTS BOUNDARY

The MUNICIPAL INFRASTRUCTURE Group Ltd.

VAUGHAN METROPOLITAN CENTRE
MUNICIPAL SERVICING CLASS
ENVIRONMENTAL ASSESSMENT
MASTER PLAN

BLACK CREEK WATERSHED
CATCHMENTS BOUNDARY

PROJECT No.	DATE:	FIGURE No.
08104	SEPT 2012	APPENDIX D-a

Vaughan Metropolitan Centre
City of Vaughan
25mm Runoff Coefficient Adjustment
NE Corner of Millway Avenue & Hwy 7

Project #: 08104
Date: April 2012

Storm Volume (6 hrs AES storms)

Storm Event	Rainfall Depth (mm)
25mm	25.00
2-Year	36.00
5-Year	47.80
10-Year	55.70
25-Year	65.60
50-Year	73.00
100-Year	80.30

Building base run-off coefficient = 0.90
Runoff reduction = 15 mm (According to LEED Gold Objective)

Adjustment to Building Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 15mm	C_{15}
25mm	**25.00**	**22.50**	**7.50**	**0.30**
2-Year	36.00	32.40	17.40	0.48
5-Year	47.80	43.02	28.02	0.59
10-Year	55.70	50.13	35.13	0.63
25-Year	65.60	59.04	44.04	0.67
50-Year	73.00	65.70	50.70	0.69
100-Year	80.30	72.27	57.27	0.71

Base run-off coefficient = 0.25
Runoff reduction = 10 mm (Assume 5mm initial abstraction to include for the total proposed 15mm)

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 10mm	C_{10}
25mm	**25.00**	**6.25**	**0.00**	**0.00**
2-Year	36.00	9.00	0.00	0.00
5-Year	47.80	11.95	1.95	0.04
10-Year	55.70	13.93	3.93	0.07
25-Year	65.60	16.40	6.40	0.10
50-Year	73.00	18.25	8.25	0.11
100-Year	80.30	20.08	10.08	0.13

Assumption:

Residential
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Commercial
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Mixed Area
For mixed area 50% is for residential and 50% is for commercial

Open Space and Parkland
C = 0.75 for Parkland (in accordance with the City's design criteria)
C = 0.25 for open space
An average runoff coefficient of 0.50 is used for the land indicated as major parks and open spaces

Area & Imperviousness for Permanent Pool Calculation (based on 25mm Runoff Coefficient)

NE Corner of Millway Avenue & Hwy 7

WEST SIDE

		Area (ha)	C	AC		
Mized Use (Residential)	Building	4.80	0.30	1.44		
	Paved Area	1.60	0.90	1.44		
	Landscape	1.70	0.00	0.00		
Mixed Use (Commercial)	Building	4.80	0.30	1.44		
	Paved Area	1.60	0.90	1.44		
	Landscape	1.70	0.00	0.00		
	Total	16.19		5.76	←	Weighted "C" = **0.36**
						Weighted Imperviousness = **0.22**
	Open Space / Parkland	3.16	0.50	1.58		
	Road	11.78	0.90	10.60		
	Total	14.94		12.18	←	Weighted "C" = **0.82**
						Weighted Imperviousness = **0.88**

EAST SIDE

		Area (ha)	C	AC		
Residential	Building	3.65	0.30	1.09		
	Paved Area	1.22	0.90	1.09		
	Landscape	1.29	0.00	0.00		4.796288
Commercial	Building	1.57	0.30	0.47		1.69995
	Paved Area	0.52	0.90	0.47		
	Landscape	0.56	0.00	0.00		
	Total	8.81		3.13	←	Weighted "C" = **0.36**
						Weighted Imperviousness = **0.22**
Open Space / Parkland		1.57	0.50	0.79		
Road		7.00	0.90	6.30		
Total		8.57		7.09	←	Weighted "C" = **0.83**
						Weighted Imperviousness = **0.90**

Vaughan Metropolitan Centre
City of Vaughan
2-year Runoff Coefficient Adjustment
NE Corner of Millway Avenue & Hwy 7

Project #: 08104
Date: April 2012

Storm Volume (6 hrs AES storms)

Storm Event	Rainfall Depth (mm)
25mm	25.00
2-Year	36.00
5-Year	47.80
10-Year	55.70
25-Year	65.60
50-Year	73.00
100-Year	80.30

Building base run-off coefficient = 0.90
Runoff reduction = 15 mm (According to LEED Gold Objective)

Adjustment to Building Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 15mm	C_{15}
25mm	25.00	22.50	7.50	0.30
2-Year	**36.00**	**32.40**	**17.40**	**0.48**
5-Year	47.80	43.02	28.02	0.59
10-Year	55.70	50.13	35.13	0.63
25-Year	65.60	59.04	44.04	0.67
50-Year	73.00	65.70	50.70	0.69
100-Year	80.30	72.27	57.27	0.71

Base run-off coefficient = 0.25
Runoff reduction = 10 mm (Assume 5mm initial abstraction to include for the total proposed 15mm)

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 10mm	C_{10}
25mm	25.00	6.25	0.00	0.00
2-Year	**36.00**	**9.00**	**0.00**	**0.00**
5-Year	47.80	11.95	1.95	0.04
10-Year	55.70	13.93	3.93	0.07
25-Year	65.60	16.40	6.40	0.10
50-Year	73.00	18.25	8.25	0.11
100-Year	80.30	20.08	10.08	0.13

Assumption:

Residential
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Commercial
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Mixed Area
For mixed area 50% is for residential and 50% is for commercial

Open Space and Parkland
C = 0.75 for Parkland (in accordance with the City's design criteria)
C = 0.25 for open space
An average runoff coefficient of 0.50 is used for the land indicated as major parks and open spaces

Area & Imperviousness for Permanent Pool Calculation (based on 2-year Runoff Coefficient)

NE Corner of Millway Avenue & Hwy 7

WEST SIDE

		Area (ha)	C	AC		
Mized Use (Residential)	Building	4.80	0.48	2.32		
	Paved Area	1.60	0.90	1.44		
	Landscape	1.70	0.00	0.00		
Mixed Use (Commercial)	Building	4.80	0.48	2.32		
	Paved Area	1.60	0.90	1.44		
	Landscape	1.70	0.00	0.00		
	Total	16.19		7.51	←	Weighted "C" = **0.46**
						Weighted Imperviousness = **0.38**
	Open Space / Parkland	3.16	0.50	1.58		
	Road	11.78	0.90	10.60		
	Total	14.94		12.18	←	Weighted "C" = **0.82**
						Weighted Imperviousness = **0.88**

EAST SIDE

		Area (ha)	C	AC		
Residential	Building	3.65	0.48	1.76		
	Paved Area	1.22	0.90	1.09		
	Landscape	1.29	0.00	0.00		
Commercial	Building	1.57	0.48	0.76		
	Paved Area	0.52	0.90	0.47		
	Landscape	0.56	0.00	0.00		
	Total	8.81		4.09	←	Weighted "C" = **0.46**
						Weighted Imperviousness = **0.38**
Open Space / Parkland		1.57	0.50	0.79		
Road		7.00	0.90	6.30		
Total		8.57		7.09	←	Weighted "C" = **0.83**
						Weighted Imperviousness = **0.90**

Vaughan Metropolitan Centre
City of Vaughan
5-year Runoff Coefficient Adjustment
NE Corner of Millway Avenue & Hwy 7

Project #: 08104
Date: April 2012

Storm Volume (6 hrs AES storms)

Storm Event	Rainfall Depth (mm)
25mm	25.00
2-Year	36.00
5-Year	47.80
10-Year	55.70
25-Year	65.60
50-Year	73.00
100-Year	80.30

Building base run-off coefficient = 0.90
Runoff reduction = 15 mm (According to LEED Gold Objective)

Adjustment to Building Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 15mm	C_{15}
25mm	25.00	22.50	7.50	0.30
2-Year	36.00	32.40	17.40	0.48
5-Year	**47.80**	**43.02**	**28.02**	**0.59**
10-Year	55.70	50.13	35.13	0.63
25-Year	65.60	59.04	44.04	0.67
50-Year	73.00	65.70	50.70	0.69
100-Year	80.30	72.27	57.27	0.71

Base run-off coefficient = 0.25
Runoff reduction = 10 mm (Assume 5mm initial abstraction to include for the total proposed 15mm)

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 10mm	C_{10}
25mm	25.00	6.25	0.00	0.00
2-Year	36.00	9.00	0.00	0.00
5-Year	**47.80**	**11.95**	**1.95**	**0.04**
10-Year	55.70	13.93	3.93	0.07
25-Year	65.60	16.40	6.40	0.10
50-Year	73.00	18.25	8.25	0.11
100-Year	80.30	20.08	10.08	0.13

Assumption:

Residential
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Commercial
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Mixed Area
For mixed area 50% is for residential and 50% is for commercial

Open Space and Parkland
C = 0.75 for Parkland (in accordance with the City's design criteria)
C = 0.25 for open space
An average runoff coefficient of 0.50 is used for the land indicated as major parks and open spaces

Area & Imperviousness for Permanent Pool Calculation (based on 5-year Runoff Coefficient)

NE Corner of Millway Avenue & Hwy 7

WEST SIDE

		Area (ha)	C	AC		
Mized Use (Residential)	Building	4.80	0.59	2.81		
	Paved Area	1.60	0.90	1.44		
	Landscape	1.70	0.04	0.07		
Mixed Use (Commercial)	Building	4.80	0.59	2.81		
	Paved Area	1.60	0.90	1.44		
	Landscape	1.70	0.04	0.07		
	Total	16.19		8.64	←	Weighted "C" = **0.53**
						Weighted Imperviousness = **0.48**
	Open Space / Parkland	3.16	0.50	1.58		
	Road	11.78	0.90	10.60		
	Total	14.94		12.18	←	Weighted "C" = **0.82**
						Weighted Imperviousness = **0.88**

EAST SIDE

		Area (ha)	C	AC		
Residential	Building	3.65	0.59	2.14		
	Paved Area	1.22	0.90	1.09		
	Landscape	1.29	0.04	0.05		
Commercial	Building	1.57	0.59	0.92		
	Paved Area	0.52	0.90	0.47		
	Landscape	0.56	0.04	0.02		
	Total	8.81		4.70	←	Weighted "C" = **0.53**
						Weighted Imperviousness = **0.48**
Open Space / Parkland		1.57	0.50	0.79		
Road		7.00	0.90	6.30		
Total		8.57		7.09	←	Weighted "C" = **0.83**
						Weighted Imperviousness = **0.90**

Vaughan Metropolitan Centre
City of Vaughan
10-year Runoff Coefficient Adjustment
NE Corner of Millway Avenue & Hwy 7

Project #: 08104
Date: April 2012

Storm Volume (6 hrs AES storms)

Storm Event	Rainfall Depth (mm)
25mm	25.00
2-Year	36.00
5-Year	47.80
10-Year	55.70
25-Year	65.60
50-Year	73.00
100-Year	80.30

Building base run-off coefficient = 0.90
Runoff reduction = 15 mm (According to LEED Gold Objective)

Adjustment to Building Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 15mm	C_{15}
25mm	25.00	22.50	7.50	0.30
2-Year	36.00	32.40	17.40	0.48
5-Year	47.80	43.02	28.02	0.59
10-Year	**55.70**	**50.13**	**35.13**	**0.63**
25-Year	65.60	59.04	44.04	0.67
50-Year	73.00	65.70	50.70	0.69
100-Year	80.30	72.27	57.27	0.71

Base run-off coefficient = 0.25
Runoff reduction = 10 mm (Assume 5mm initial abstraction to include for the total proposed 15mm)

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 10mm	C_{10}
25mm	25.00	6.25	0.00	0.00
2-Year	36.00	9.00	0.00	0.00
5-Year	47.80	11.95	1.95	0.04
10-Year	**55.70**	**13.93**	**3.93**	**0.07**
25-Year	65.60	16.40	6.40	0.10
50-Year	73.00	18.25	8.25	0.11
100-Year	80.30	20.08	10.08	0.13

Assumption:

Residential
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Commercial
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Mixed Area
For mixed area 50% is for residential and 50% is for commercial

Open Space and Parkland
C = 0.75 for Parkland (in accordance with the City's design criteria)
C = 0.25 for open space
An average runoff coefficient of 0.50 is used for the land indicated as major parks and open spaces

Area & Imperviousness for Permanent Pool Calculation (based on 10-year Runoff Coefficient)

NE Corner of Millway Avenue & Hwy 7

WEST SIDE

		Area (ha)	C	AC		
Mized Use (Residential)	Building	4.80	0.63	3.03		
	Paved Area	1.60	0.90	1.44		
	Landscape	1.70	0.07	0.12		
Mixed Use (Commercial)	Building	4.80	0.63	3.03		
	Paved Area	1.60	0.90	1.44		
	Landscape	1.70	0.07	0.12		
	Total	16.19		9.17	←	Weighted "C" = **0.57**
						Weighted Imperviousness = **0.52**
	Open Space / Parkland	3.16	0.50	1.58		
	Road	11.78	0.90	10.60		
	Total	14.94		12.18	←	Weighted "C" = **0.82**
						Weighted Imperviousness = **0.88**

EAST SIDE

		Area (ha)	C	AC		
Residential	Building	3.65	0.63	2.30		
	Paved Area	1.22	0.90	1.09		
	Landscape	1.29	0.07	0.09		
Commercial	Building	1.57	0.63	0.99		
	Paved Area	0.52	0.90	0.47		
	Landscape	0.56	0.07	0.04		
	Total	8.81		4.99	←	Weighted "C" = **0.57**
						Weighted Imperviousness = **0.52**
Open Space / Parkland		1.57	0.50	0.79		
Road		7.00	0.90	6.30		
Total		8.57		7.09	←	Weighted "C" = **0.83**
						Weighted Imperviousness = **0.90**

Vaughan Metropolitan Centre
City of Vaughan
25-year Runoff Coefficient Adjustment
NE Corner of Millway Avenue & Hwy 7

Project #: 08104
Date: April 2012

Storm Volume (6 hrs AES storms)

Storm Event	Rainfall Depth (mm)
25mm	25.00
2-Year	36.00
5-Year	47.80
10-Year	55.70
25-Year	65.60
50-Year	73.00
100-Year	80.30

Building base run-off coefficient = 0.90
Runoff reduction = 15 mm (According to LEED Gold Objective)

Adjustment to Building Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 15mm	C_{15}
25mm	25.00	22.50	7.50	0.30
2-Year	36.00	32.40	17.40	0.48
5-Year	47.80	43.02	28.02	0.59
10-Year	55.70	50.13	35.13	0.63
25-Year	**65.60**	**59.04**	**44.04**	**0.67**
50-Year	73.00	65.70	50.70	0.69
100-Year	80.30	72.27	57.27	0.71

Base run-off coefficient = 0.25
Runoff reduction = 10 mm (Assume 5mm initial abstraction to include for the total proposed 15mm)

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 10mm	C_{10}
25mm	25.00	6.25	0.00	0.00
2-Year	36.00	9.00	0.00	0.00
5-Year	47.80	11.95	1.95	0.04
10-Year	55.70	13.93	3.93	0.07
25-Year	**65.60**	**16.40**	**6.40**	**0.10**
50-Year	73.00	18.25	8.25	0.11
100-Year	80.30	20.08	10.08	0.13

Assumption:

Residential
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Commercial
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Mixed Area
For mixed area 50% is for residential and 50% is for commercial

Open Space and Parkland
C = 0.75 for Parkland (in accordance with the City's design criteria)
C = 0.25 for open space
An average runoff coefficient of 0.50 is used for the land indicated as major parks and open spaces

Area & Imperviousness for Permanent Pool Calculation (based on 25-year Runoff Coefficient)

NE Corner of Millway Avenue & Hwy 7

WEST SIDE

		Area (ha)	C	AC		
Mized Use (Residential)	Building	4.80	0.67	3.22		
	Paved Area	1.60	0.90	1.44		
	Landscape	1.70	0.10	0.17		
Mixed Use (Commercial)	Building	4.80	0.67	3.22		
	Paved Area	1.60	0.90	1.44		
	Landscape	1.70	0.10	0.17		
	Total	16.19		9.65	←	Weighted "C" = **0.60**
						Weighted Imperviousness = **0.57**
	Open Space / Parkland	3.16	0.50	1.58		
	Road	11.78	0.90	10.60		
	Total	14.94		12.18	←	Weighted "C" = **0.82**
						Weighted Imperviousness = **0.88**

EAST SIDE

		Area (ha)	C	AC		
Residential	Building	3.65	0.67	2.45		
	Paved Area	1.22	0.90	1.09		
	Landscape	1.29	0.10	0.13		
Commercial	Building	1.57	0.67	1.05		
	Paved Area	0.52	0.90	0.47		
	Landscape	0.56	0.10	0.05		
	Total	8.81		5.25	←	Weighted "C" = **0.60**
						Weighted Imperviousness = **0.57**
Open Space / Parkland		1.57	0.50	0.79		
Road		7.00	0.90	6.30		
Total		8.57		7.09	←	Weighted "C" = **0.83**
						Weighted Imperviousness = **0.90**

Vaughan Metropolitan Centre
City of Vaughan
50-year Runoff Coefficient Adjustment
NE Corner of Millway Avenue & Hwy 7

Project #: 08104
Date: April 2012

Storm Volume (6 hrs AES storms)

Storm Event	Rainfall Depth (mm)
25mm	25.00
2-Year	36.00
5-Year	47.80
10-Year	55.70
25-Year	65.60
50-Year	73.00
100-Year	80.30

Building base run-off coefficient = 0.90
Runoff reduction = 15 mm (According to LEED Gold Objective)

Adjustment to Building Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 15mm	C_{15}
25mm	25.00	22.50	7.50	0.30
2-Year	36.00	32.40	17.40	0.48
5-Year	47.80	43.02	28.02	0.59
10-Year	55.70	50.13	35.13	0.63
25-Year	65.60	59.04	44.04	0.67
50-Year	**73.00**	**65.70**	**50.70**	**0.69**
100-Year	80.30	72.27	57.27	0.71

Base run-off coefficient = 0.25
Runoff reduction = 10 mm (Assume 5mm initial abstraction to include for the total proposed 15mm)

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 10mm	C_{10}
25mm	25.00	6.25	0.00	0.00
2-Year	36.00	9.00	0.00	0.00
5-Year	47.80	11.95	1.95	0.04
10-Year	55.70	13.93	3.93	0.07
25-Year	65.60	16.40	6.40	0.10
50-Year	**73.00**	**18.25**	**8.25**	**0.11**
100-Year	80.30	20.08	10.08	0.13

Assumption:

Residential
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Commercial
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Mixed Area
For mixed area 50% is for residential and 50% is for commercial

Open Space and Parkland
C = 0.75 for Parkland (in accordance with the City's design criteria)
C = 0.25 for open space
An average runoff coefficient of 0.50 is used for the land indicated as major parks and open spaces

Area & Imperviousness for Permanent Pool Calculation (based on 50-year Runoff Coefficient)

NE Corner of Millway Avenue & Hwy 7

WEST SIDE

		Area (ha)	C	AC		
Mized Use (Residential)	Building	4.80	0.69	3.33		
	Paved Area	1.60	0.90	1.44		
	Landscape	1.70	0.11	0.19		
Mixed Use (Commercial)	Building	4.80	0.69	3.33		
	Paved Area	1.60	0.90	1.44		
	Landscape	1.70	0.11	0.19		
	Total	16.19		9.92	←	Weighted "C" = **0.61**
						Weighted Imperviousness = **0.59**
	Open Space / Parkland	3.16	0.50	1.58		
	Road	11.78	0.90	10.60		
	Total	14.94		12.18	←	Weighted "C" = **0.82**
						Weighted Imperviousness = **0.88**

EAST SIDE

		Area (ha)	C	AC		
Residential	Building	3.65	0.69	2.53		
	Paved Area	1.22	0.90	1.09		
	Landscape	1.29	0.11	0.15		
Commercial	Building	1.57	0.69	1.09		
	Paved Area	0.52	0.90	0.47		
	Landscape	0.56	0.11	0.06		
	Total	8.81		5.40	←	Weighted "C" = **0.61**
						Weighted Imperviousness = **0.59**
Open Space / Parkland		1.57	0.50	0.79		
Road		7.00	0.90	6.30		
Total		8.57		7.09	←	Weighted "C" = **0.83**
						Weighted Imperviousness = **0.90**

Vaughan Metropolitan Centre
City of Vaughan
100-year Runoff Coefficient Adjustment
NE Corner of Millway Avenue & Hwy 7

Project #: 08104
Date: April 2012

Storm Volume (6 hrs AES storms)

Storm Event	Rainfall Depth (mm)
25mm	25.00
2-Year	36.00
5-Year	47.80
10-Year	55.70
25-Year	65.60
50-Year	73.00
100-Year	80.30

Building base run-off coefficient = 0.90
Runoff reduction = 15 mm (According to LEED Gold Objective)

Adjustment to Building Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 15mm	C_{15}
25mm	25.00	22.50	7.50	0.30
2-Year	36.00	32.40	17.40	0.48
5-Year	47.80	43.02	28.02	0.59
10-Year	55.70	50.13	35.13	0.63
25-Year	65.60	59.04	44.04	0.67
50-Year	73.00	65.70	50.70	0.69
100-Year	**80.30**	**72.27**	**57.27**	**0.71**

Base run-off coefficient = 0.25
Runoff reduction = 10 mm (Assume 5mm initial abstraction to include for the total proposed 15mm)

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 10mm	C_{10}
25mm	25.00	6.25	0.00	0.00
2-Year	36.00	9.00	0.00	0.00
5-Year	47.80	11.95	1.95	0.04
10-Year	55.70	13.93	3.93	0.07
25-Year	65.60	16.40	6.40	0.10
50-Year	73.00	18.25	8.25	0.11
100-Year	**80.30**	**20.08**	**10.08**	**0.13**

Assumption:

Residential
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Commercial
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Mixed Area
For mixed area 50% is for residential and 50% is for commercial

Open Space and Parkland
C = 0.75 for Parkland (in accordance with the City's design criteria)
C = 0.25 for open space
An average runoff coefficient of 0.50 is used for the land indicated as major parks and open spaces

Area & Imperviousness for Permanent Pool Calculation (based on 100-year Runoff Coefficient)

NE Corner of Millway Avenue & Hwy 7

WEST SIDE

		Area (ha)	C	AC
Mized Use (Residential)	Building	4.80	0.71	3.42
	Paved Area	1.60	0.90	1.44
	Landscape	1.70	0.13	0.21
Mixed Use (Commercial)	Building	4.80	0.71	3.42
	Paved Area	1.60	0.90	1.44
	Landscape	1.70	0.13	0.21
	Total	16.19		10.15

← Weighted "C" = **0.63**
Weighted Imperviousness = **0.61**

Open Space / Parkland	3.16	0.50	1.58
Road	11.78	0.90	10.60
Total	14.94		12.18

← Weighted "C" = **0.82**
Weighted Imperviousness = **0.88**

EAST SIDE

		Area (ha)	C	AC
Residential	Building	3.65	0.71	2.60
	Paved Area	1.22	0.90	1.09
	Landscape	1.29	0.13	0.16
Commercial	Building	1.57	0.71	1.12
	Paved Area	0.52	0.90	0.47
	Landscape	0.56	0.13	0.07
	Total	8.81		5.52

← Weighted "C" = **0.63**
Weighted Imperviousness = **0.61**

Open Space / Parkland	1.57	0.50	0.79
Road	7.00	0.90	6.30
Total	8.57		7.09

← Weighted "C" = **0.83**
Weighted Imperviousness = **0.90**

Vaughan Metropolitan Centre
City of Vaughan
Summary of Controlled / Uncontrolled areas
NE Corner of Millway Avenue & Hwy 7

	Reduced Runoff Coefficients			
	West (31.13ha)		East (17.38ha)	
	16.19	14.94	8.81	8.57
Return Period	Controlled	Uncontrolled	Controlled	Uncontrolled
25mm	0.36	0.82	0.36	0.83
2-yr	0.46	0.82	0.46	0.83
5-yr	0.53	0.82	0.53	0.83
10-yr	0.57	0.82	0.57	0.83
25-yr	0.60	0.82	0.60	0.83
50-yr	0.61	0.82	0.61	0.83
100-yr	0.63	0.82	0.63	0.83

	Level of Imperviousness			
	West (31.13ha)		East (17.38ha)	
	16.19	14.94	8.81	8.57
Return Period	Controlled	Uncontrolled	Controlled	Uncontrolled
25mm	0.22	0.88	0.22	0.90
2-yr	0.38	0.88	0.38	0.90
5-yr	0.48	0.88	0.48	0.90
10-yr	0.52	0.88	0.52	0.90
25-yr	0.57	0.88	0.57	0.90
50-yr	0.59	0.88	0.59	0.90
100-yr	0.61	0.88	0.61	0.90

existing conditions

total area to Jane street	576.91	ha
C12 catchment	190.40	ha
total area to pond 18.0	**767.31**	ha

Proposed conditions

total area to Jane street		576.91	ha
VMC	**54.43**		**ha**
west block		31.13	
controlled	16.19		
uncontrolled	14.94		
east block		17.38	
controlled	8.81		
uncontrolled	8.57		
SWM Block	5.92		ha
External East of VMC		17.24	ha
ernal North of VMC + Pond block		124.65	ha
total area to pond 18.0		**767.31**	ha

On site controls (rating curve)

west 16.19 ha

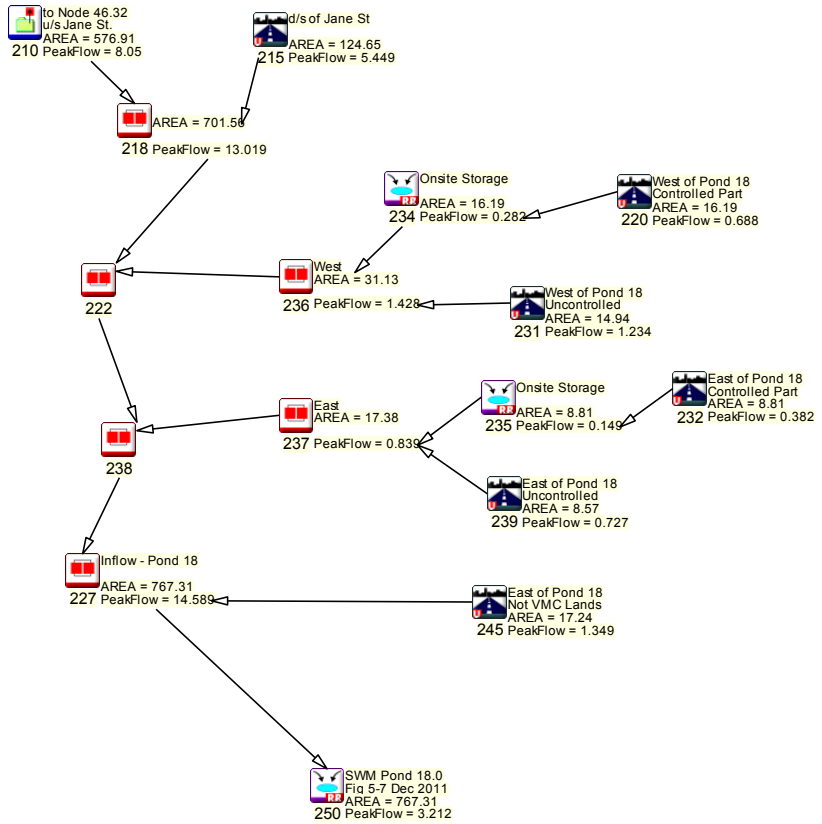
qout (m3/s)	v (ha.m)
1.201	0.5367

east 8.81 ha

qout (m3/s)	vol (ha.m)
0.665	0.2915

note: model G:\Projects\2008\08104 - Vaughan Corporate Centre - Master Servicing Strategy\Design\SWM\2012 02 final submission\100-year to 2-year, scenario: target release rates, TRR are based on 80% imperviousness

North East POND (2yr 6hr AES)



Summary Hydrograph Data

Run Number : 1

NHYD	DT [hr]	AREA [ha]	Peak flow [m³/s]	TP [hr]	Runoff Vol. [mm]	DWF [m³/s]
250	0.083	767.310	3.212	6.833	27.241	0.000

```
================================================================================
==============

       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM, Version 2.0
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M  M  O   O   Licensed To: TMIG
        OOO     T      T    H   H    Y    M   M   OOO                vo2-0145

Developed and Distributed by Greenland International Consulting Inc.
Copyright 1996, 2001 Schaeffer & Associates Ltd.
All rights reserved.

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


  Input   filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat
  Output  filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final
submission\05PROP~1\2y6 w Dev VMC, Prop Pond With %IMP Reduction.out
  Summary filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final
submission\05PROP~1\2y6 w Dev VMC, Prop Pond With %IMP Reduction.sum


DATE: 4/10/2012                           TIME: 12:16:32 PM

USER:


COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
---------------
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\December 2011 - TS\VO2 Input Hydr
| Ptotal= 36.00 mm |    Comments: 2yr/6hr
--------------------
                TIME     RAIN |  TIME     RAIN |  TIME     RAIN |  TIME     RAIN
                 hrs    mm/hr |   hrs    mm/hr |   hrs    mm/hr |   hrs    mm/hr
                 .25      .00 |  2.00    12.24 |  3.75     5.04 |  5.50      .72
                 .50      .72 |  2.25    12.24 |  4.00     2.88 |  5.75      .72
                 .75      .72 |  2.50    33.12 |  4.25     2.88 |  6.00      .72
                1.00      .72 |  2.75    33.12 |  4.50     1.44 |  6.25      .72
                1.25      .72 |  3.00     9.36 |  4.75     1.44 |
                1.50     4.32 |  3.25     9.36 |  5.00      .72 |
                1.75     4.32 |  3.50     5.04 |  5.25      .72 |

--------------------------------------------------------------------------------
```

```
--------------------
| CALIB            |
| STANDHYD  (0245) |   Area    (ha)=  17.24
|ID= 1 DT= 5.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     14.65         2.59
     Dep. Storage     (mm)=      1.00         4.30
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    339.00        40.00
     Mannings n           =      .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .083     .00 | 1.667    4.32 | 3.250    9.36 |  4.83     .72
               .167     .00 | 1.750    4.32 | 3.333    5.04 |  4.92     .72
               .250     .00 | 1.833   12.24 | 3.417    5.04 |  5.00     .72
               .333     .72 | 1.917   12.24 | 3.500    5.04 |  5.08     .72
               .417     .72 | 2.000   12.24 | 3.583    5.04 |  5.17     .72
               .500     .72 | 2.083   12.24 | 3.667    5.04 |  5.25     .72
               .583     .72 | 2.167   12.24 | 3.750    5.04 |  5.33     .72
               .667     .72 | 2.250   12.24 | 3.833    2.88 |  5.42     .72
               .750     .72 | 2.333   33.12 | 3.917    2.88 |  5.50     .72
               .833     .72 | 2.417   33.12 | 4.000    2.88 |  5.58     .72
               .917     .72 | 2.500   33.12 | 4.083    2.88 |  5.67     .72
              1.000     .72 | 2.583   33.12 | 4.167    2.88 |  5.75     .72
              1.083     .72 | 2.667   33.12 | 4.250    2.88 |  5.83     .72
              1.167     .72 | 2.750   33.12 | 4.333    1.44 |  5.92     .72
              1.250     .72 | 2.833    9.36 | 4.417    1.44 |  6.00     .72
              1.333    4.32 | 2.917    9.36 | 4.500    1.44 |  6.08     .72
              1.417    4.32 | 3.000    9.36 | 4.583    1.44 |  6.17     .72
              1.500    4.32 | 3.083    9.36 | 4.667    1.44 |  6.25     .72
              1.583    4.32 | 3.167    9.36 | 4.750    1.44 |

     Max.Eff.Inten.(mm/hr)=      33.12        11.75
               over (min)        10.00        25.00
     Storage Coeff.  (min)=     8.27 (ii)   24.89 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=        .13          .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.31          .05          1.349 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00           2.75
     RUNOFF VOLUME    (mm)=      35.00        10.56          31.33
     TOTAL RAINFALL   (mm)=      36.00        36.00          36.00
     RUNOFF COEFFICIENT   =        .97          .29            .87

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0239) |   Area    (ha)=   8.57
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      7.71          .86
     Dep. Storage     (mm)=      1.00         4.30
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    239.00        40.00
     Mannings n           =      .013         .250

     Max.Eff.Inten.(mm/hr)=      33.12        13.24
               over (min)         5.00        15.00
     Storage Coeff.  (min)=      6.70 (ii)   11.26 (ii)
     Unit Hyd. Tpeak (min)=      5.00        15.00
     Unit Hyd. peak  (cms)=       .18          .09
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .70          .02           .727 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.83          2.75
     RUNOFF VOLUME    (mm)=      35.00        10.56         32.55
     TOTAL RAINFALL   (mm)=      36.00        36.00         36.00
     RUNOFF COEFFICIENT   =        .97          .29           .90

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0232) |   Area    (ha)=   8.81
|ID= 1 DT= 5.0 min |   Total Imp(%)=  38.00   Dir. Conn.(%)=  38.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      3.35         5.46
     Dep. Storage     (mm)=      1.00         4.30
     Average Slope     (%)=      1.00         2.00
     Length            (m)=    242.30        40.00
     Mannings n           =      .013         .250

     Max.Eff.Inten.(mm/hr)=      33.12        11.75
               over (min)         5.00        25.00
     Storage Coeff.  (min)=      6.76 (ii)   23.38 (ii)
     Unit Hyd. Tpeak (min)=      5.00        25.00
     Unit Hyd. peak  (cms)=       .18          .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .31          .11           .382 (iii)
     TIME TO PEAK    (hrs)=      2.75         3.00          2.75
     RUNOFF VOLUME    (mm)=      35.00        10.56         19.84
     TOTAL RAINFALL   (mm)=      36.00        36.00         36.00
     RUNOFF COEFFICIENT   =        .97          .29           .55

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0235) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)      (ha.m.)   |   (cms)     (ha.m.)
                           .0000       .0000   |    .5820      .3000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0232)    8.81       .38      2.75      19.84
     OUTFLOW: ID= 1 (0235)    8.81       .15      3.33      19.83
```

```
                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 39.05
                  TIME SHIFT OF PEAK FLOW         (min)= 35.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .0770

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0237) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0239):     8.57    .727     2.75    32.55
       + ID2= 2 (0235):     8.81    .149     3.33    19.83
         ================================================
         ID = 3 (0237):    17.38    .839     2.75    26.10

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0220) |   Area    (ha)=  16.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  38.00   Dir. Conn.(%)=  38.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.15        10.04
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     328.50        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      33.12        11.75
               over (min)        10.00        25.00
     Storage Coeff.  (min)=       8.11 (ii)   24.74 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=        .13          .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .55          .19          .688 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00          2.75
     RUNOFF VOLUME    (mm)=      35.00        10.56         19.84
     TOTAL RAINFALL   (mm)=      36.00        36.00         36.00
     RUNOFF COEFFICIENT   =        .97          .29           .55


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0234) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   1.1510      .5700

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0220)    16.19       .69      2.75      19.84
     OUTFLOW: ID= 1 (0234)    16.19       .28      3.42      19.84

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.00
                  TIME SHIFT OF PEAK FLOW         (min)= 40.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .1398

--------------------------------------------------------------------------------
```

```
--------------------
| CALIB            |
| STANDHYD  (0231) |   Area    (ha)=  14.94
|ID= 1 DT= 5.0 min |   Total Imp(%)=  88.00   Dir. Conn.(%)=  88.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.15         1.79
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     315.60        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      33.12        34.19
               over (min)        10.00        15.00
     Storage Coeff.  (min)=       7.92 (ii)   12.87 (ii)
     Unit Hyd. Tpeak (min)=      10.00        15.00
     Unit Hyd. peak  (cms)=        .13          .08
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.18          .05          1.234 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83          2.75
     RUNOFF VOLUME    (mm)=      35.00        12.15         32.26
     TOTAL RAINFALL   (mm)=      36.00        36.00         36.00
     RUNOFF COEFFICIENT   =        .97          .34           .90


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0236) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0234):    16.19    .282     3.42    19.84
       + ID2= 2 (0231):    14.94   1.234     2.75    32.26
         ================================================
         ID = 3 (0236):    31.13   1.428     2.75    25.80

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0215) |   Area    (ha)= 124.65
|ID= 1 DT= 5.0 min |   Total Imp(%)=  83.00   Dir. Conn.(%)=  79.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     103.46        21.19
     Dep. Storage     (mm)=        .50         4.70
     Average Slope     (%)=        .30          .40
     Length            (m)=    1800.00       200.00
     Mannings n           =       .016         .250

     Max.Eff.Inten.(mm/hr)=      33.12         8.97
               over (min)        30.00       120.00
     Storage Coeff.  (min)=      36.60 (ii)  115.40 (ii)
     Unit Hyd. Tpeak (min)=      30.00       120.00
     Unit Hyd. peak  (cms)=        .03          .01
                                                    *TOTALS*
     PEAK FLOW       (cms)=       5.41          .20          5.449 (iii)
     TIME TO PEAK    (hrs)=       3.00         4.67          3.00
     RUNOFF VOLUME    (mm)=      35.50        10.67         30.29
     TOTAL RAINFALL   (mm)=      36.00        36.00         36.00
```

```
     RUNOFF COEFFICIENT   =        .99          .30           .84


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  76.0    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.

--------------------------------------------------------------------------------
--------------------
| READ HYD  (0210) |   AREA       (ha)= 576.91
| DT= 5.0 min      |   TPEAK     (hrs)=   3.33
--------------------   VOLUME     (mm)=  26.58
  Filename: G:\Projects\2008\08104 - Vaughan Corporate Centre - Master Servicing
Strategy\Design\SWM\December 20
  Comments: Outflow at 46.32
```

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	33.42	.159	66.83	.063	100.25	.022	133.67	.010
.08	.000	33.50	.159	66.92	.063	100.33	.022	133.75	.010
.17	.000	33.58	.158	67.00	.063	100.42	.022	133.83	.010
.25	.000	33.67	.158	67.08	.063	100.50	.022	133.92	.010
.33	.000	33.75	.158	67.17	.062	100.58	.022	134.00	.010
.42	.000	33.83	.158	67.25	.062	100.67	.022	134.08	.010
.50	.000	33.92	.157	67.33	.062	100.75	.022	134.17	.010
.58	.000	34.00	.157	67.42	.062	100.83	.022	134.25	.010
.67	.000	34.08	.157	67.50	.062	100.92	.022	134.33	.010
.75	.000	34.17	.157	67.58	.062	101.00	.022	134.42	.010
.83	.000	34.25	.156	67.67	.061	101.08	.022	134.50	.010
.92	.000	34.33	.156	67.75	.061	101.17	.022	134.58	.010
1.00	.000	34.42	.156	67.83	.061	101.25	.022	134.67	.010
1.08	.000	34.50	.156	67.92	.061	101.33	.022	134.75	.010
1.17	.000	34.58	.155	68.00	.061	101.42	.022	134.83	.010
1.25	.000	34.67	.155	68.08	.060	101.50	.022	134.92	.010
1.33	.000	34.75	.155	68.17	.060	101.58	.021	135.00	.010
1.42	.000	34.83	.155	68.25	.060	101.67	.021	135.08	.010
1.50	.000	34.92	.154	68.33	.060	101.75	.021	135.17	.010
1.58	.000	35.00	.154	68.42	.060	101.83	.021	135.25	.010
1.67	.001	35.08	.154	68.50	.059	101.92	.021	135.33	.010
1.75	.001	35.17	.154	68.58	.059	102.00	.021	135.42	.010
1.83	.002	35.25	.153	68.67	.059	102.08	.021	135.50	.010
1.92	.003	35.33	.153	68.75	.059	102.17	.021	135.58	.010
2.00	.005	35.42	.153	68.83	.059	102.25	.021	135.67	.010
2.08	.008	35.50	.153	68.92	.059	102.33	.021	135.75	.010
2.17	.168	35.58	.152	69.00	.058	102.42	.021	135.83	.010
2.25	.601	35.67	.152	69.08	.058	102.50	.021	135.92	.010
2.33	1.063	35.75	.152	69.17	.058	102.58	.021	136.00	.010
2.42	1.605	35.83	.152	69.25	.058	102.67	.021	136.08	.010
2.50	2.245	35.92	.152	69.33	.058	102.75	.021	136.17	.010
2.58	2.975	36.00	.151	69.42	.058	102.83	.021	136.25	.010
2.67	3.777	36.08	.151	69.50	.057	102.92	.021	136.33	.010
2.75	4.624	36.17	.151	69.58	.057	103.00	.021	136.42	.010
2.83	5.461	36.25	.151	69.67	.057	103.08	.021	136.50	.010
2.92	6.200	36.33	.150	69.75	.057	103.17	.021	136.58	.010
3.00	6.798	36.42	.150	69.83	.057	103.25	.020	136.67	.010
3.08	7.382	36.50	.150	69.92	.056	103.33	.020	136.75	.010
3.17	7.777	36.58	.150	70.00	.056	103.42	.020	136.83	.010
3.25	7.984	36.67	.149	70.08	.056	103.50	.020	136.92	.010
3.33	8.050	36.75	.149	70.17	.056	103.58	.020	137.00	.010
3.42	8.001	36.83	.149	70.25	.056	103.67	.020	137.08	.010
3.50	7.869	36.92	.149	70.33	.056	103.75	.020	137.17	.010
3.58	7.682	37.00	.148	70.42	.055	103.83	.020	137.25	.010
3.67	7.461	37.08	.148	70.50	.055	103.92	.020	137.33	.010
3.75	7.221	37.17	.148	70.58	.055	104.00	.020	137.42	.010
3.83	6.976	37.25	.148	70.67	.055	104.08	.020	137.50	.010
3.92	6.769	37.33	.148	70.75	.055	104.17	.020	137.58	.010
4.00	6.580	37.42	.147	70.83	.055	104.25	.020	137.67	.010
4.08	6.388	37.50	.147	70.92	.054	104.33	.020	137.75	.010
4.17	6.196	37.58	.147	71.00	.054	104.42	.020	137.83	.010
4.25	6.009	37.67	.147	71.08	.054	104.50	.020	137.92	.010
4.33	5.826	37.75	.146	71.17	.054	104.58	.020	138.00	.010
4.42	5.648	37.83	.146	71.25	.054	104.67	.020	138.08	.010
4.50	5.475	37.92	.146	71.33	.054	104.75	.020	138.17	.010
4.58	5.306	38.00	.146	71.42	.053	104.83	.020	138.25	.010
4.67	5.144	38.08	.145	71.50	.053	104.92	.020	138.33	.010
4.75	4.989	38.17	.145	71.58	.053	105.00	.020	138.42	.010
4.83	4.841	38.25	.145	71.67	.053	105.08	.019	138.50	.010
4.92	4.699	38.33	.145	71.75	.053	105.17	.019	138.58	.010
5.00	4.563	38.42	.145	71.83	.053	105.25	.019	138.67	.010
5.08	4.434	38.50	.144	71.92	.053	105.33	.019	138.75	.010
5.17	4.311	38.58	.144	72.00	.052	105.42	.019	138.83	.010
5.25	4.194	38.67	.144	72.08	.052	105.50	.019	138.92	.010
5.33	4.084	38.75	.144	72.17	.052	105.58	.019	139.00	.010
5.42	3.982	38.83	.143	72.25	.052	105.67	.019	139.08	.010
5.50	3.886	38.92	.143	72.33	.052	105.75	.019	139.17	.010
5.58	3.798	39.00	.143	72.42	.052	105.83	.019	139.25	.010
5.67	3.716	39.08	.143	72.50	.051	105.92	.019	139.33	.010
5.75	3.640	39.17	.143	72.58	.051	106.00	.019	139.42	.010
5.83	3.569	39.25	.142	72.67	.051	106.08	.019	139.50	.010
5.92	3.503	39.33	.142	72.75	.051	106.17	.019	139.58	.010
6.00	3.442	39.42	.142	72.83	.051	106.25	.019	139.67	.010
6.08	3.385	39.50	.142	72.92	.051	106.33	.019	139.75	.010
6.17	3.332	39.58	.141	73.00	.051	106.42	.019	139.83	.010
6.25	3.281	39.67	.141	73.08	.050	106.50	.019	139.92	.010
6.33	3.232	39.75	.141	73.17	.050	106.58	.019	140.00	.010
6.42	3.181	39.83	.141	73.25	.050	106.67	.019	140.08	.010
6.50	3.127	39.92	.141	73.33	.050	106.75	.019	140.17	.010
6.58	3.071	40.00	.140	73.42	.050	106.83	.019	140.25	.010
6.67	3.012	40.08	.140	73.50	.050	106.92	.018	140.33	.010
6.75	2.951	40.17	.140	73.58	.050	107.00	.018	140.42	.010
6.83	2.888	40.25	.140	73.67	.049	107.08	.018	140.50	.010
6.92	2.826	40.33	.139	73.75	.049	107.17	.018	140.58	.010
7.00	2.763	40.42	.139	73.83	.049	107.25	.018	140.67	.010
7.08	2.702	40.50	.139	73.92	.049	107.33	.018	140.75	.010
7.17	2.641	40.58	.139	74.00	.049	107.42	.018	140.83	.010
7.25	2.582	40.67	.139	74.08	.049	107.50	.018	140.92	.010
7.33	2.525	40.75	.138	74.17	.049	107.58	.018	141.00	.010
7.42	2.470	40.83	.138	74.25	.049	107.67	.018	141.08	.010
7.50	2.417	40.92	.138	74.33	.048	107.75	.018	141.17	.010
7.58	2.366	41.00	.138	74.42	.048	107.83	.018	141.25	.010
7.67	2.319	41.08	.137	74.50	.048	107.92	.018	141.33	.010
7.75	2.274	41.17	.137	74.58	.048	108.00	.018	141.42	.010
7.83	2.231	41.25	.137	74.67	.048	108.08	.018	141.50	.010
7.92	2.190	41.33	.137	74.75	.048	108.17	.018	141.58	.010
8.00	2.151	41.42	.137	74.83	.048	108.25	.018	141.67	.010
8.08	2.114	41.50	.136	74.92	.048	108.33	.018	141.75	.010
8.17	2.078	41.58	.136	75.00	.047	108.42	.018	141.83	.010
8.25	2.043	41.67	.136	75.08	.047	108.50	.018	141.92	.010
8.33	2.010	41.75	.136	75.17	.047	108.58	.018	142.00	.010
8.42	1.977	41.83	.135	75.25	.047	108.67	.018	142.08	.010
8.50	1.946	41.92	.135	75.33	.047	108.75	.018	142.17	.010
8.58	1.915	42.00	.135	75.42	.047	108.83	.018	142.25	.010
8.67	1.886	42.08	.135	75.50	.047	108.92	.017	142.33	.010
8.75	1.857	42.17	.135	75.58	.047	109.00	.017	142.42	.010
8.83	1.829	42.25	.134	75.67	.046	109.08	.017	142.50	.010
8.92	1.801	42.33	.134	75.75	.046	109.17	.017	142.58	.010
9.00	1.775	42.42	.134	75.83	.046	109.25	.017	142.67	.010
9.08	1.748	42.50	.134	75.92	.046	109.33	.017	142.75	.010
9.17	1.722	42.58	.133	76.00	.046	109.42	.017	142.83	.010
9.25	1.695	42.67	.133	76.08	.046	109.50	.017	142.92	.010
9.33	1.669	42.75	.133	76.17	.046	109.58	.017	143.00	.010
9.42	1.642	42.83	.133	76.25	.046	109.67	.017	143.08	.010

9.50	1.615	42.92	.133	76.33	.045	109.75	.017	143.17	.010	15.08	.413	48.50	.119	81.92	.038	115.33	.015	148.75	.009
9.58	1.589	43.00	.132	76.42	.045	109.83	.017	143.25	.010	15.17	.408	48.58	.118	82.00	.038	115.42	.015	148.83	.009
9.67	1.563	43.08	.132	76.50	.045	109.92	.017	143.33	.010	15.25	.403	48.67	.118	82.08	.038	115.50	.015	148.92	.009
9.75	1.537	43.17	.132	76.58	.045	110.00	.017	143.42	.010	15.33	.399	48.75	.118	82.17	.038	115.58	.015	149.00	.009
9.83	1.511	43.25	.132	76.67	.045	110.08	.017	143.50	.010	15.42	.394	48.83	.118	82.25	.038	115.67	.015	149.08	.009
9.92	1.486	43.33	.132	76.75	.045	110.17	.017	143.58	.010	15.50	.389	48.92	.118	82.33	.038	115.75	.014	149.17	.009
10.00	1.461	43.42	.131	76.83	.045	110.25	.017	143.67	.010	15.58	.385	49.00	.117	82.42	.038	115.83	.014	149.25	.009
10.08	1.436	43.50	.131	76.92	.045	110.33	.017	143.75	.010	15.67	.381	49.08	.117	82.50	.038	115.92	.014	149.33	.009
10.17	1.409	43.58	.131	77.00	.044	110.42	.017	143.83	.010	15.75	.377	49.17	.117	82.58	.037	116.00	.014	149.42	.009
10.25	1.382	43.67	.131	77.08	.044	110.50	.017	143.92	.010	15.83	.373	49.25	.117	82.67	.037	116.08	.014	149.50	.009
10.33	1.353	43.75	.130	77.17	.044	110.58	.017	144.00	.010	15.92	.369	49.33	.116	82.75	.037	116.17	.014	149.58	.009
10.42	1.323	43.83	.130	77.25	.044	110.67	.017	144.08	.010	16.00	.365	49.42	.116	82.83	.037	116.25	.014	149.67	.009
10.50	1.293	43.92	.130	77.33	.044	110.75	.017	144.17	.010	16.08	.362	49.50	.116	82.92	.037	116.33	.014	149.75	.009
10.58	1.262	44.00	.130	77.42	.044	110.83	.017	144.25	.010	16.17	.358	49.58	.116	83.00	.037	116.42	.014	149.83	.009
10.67	1.232	44.08	.130	77.50	.044	110.92	.017	144.33	.010	16.25	.355	49.67	.116	83.08	.037	116.50	.014	149.92	.009
10.75	1.202	44.17	.129	77.58	.044	111.00	.017	144.42	.010	16.33	.351	49.75	.115	83.17	.037	116.58	.014	150.00	.009
10.83	1.172	44.25	.129	77.67	.044	111.08	.016	144.50	.010	16.42	.348	49.83	.115	83.25	.037	116.67	.014	150.08	.009
10.92	1.142	44.33	.129	77.75	.043	111.17	.016	144.58	.010	16.50	.344	49.92	.115	83.33	.037	116.75	.014	150.17	.009
11.00	1.114	44.42	.129	77.83	.043	111.25	.016	144.67	.010	16.58	.341	50.00	.115	83.42	.037	116.83	.014	150.25	.009
11.08	1.085	44.50	.129	77.92	.043	111.33	.016	144.75	.010	16.67	.338	50.08	.114	83.50	.036	116.92	.014	150.33	.009
11.17	1.058	44.58	.128	78.00	.043	111.42	.016	144.83	.010	16.75	.334	50.17	.114	83.58	.036	117.00	.014	150.42	.009
11.25	1.031	44.67	.128	78.08	.043	111.50	.016	144.92	.010	16.83	.331	50.25	.114	83.67	.036	117.08	.014	150.50	.009
11.33	1.005	44.75	.128	78.17	.043	111.58	.016	145.00	.010	16.92	.328	50.33	.113	83.75	.036	117.17	.014	150.58	.009
11.42	.979	44.83	.128	78.25	.043	111.67	.016	145.08	.010	17.00	.325	50.42	.113	83.83	.036	117.25	.014	150.67	.009
11.50	.954	44.92	.128	78.33	.043	111.75	.016	145.17	.010	17.08	.322	50.50	.113	83.92	.036	117.33	.014	150.75	.009
11.58	.931	45.00	.127	78.42	.043	111.83	.016	145.25	.010	17.17	.318	50.58	.113	84.00	.036	117.42	.014	150.83	.009
11.67	.907	45.08	.127	78.50	.042	111.92	.016	145.33	.010	17.25	.315	50.67	.112	84.08	.036	117.50	.014	150.92	.009
11.75	.885	45.17	.127	78.58	.042	112.00	.016	145.42	.010	17.33	.312	50.75	.112	84.17	.036	117.58	.014	151.00	.009
11.83	.863	45.25	.127	78.67	.042	112.08	.016	145.50	.010	17.42	.309	50.83	.112	84.25	.036	117.67	.014	151.08	.009
11.92	.842	45.33	.127	78.75	.042	112.17	.016	145.58	.010	17.50	.306	50.92	.112	84.33	.036	117.75	.014	151.17	.009
12.00	.822	45.42	.126	78.83	.042	112.25	.016	145.67	.010	17.58	.303	51.00	.111	84.42	.035	117.83	.014	151.25	.009
12.08	.802	45.50	.126	78.92	.042	112.33	.016	145.75	.010	17.67	.300	51.08	.111	84.50	.035	117.92	.014	151.33	.009
12.17	.784	45.58	.126	79.00	.042	112.42	.016	145.83	.010	17.75	.297	51.17	.111	84.58	.035	118.00	.014	151.42	.009
12.25	.765	45.67	.126	79.08	.042	112.50	.016	145.92	.010	17.83	.294	51.25	.110	84.67	.035	118.08	.014	151.50	.009
12.33	.748	45.75	.125	79.17	.042	112.58	.016	146.00	.010	17.92	.292	51.33	.110	84.75	.035	118.17	.014	151.58	.009
12.42	.731	45.83	.125	79.25	.041	112.67	.016	146.08	.010	18.00	.289	51.42	.110	84.83	.035	118.25	.014	151.67	.009
12.50	.715	45.92	.125	79.33	.041	112.75	.016	146.17	.010	18.08	.286	51.50	.110	84.92	.035	118.33	.013	151.75	.009
12.58	.699	46.00	.125	79.42	.041	112.83	.016	146.25	.010	18.17	.284	51.58	.109	85.00	.035	118.42	.013	151.83	.009
12.67	.684	46.08	.125	79.50	.041	112.92	.016	146.33	.010	18.25	.281	51.67	.109	85.08	.035	118.50	.013	151.92	.009
12.75	.669	46.17	.124	79.58	.041	113.00	.016	146.42	.010	18.33	.278	51.75	.109	85.17	.035	118.58	.013	152.00	.009
12.83	.655	46.25	.124	79.67	.041	113.08	.016	146.50	.010	18.42	.276	51.83	.108	85.25	.035	118.67	.013	152.08	.009
12.92	.641	46.33	.124	79.75	.041	113.17	.016	146.58	.010	18.50	.274	51.92	.108	85.33	.034	118.75	.013	152.17	.009
13.00	.628	46.42	.124	79.83	.041	113.25	.016	146.67	.010	18.58	.271	52.00	.108	85.42	.034	118.83	.013	152.25	.009
13.08	.615	46.50	.124	79.92	.041	113.33	.015	146.75	.010	18.67	.269	52.08	.108	85.50	.034	118.92	.013	152.33	.009
13.17	.603	46.58	.123	80.00	.041	113.42	.015	146.83	.010	18.75	.267	52.17	.107	85.58	.034	119.00	.013	152.42	.009
13.25	.591	46.67	.123	80.08	.040	113.50	.015	146.92	.009	18.83	.265	52.25	.107	85.67	.034	119.08	.013	152.50	.009
13.33	.580	46.75	.123	80.17	.040	113.58	.015	147.00	.009	18.92	.263	52.33	.107	85.75	.034	119.17	.013	152.58	.009
13.42	.569	46.83	.123	80.25	.040	113.67	.015	147.08	.009	19.00	.261	52.42	.106	85.83	.034	119.25	.013	152.67	.009
13.50	.558	46.92	.123	80.33	.040	113.75	.015	147.17	.009	19.08	.259	52.50	.106	85.92	.034	119.33	.013	152.75	.009
13.58	.548	47.00	.122	80.42	.040	113.83	.015	147.25	.009	19.17	.257	52.58	.106	86.00	.034	119.42	.013	152.83	.009
13.67	.538	47.08	.122	80.50	.040	113.92	.015	147.33	.009	19.25	.255	52.67	.105	86.08	.034	119.50	.013	152.92	.009
13.75	.529	47.17	.122	80.58	.040	114.00	.015	147.42	.009	19.33	.253	52.75	.105	86.17	.034	119.58	.013	153.00	.009
13.83	.519	47.25	.122	80.67	.040	114.08	.015	147.50	.009	19.42	.252	52.83	.105	86.25	.034	119.67	.013	153.08	.009
13.92	.510	47.33	.122	80.75	.040	114.17	.015	147.58	.009	19.50	.250	52.92	.105	86.33	.033	119.75	.013	153.17	.009
14.00	.502	47.42	.121	80.83	.039	114.25	.015	147.67	.009	19.58	.248	53.00	.104	86.42	.033	119.83	.013	153.25	.009
14.08	.494	47.50	.121	80.92	.039	114.33	.015	147.75	.009	19.67	.247	53.08	.104	86.50	.033	119.92	.013	153.33	.009
14.17	.486	47.58	.121	81.00	.039	114.42	.015	147.83	.009	19.75	.245	53.17	.104	86.58	.033	120.00	.013	153.42	.009
14.25	.478	47.67	.121	81.08	.039	114.50	.015	147.92	.009	19.83	.244	53.25	.103	86.67	.033	120.08	.013	153.50	.009
14.33	.470	47.75	.121	81.17	.039	114.58	.015	148.00	.009	19.92	.242	53.33	.103	86.75	.033	120.17	.013	153.58	.009
14.42	.463	47.83	.120	81.25	.039	114.67	.015	148.08	.009	20.00	.241	53.42	.103	86.83	.033	120.25	.013	153.67	.009
14.50	.456	47.92	.120	81.33	.039	114.75	.015	148.17	.009	20.08	.239	53.50	.103	86.92	.033	120.33	.013	153.75	.009
14.58	.449	48.00	.120	81.42	.039	114.83	.015	148.25	.009	20.17	.238	53.58	.102	87.00	.033	120.42	.013	153.83	.009
14.67	.443	48.08	.120	81.50	.039	114.92	.015	148.33	.009	20.25	.237	53.67	.102	87.08	.033	120.50	.013	153.92	.009
14.75	.436	48.17	.120	81.58	.039	115.00	.015	148.42	.009	20.33	.235	53.75	.102	87.17	.033	120.58	.013	154.00	.009
14.83	.430	48.25	.119	81.67	.038	115.08	.015	148.50	.009	20.42	.234	53.83	.101	87.25	.033	120.67	.013	154.08	.009
14.92	.424	48.33	.119	81.75	.038	115.17	.015	148.58	.009	20.50	.233	53.92	.101	87.33	.032	120.75	.013	154.17	.009
15.00	.419	48.42	.119	81.83	.038	115.25	.015	148.67	.009	20.58	.232	54.00	.101	87.42	.032	120.83	.013	154.25	.009

20.67	.230	54.08	.100	87.50	.032	120.92	.013	154.33	.009	26.25	.186	59.67	.082	93.08	.027	126.50	.011	159.92	.009
20.75	.229	54.17	.100	87.58	.032	121.00	.013	154.42	.009	26.33	.186	59.75	.082	93.17	.027	126.58	.011	160.00	.009
20.83	.228	54.25	.100	87.67	.032	121.08	.013	154.50	.009	26.42	.186	59.83	.082	93.25	.027	126.67	.011	160.08	.009
20.92	.227	54.33	.100	87.75	.032	121.17	.012	154.58	.009	26.50	.185	59.92	.082	93.33	.027	126.75	.011	160.17	.009
21.00	.226	54.42	.099	87.83	.032	121.25	.012	154.67	.009	26.58	.185	60.00	.082	93.42	.027	126.83	.011	160.25	.009
21.08	.225	54.50	.099	87.92	.032	121.33	.012	154.75	.009	26.67	.184	60.08	.081	93.50	.027	126.92	.011	160.33	.009
21.17	.224	54.58	.099	88.00	.032	121.42	.012	154.83	.009	26.75	.184	60.17	.081	93.58	.027	127.00	.011	160.42	.009
21.25	.223	54.67	.098	88.08	.032	121.50	.012	154.92	.009	26.83	.184	60.25	.081	93.67	.027	127.08	.011	160.50	.009
21.33	.222	54.75	.098	88.17	.032	121.58	.012	155.00	.009	26.92	.183	60.33	.081	93.75	.027	127.17	.011	160.58	.009
21.42	.221	54.83	.098	88.25	.032	121.67	.012	155.08	.009	27.00	.183	60.42	.080	93.83	.027	127.25	.011	160.67	.009
21.50	.220	54.92	.098	88.33	.032	121.75	.012	155.17	.009	27.08	.182	60.50	.080	93.92	.027	127.33	.011	160.75	.009
21.58	.219	55.00	.097	88.42	.031	121.83	.012	155.25	.009	27.17	.182	60.58	.080	94.00	.027	127.42	.011	160.83	.009
21.67	.218	55.08	.097	88.50	.031	121.92	.012	155.33	.009	27.25	.182	60.67	.080	94.08	.027	127.50	.011	160.92	.009
21.75	.217	55.17	.097	88.58	.031	122.00	.012	155.42	.009	27.33	.181	60.75	.079	94.17	.027	127.58	.010	161.00	.009
21.83	.217	55.25	.096	88.67	.031	122.08	.012	155.50	.009	27.42	.181	60.83	.079	94.25	.026	127.67	.010	161.08	.009
21.92	.216	55.33	.096	88.75	.031	122.17	.012	155.58	.009	27.50	.181	60.92	.079	94.33	.026	127.75	.010	161.17	.009
22.00	.215	55.42	.096	88.83	.031	122.25	.012	155.67	.009	27.58	.180	61.00	.079	94.42	.026	127.83	.010	161.25	.009
22.08	.214	55.50	.096	88.92	.031	122.33	.012	155.75	.009	27.67	.180	61.08	.078	94.50	.026	127.92	.010	161.33	.009
22.17	.213	55.58	.095	89.00	.031	122.42	.012	155.83	.009	27.75	.179	61.17	.078	94.58	.026	128.00	.010	161.42	.009
22.25	.212	55.67	.095	89.08	.031	122.50	.012	155.92	.009	27.83	.179	61.25	.078	94.67	.026	128.08	.010	161.50	.009
22.33	.212	55.75	.095	89.17	.031	122.58	.012	156.00	.009	27.92	.179	61.33	.078	94.75	.026	128.17	.010	161.58	.009
22.42	.211	55.83	.094	89.25	.031	122.67	.012	156.08	.009	28.00	.178	61.42	.077	94.83	.026	128.25	.010	161.67	.009
22.50	.210	55.92	.094	89.33	.031	122.75	.012	156.17	.009	28.08	.178	61.50	.077	94.92	.026	128.33	.010	161.75	.009
22.58	.210	56.00	.094	89.42	.031	122.83	.012	156.25	.009	28.17	.178	61.58	.077	95.00	.026	128.42	.010	161.83	.009
22.67	.209	56.08	.094	89.50	.030	122.92	.012	156.33	.009	28.25	.177	61.67	.077	95.08	.026	128.50	.010	161.92	.009
22.75	.208	56.17	.093	89.58	.030	123.00	.012	156.42	.009	28.33	.177	61.75	.076	95.17	.026	128.58	.010	162.00	.009
22.83	.207	56.25	.093	89.67	.030	123.08	.012	156.50	.009	28.42	.177	61.83	.076	95.25	.026	128.67	.010	162.08	.009
22.92	.207	56.33	.093	89.75	.030	123.17	.012	156.58	.009	28.50	.176	61.92	.076	95.33	.026	128.75	.010	162.17	.009
23.00	.206	56.42	.093	89.83	.030	123.25	.012	156.67	.009	28.58	.176	62.00	.076	95.42	.026	128.83	.010	162.25	.009
23.08	.205	56.50	.092	89.92	.030	123.33	.012	156.75	.009	28.67	.176	62.08	.075	95.50	.026	128.92	.010	162.33	.009
23.17	.205	56.58	.092	90.00	.030	123.42	.012	156.83	.009	28.75	.175	62.17	.075	95.58	.025	129.00	.010	162.42	.009
23.25	.204	56.67	.092	90.08	.030	123.50	.012	156.92	.009	28.83	.175	62.25	.075	95.67	.025	129.08	.010	162.50	.009
23.33	.204	56.75	.091	90.17	.030	123.58	.012	157.00	.009	28.92	.175	62.33	.075	95.75	.025	129.17	.010	162.58	.009
23.42	.203	56.83	.091	90.25	.030	123.67	.012	157.08	.009	29.00	.174	62.42	.075	95.83	.025	129.25	.010	162.67	.009
23.50	.202	56.92	.091	90.33	.030	123.75	.012	157.17	.009	29.08	.174	62.50	.074	95.92	.025	129.33	.010	162.75	.009
23.58	.202	57.00	.091	90.42	.030	123.83	.012	157.25	.009	29.17	.174	62.58	.074	96.00	.025	129.42	.010	162.83	.009
23.67	.201	57.08	.090	90.50	.030	123.92	.012	157.33	.009	29.25	.173	62.67	.074	96.08	.025	129.50	.010	162.92	.009
23.75	.201	57.17	.090	90.58	.029	124.00	.012	157.42	.009	29.33	.173	62.75	.074	96.17	.025	129.58	.010	163.00	.009
23.83	.200	57.25	.090	90.67	.029	124.08	.012	157.50	.009	29.42	.173	62.83	.073	96.25	.025	129.67	.010	163.08	.009
23.92	.200	57.33	.090	90.75	.029	124.17	.012	157.58	.009	29.50	.172	62.92	.073	96.33	.025	129.75	.010	163.17	.009
24.00	.199	57.42	.089	90.83	.029	124.25	.011	157.67	.009	29.58	.172	63.00	.073	96.42	.025	129.83	.010	163.25	.009
24.08	.198	57.50	.089	90.92	.029	124.33	.011	157.75	.009	29.67	.172	63.08	.073	96.50	.025	129.92	.010	163.33	.009
24.17	.198	57.58	.089	91.00	.029	124.42	.011	157.83	.009	29.75	.171	63.17	.072	96.58	.025	130.00	.010	163.42	.009
24.25	.197	57.67	.089	91.08	.029	124.50	.011	157.92	.009	29.83	.171	63.25	.072	96.67	.025	130.08	.010	163.50	.009
24.33	.197	57.75	.088	91.17	.029	124.58	.011	158.00	.009	29.92	.171	63.33	.072	96.75	.025	130.17	.010	163.58	.009
24.42	.196	57.83	.088	91.25	.029	124.67	.011	158.08	.009	30.00	.170	63.42	.072	96.83	.025	130.25	.010	163.67	.009
24.50	.196	57.92	.088	91.33	.029	124.75	.011	158.17	.009	30.08	.170	63.50	.072	96.92	.025	130.33	.010	163.75	.009
24.58	.195	58.00	.088	91.42	.029	124.83	.011	158.25	.009	30.17	.170	63.58	.071	97.00	.024	130.42	.010	163.83	.009
24.67	.195	58.08	.087	91.50	.029	124.92	.011	158.33	.009	30.25	.170	63.67	.071	97.08	.024	130.50	.010	163.92	.009
24.75	.194	58.17	.087	91.58	.029	125.00	.011	158.42	.009	30.33	.169	63.75	.071	97.17	.024	130.58	.010	164.00	.008
24.83	.194	58.25	.087	91.67	.029	125.08	.011	158.50	.009	30.42	.169	63.83	.071	97.25	.024	130.67	.010	164.08	.008
24.92	.193	58.33	.086	91.75	.028	125.17	.011	158.58	.009	30.50	.169	63.92	.070	97.33	.024	130.75	.010	164.17	.008
25.00	.193	58.42	.086	91.83	.028	125.25	.011	158.67	.009	30.58	.168	64.00	.070	97.42	.024	130.83	.010	164.25	.008
25.08	.193	58.50	.086	91.92	.028	125.33	.011	158.75	.009	30.67	.168	64.08	.070	97.50	.024	130.92	.010	164.33	.008
25.17	.192	58.58	.086	92.00	.028	125.42	.011	158.83	.009	30.75	.168	64.17	.070	97.58	.024	131.00	.010	164.42	.008
25.25	.192	58.67	.085	92.08	.028	125.50	.011	158.92	.009	30.83	.167	64.25	.070	97.67	.024	131.08	.010	164.50	.008
25.33	.191	58.75	.085	92.17	.028	125.58	.011	159.00	.009	30.92	.167	64.33	.069	97.75	.024	131.17	.010	164.58	.008
25.42	.191	58.83	.085	92.25	.028	125.67	.011	159.08	.009	31.00	.167	64.42	.069	97.83	.024	131.25	.010	164.67	.008
25.50	.190	58.92	.085	92.33	.028	125.75	.011	159.17	.009	31.08	.167	64.50	.069	97.92	.024	131.33	.010	164.75	.008
25.58	.190	59.00	.084	92.42	.028	125.83	.011	159.25	.009	31.17	.166	64.58	.069	98.00	.024	131.42	.010	164.83	.008
25.67	.189	59.08	.084	92.50	.028	125.92	.011	159.33	.009	31.25	.166	64.67	.069	98.08	.024	131.50	.010	164.92	.008
25.75	.189	59.17	.084	92.58	.028	126.00	.011	159.42	.009	31.33	.166	64.75	.068	98.17	.024	131.58	.010	165.00	.008
25.83	.189	59.25	.084	92.67	.028	126.08	.011	159.50	.009	31.42	.165	64.83	.068	98.25	.024	131.67	.010	165.08	.008
25.92	.188	59.33	.083	92.75	.028	126.17	.011	159.58	.009	31.50	.165	64.92	.068	98.33	.024	131.75	.010	165.17	.008
26.00	.188	59.42	.083	92.83	.028	126.25	.011	159.67	.009	31.58	.165	65.00	.068	98.42	.024	131.83	.010	165.25	.008
26.08	.187	59.50	.083	92.92	.028	126.33	.011	159.75	.009	31.67	.165	65.08	.067	98.50	.023	131.92	.010	165.33	.008
26.17	.187	59.58	.083	93.00	.027	126.42	.011	159.83	.009	31.75	.164	65.17	.067	98.58	.023	132.00	.010	165.42	.008

31.83	.164	65.25	.067	98.67	.023	132.08	.010	165.50	.008
31.92	.164	65.33	.067	98.75	.023	132.17	.010	165.58	.008
32.00	.163	65.42	.067	98.83	.023	132.25	.010	165.67	.008
32.08	.163	65.50	.066	98.92	.023	132.33	.010	165.75	.008
32.17	.163	65.58	.066	99.00	.023	132.42	.010	165.83	.008
32.25	.163	65.67	.066	99.08	.023	132.50	.010	165.92	.008
32.33	.162	65.75	.066	99.17	.023	132.58	.010	166.00	.008
32.42	.162	65.83	.066	99.25	.023	132.67	.010	166.08	.008
32.50	.162	65.92	.065	99.33	.023	132.75	.010	166.17	.008
32.58	.162	66.00	.065	99.42	.023	132.83	.010	166.25	.008
32.67	.161	66.08	.065	99.50	.023	132.92	.010	166.33	.008
32.75	.161	66.17	.065	99.58	.023	133.00	.010	166.42	.008
32.83	.161	66.25	.065	99.67	.023	133.08	.010	166.50	.008
32.92	.160	66.33	.064	99.75	.023	133.17	.010	166.58	.008
33.00	.160	66.42	.064	99.83	.023	133.25	.010		
33.08	.160	66.50	.064	99.92	.023	133.33	.010		
33.17	.160	66.58	.064	100.00	.022	133.42	.010		
33.25	.159	66.67	.064	100.08	.022	133.50	.010		
33.33	.159	66.75	.063	100.17	.022	133.58	.010		

READ STORM | Filename: G:\Projects\2008\
08104 - Vaughan Corporate Centre - Master Ser
\Design\SWM\December 2011 - TS\VO2 Input Hydr
Ptotal= 36.00 mm | Comments: 2yr/6hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	2.00	12.24	3.75	5.04	5.50	.72
.50	.72	2.25	12.24	4.00	2.88	5.75	.72
.75	.72	2.50	33.12	4.25	2.88	6.00	.72
1.00	.72	2.75	33.12	4.50	1.44	6.25	.72
1.25	.72	3.00	9.36	4.75	1.44		
1.50	4.32	3.25	9.36	5.00	.72		
1.75	4.32	3.50	5.04	5.25	.72		

ADD HYD (0218)

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0215):	124.65	5.449	3.00	30.29
+ ID2= 2 (0210):	576.91	8.050	3.33	26.58
ID = 3 (0218):	701.56	13.019	3.17	27.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0222)

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0236):	31.13	1.428	2.75	25.80
+ ID2= 2 (0218):	701.56	13.019	3.17	27.24
ID = 3 (0222):	732.69	13.721	3.17	27.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0238)

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0237):	17.38	.839	2.75	26.10
+ ID2= 2 (0222):	732.69	13.721	3.17	27.18
ID = 3 (0238):	750.07	14.093	3.17	27.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0227)

1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0245):	17.24	1.349	2.75	31.33
+ ID2= 2 (0238):	750.07	14.093	3.17	27.15
ID = 3 (0227):	767.31	14.589	3.17	27.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0250)
IN= 2---> OUT= 1
DT= 5.0 min

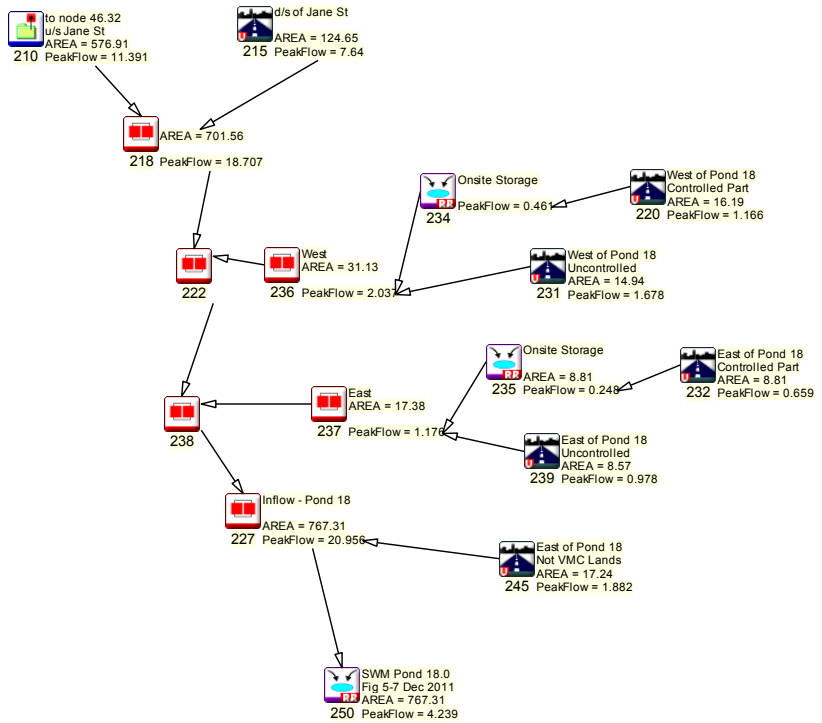
OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	17.9700	18.1470
1.8900	1.0080	19.4300	18.8300
2.2330	1.9630	23.4600	19.3240
2.7950	6.4020	31.0300	19.8490
3.2760	9.1830	38.3600	20.2920
3.4270	10.6610	40.0000	20.3980
3.6700	12.2670	42.5000	21.3030
5.6440	13.9060	45.0000	22.1830
9.7990	15.5860	47.5000	23.5100
15.2400	17.3710	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0227)	767.31	14.59	3.17	27.25
OUTFLOW: ID= 1 (0250)	767.31	3.21	6.83	27.24

PEAK FLOW REDUCTION [Qout/Qin](%)= 22.01
TIME SHIFT OF PEAK FLOW (min)=220.00
MAXIMUM STORAGE USED (ha.m.)= 8.8109

FINISH

North East POND (5yr 6hr AES)



Summary Hydrograph Data

Run Number: 1

NHYD	DT [hr]	AREA [ha]	Peak flow [m³/s]	TP [hr]	Runoff Vol. [mm]	DWF [m³/s]
250	0.083	767.310	4.239	6.750	37.784	0.000

```
================================================================================
==============

       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM, Version 2.0
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O   Licensed To: TMIG
        OOO     T      T    H   H    Y    M   M   OOO                 vo2-0145

Developed and Distributed by Greenland International Consulting Inc.
Copyright 1996, 2001 Schaeffer & Associates Ltd.
All rights reserved.


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


  Input   filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat
  Output  filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final
submission\05PROP~1\5y6 w Dev VMC, Prop Pond 18 With %IMP Reduction.o
  Summary filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final
submission\05PROP~1\5y6 w Dev VMC, Prop Pond 18 With %IMP Reduction.s


DATE: 4/10/2012                           TIME: 12:19:47 PM

USER:


COMMENTS: _____________________________________________________

--------------------------------------------------------------------------------
---------------
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\December 2011 - TS\VO2 Input Hydr
| Ptotal= 47.81 mm |    Comments: 5yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   16.25 |  3.75    6.69 |  5.50     .96
                 .50     .96 |  2.25   16.25 |  4.00    3.82 |  5.75     .96
                 .75     .96 |  2.50   43.98 |  4.25    3.82 |  6.00     .96
                1.00     .96 |  2.75   43.98 |  4.50    1.91 |  6.25     .96
                1.25     .96 |  3.00   12.43 |  4.75    1.91 |
                1.50    5.74 |  3.25   12.43 |  5.00     .96 |
                1.75    5.74 |  3.50    6.69 |  5.25     .96 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0245) |   Area     (ha)=  17.24
|ID= 1 DT= 5.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
```

```
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.65          2.59
     Dep. Storage     (mm)=       1.00          4.30
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     339.00         40.00
     Mannings n           =       .013          .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .083     .00 | 1.667    5.74 | 3.250   12.43 |  4.83     .96
               .167     .00 | 1.750    5.74 | 3.333    6.69 |  4.92     .96
               .250     .00 | 1.833   16.25 | 3.417    6.69 |  5.00     .96
               .333     .96 | 1.917   16.25 | 3.500    6.69 |  5.08     .96
               .417     .96 | 2.000   16.25 | 3.583    6.69 |  5.17     .96
               .500     .96 | 2.083   16.25 | 3.667    6.69 |  5.25     .96
               .583     .96 | 2.167   16.25 | 3.750    6.69 |  5.33     .96
               .667     .96 | 2.250   16.25 | 3.833    3.82 |  5.42     .96
               .750     .96 | 2.333   43.98 | 3.917    3.82 |  5.50     .96
               .833     .96 | 2.417   43.98 | 4.000    3.82 |  5.58     .96
               .917     .96 | 2.500   43.98 | 4.083    3.82 |  5.67     .96
              1.000     .96 | 2.583   43.98 | 4.167    3.82 |  5.75     .96
              1.083     .96 | 2.667   43.98 | 4.250    3.82 |  5.83     .96
              1.167     .96 | 2.750   43.98 | 4.333    1.91 |  5.92     .96
              1.250     .96 | 2.833   12.43 | 4.417    1.91 |  6.00     .96
              1.333    5.74 | 2.917   12.43 | 4.500    1.91 |  6.08     .96
              1.417    5.74 | 3.000   12.43 | 4.583    1.91 |  6.17     .96
              1.500    5.74 | 3.083   12.43 | 4.667    1.91 |  6.25     .96
              1.583    5.74 | 3.167   12.43 | 4.750    1.91 |

     Max.Eff.Inten.(mm/hr)=      43.98         37.78
               over (min)         5.00         15.00
     Storage Coeff.  (min)=       7.38 (ii)    12.28 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .17           .09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.77           .12          1.882 (iii)
     TIME TO PEAK    (hrs)=       2.75          2.83           2.75
     RUNOFF VOLUME    (mm)=      46.81         17.69          42.44
     TOTAL RAINFALL   (mm)=      47.81         47.81          47.81
     RUNOFF COEFFICIENT   =        .98           .37            .89


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0215) |   Area     (ha)= 124.65
|ID= 1 DT= 5.0 min |   Total Imp(%)=  83.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     103.46         21.19
     Dep. Storage     (mm)=        .50          4.70
     Average Slope     (%)=        .30           .40
     Length            (m)=    1800.00        200.00
     Mannings n           =       .016          .250

     Max.Eff.Inten.(mm/hr)=      43.98         15.00
               over (min)        30.00        100.00
     Storage Coeff.  (min)=      32.67 (ii)    96.84 (ii)
     Unit Hyd. Tpeak (min)=      30.00        100.00
     Unit Hyd. peak  (cms)=        .04           .01
                                                      *TOTALS*
     PEAK FLOW       (cms)=       7.54           .37          7.640 (iii)
     TIME TO PEAK    (hrs)=       3.00          4.33           3.00
     RUNOFF VOLUME    (mm)=      47.31         17.78          41.11
     TOTAL RAINFALL   (mm)=      47.81         47.81          47.81
     RUNOFF COEFFICIENT   =        .99           .37            .86


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  76.0    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.

--------------------------------------------------------------------------------
--------------------
| READ HYD  (0210) |   AREA       (ha)= 576.91
| DT= 5.0 min      |   TPEAK     (hrs)=   3.25
--------------------   VOLUME     (mm)=  36.96
  Filename: G:\Projects\2008\08104 - Vaughan Corporate Centre - Master Servicing
Strategy\Design\SWM\December 20
  Comments: Outflow at 46.32

  TIME    FLOW |  TIME    FLOW |  TIME    FLOW |  TIME    FLOW |  TIME    FLOW
   hrs     cms |   hrs     cms |   hrs     cms |   hrs     cms |   hrs     cms
   .00    .000 | 33.42    .197 | 66.83    .110 |100.25    .041 |133.67    .016
   .08    .000 | 33.50    .197 | 66.92    .110 |100.33    .040 |133.75    .016
   .17    .000 | 33.58    .196 | 67.00    .110 |100.42    .040 |133.83    .016
   .25    .000 | 33.67    .196 | 67.08    .110 |100.50    .040 |133.92    .016
   .33    .000 | 33.75    .196 | 67.17    .110 |100.58    .040 |134.00    .016
   .42    .000 | 33.83    .196 | 67.25    .109 |100.67    .040 |134.08    .016
   .50    .000 | 33.92    .195 | 67.33    .109 |100.75    .040 |134.17    .016
   .58    .000 | 34.00    .195 | 67.42    .109 |100.83    .040 |134.25    .016
   .67    .000 | 34.08    .195 | 67.50    .109 |100.92    .040 |134.33    .016
   .75    .000 | 34.17    .195 | 67.58    .109 |101.00    .040 |134.42    .016
   .83    .000 | 34.25    .194 | 67.67    .109 |101.08    .040 |134.50    .016
   .92    .000 | 34.33    .194 | 67.75    .108 |101.17    .040 |134.58    .016
  1.00    .000 | 34.42    .194 | 67.83    .108 |101.25    .039 |134.67    .016
  1.08    .000 | 34.50    .194 | 67.92    .108 |101.33    .039 |134.75    .016
  1.17    .000 | 34.58    .193 | 68.00    .108 |101.42    .039 |134.83    .016
  1.25    .000 | 34.67    .193 | 68.08    .108 |101.50    .039 |134.92    .016
  1.33    .000 | 34.75    .193 | 68.17    .107 |101.58    .039 |135.00    .016
  1.42    .000 | 34.83    .193 | 68.25    .107 |101.67    .039 |135.08    .016
  1.50    .000 | 34.92    .192 | 68.33    .107 |101.75    .039 |135.17    .016
  1.58    .001 | 35.00    .192 | 68.42    .107 |101.83    .039 |135.25    .016
  1.67    .002 | 35.08    .192 | 68.50    .107 |101.92    .039 |135.33    .016
  1.75    .003 | 35.17    .192 | 68.58    .107 |102.00    .039 |135.42    .016
  1.83    .005 | 35.25    .191 | 68.67    .106 |102.08    .039 |135.50    .016
  1.92    .007 | 35.33    .191 | 68.75    .106 |102.17    .038 |135.58    .016
  2.00    .095 | 35.42    .191 | 68.83    .106 |102.25    .038 |135.67    .016
  2.08    .587 | 35.50    .191 | 68.92    .106 |102.33    .038 |135.75    .015
  2.17   1.110 | 35.58    .190 | 69.00    .106 |102.42    .038 |135.83    .015
  2.25   1.648 | 35.67    .190 | 69.08    .105 |102.50    .038 |135.92    .015
  2.33   2.229 | 35.75    .190 | 69.17    .105 |102.58    .038 |136.00    .015
  2.42   2.937 | 35.83    .190 | 69.25    .105 |102.67    .038 |136.08    .015
  2.50   3.804 | 35.92    .189 | 69.33    .105 |102.75    .038 |136.17    .015
  2.58   4.802 | 36.00    .189 | 69.42    .105 |102.83    .038 |136.25    .015
  2.67   5.896 | 36.08    .189 | 69.50    .105 |102.92    .038 |136.33    .015
  2.75   7.100 | 36.17    .189 | 69.58    .104 |103.00    .038 |136.42    .015
  2.83   8.593 | 36.25    .188 | 69.67    .104 |103.08    .037 |136.50    .015
  2.92   9.794 | 36.33    .188 | 69.75    .104 |103.17    .037 |136.58    .015
  3.00  10.635 | 36.42    .188 | 69.83    .104 |103.25    .037 |136.67    .015
  3.08  11.143 | 36.50    .188 | 69.92    .104 |103.33    .037 |136.75    .015
```

3.17	11.370	36.58	.188	70.00	.104	103.42	.037	136.83	.015
3.25	11.391	36.67	.187	70.08	.103	103.50	.037	136.92	.015
3.33	11.266	36.75	.187	70.17	.103	103.58	.037	137.00	.015
3.42	11.028	36.83	.187	70.25	.103	103.67	.037	137.08	.015
3.50	10.711	36.92	.187	70.33	.103	103.75	.037	137.17	.015
3.58	10.351	37.00	.186	70.42	.103	103.83	.037	137.25	.015
3.67	9.973	37.08	.186	70.50	.103	103.92	.037	137.33	.015
3.75	9.599	37.17	.186	70.58	.102	104.00	.037	137.42	.015
3.83	9.237	37.25	.186	70.67	.102	104.08	.036	137.50	.015
3.92	8.884	37.33	.185	70.75	.102	104.17	.036	137.58	.015
4.00	8.538	37.42	.185	70.83	.102	104.25	.036	137.67	.015
4.08	8.205	37.50	.185	70.92	.102	104.33	.036	137.75	.015
4.17	7.887	37.58	.185	71.00	.102	104.42	.036	137.83	.015
4.25	7.590	37.67	.185	71.08	.101	104.50	.036	137.92	.015
4.33	7.313	37.75	.184	71.17	.101	104.58	.036	138.00	.015
4.42	7.048	37.83	.184	71.25	.101	104.67	.036	138.08	.015
4.50	6.817	37.92	.184	71.33	.101	104.75	.036	138.17	.015
4.58	6.631	38.00	.184	71.42	.101	104.83	.036	138.25	.014
4.67	6.446	38.08	.183	71.50	.101	104.92	.036	138.33	.014
4.75	6.263	38.17	.183	71.58	.100	105.00	.036	138.42	.014
4.83	6.085	38.25	.183	71.67	.100	105.08	.035	138.50	.014
4.92	5.910	38.33	.183	71.75	.100	105.17	.035	138.58	.014
5.00	5.738	38.42	.183	71.83	.100	105.25	.035	138.67	.014
5.08	5.571	38.50	.182	71.92	.100	105.33	.035	138.75	.014
5.17	5.413	38.58	.182	72.00	.100	105.42	.035	138.83	.014
5.25	5.264	38.67	.182	72.08	.099	105.50	.035	138.92	.014
5.33	5.124	38.75	.182	72.17	.099	105.58	.035	139.00	.014
5.42	4.994	38.83	.181	72.25	.099	105.67	.035	139.08	.014
5.50	4.873	38.92	.181	72.33	.099	105.75	.035	139.17	.014
5.58	4.762	39.00	.181	72.42	.099	105.83	.035	139.25	.014
5.67	4.660	39.08	.181	72.50	.098	105.92	.035	139.33	.014
5.75	4.566	39.17	.181	72.58	.098	106.00	.035	139.42	.014
5.83	4.479	39.25	.180	72.67	.098	106.08	.034	139.50	.014
5.92	4.399	39.33	.180	72.75	.098	106.17	.034	139.58	.014
6.00	4.326	39.42	.180	72.83	.098	106.25	.034	139.67	.014
6.08	4.257	39.50	.180	72.92	.097	106.33	.034	139.75	.014
6.17	4.194	39.58	.179	73.00	.097	106.42	.034	139.83	.014
6.25	4.135	39.67	.179	73.08	.097	106.50	.034	139.92	.014
6.33	4.079	39.75	.179	73.17	.097	106.58	.034	140.00	.014
6.42	4.021	39.83	.179	73.25	.097	106.67	.034	140.08	.014
6.50	3.960	39.92	.179	73.33	.096	106.75	.034	140.17	.014
6.58	3.895	40.00	.178	73.42	.096	106.83	.034	140.25	.014
6.67	3.828	40.08	.178	73.50	.096	106.92	.034	140.33	.014
6.75	3.760	40.17	.178	73.58	.096	107.00	.034	140.42	.014
6.83	3.692	40.25	.178	73.67	.096	107.08	.034	140.50	.014
6.92	3.625	40.33	.178	73.75	.095	107.17	.033	140.58	.014
7.00	3.559	40.42	.177	73.83	.095	107.25	.033	140.67	.014
7.08	3.496	40.50	.177	73.92	.095	107.33	.033	140.75	.014
7.17	3.436	40.58	.177	74.00	.095	107.42	.033	140.83	.014
7.25	3.377	40.67	.177	74.08	.094	107.50	.033	140.92	.014
7.33	3.322	40.75	.176	74.17	.094	107.58	.033	141.00	.013
7.42	3.268	40.83	.176	74.25	.094	107.67	.033	141.08	.013
7.50	3.218	40.92	.176	74.33	.094	107.75	.033	141.17	.013
7.58	3.169	41.00	.176	74.42	.093	107.83	.033	141.25	.013
7.67	3.122	41.08	.176	74.50	.093	107.92	.033	141.33	.013
7.75	3.077	41.17	.175	74.58	.093	108.00	.033	141.42	.013
7.83	3.033	41.25	.175	74.67	.093	108.08	.033	141.50	.013
7.92	2.990	41.33	.175	74.75	.092	108.17	.033	141.58	.013
8.00	2.949	41.42	.175	74.83	.092	108.25	.033	141.67	.013
8.08	2.908	41.50	.175	74.92	.092	108.33	.032	141.75	.013
8.17	2.869	41.58	.174	75.00	.092	108.42	.032	141.83	.013
8.25	2.830	41.67	.174	75.08	.092	108.50	.032	141.92	.013
8.33	2.792	41.75	.174	75.17	.091	108.58	.032	142.00	.013
8.42	2.755	41.83	.174	75.25	.091	108.67	.032	142.08	.013
8.50	2.718	41.92	.173	75.33	.091	108.75	.032	142.17	.013
8.58	2.681	42.00	.173	75.42	.091	108.83	.032	142.25	.013
8.67	2.643	42.08	.173	75.50	.090	108.92	.032	142.33	.013
8.75	2.604	42.17	.173	75.58	.090	109.00	.032	142.42	.013
8.83	2.565	42.25	.173	75.67	.090	109.08	.032	142.50	.013
8.92	2.525	42.33	.172	75.75	.090	109.17	.032	142.58	.013
9.00	2.485	42.42	.172	75.83	.089	109.25	.032	142.67	.013
9.08	2.444	42.50	.172	75.92	.089	109.33	.032	142.75	.013
9.17	2.403	42.58	.172	76.00	.089	109.42	.031	142.83	.013
9.25	2.362	42.67	.172	76.08	.089	109.50	.031	142.92	.013
9.33	2.321	42.75	.171	76.17	.088	109.58	.031	143.00	.013
9.42	2.280	42.83	.171	76.25	.088	109.67	.031	143.08	.013
9.50	2.239	42.92	.171	76.33	.088	109.75	.031	143.17	.013
9.58	2.198	43.00	.171	76.42	.088	109.83	.031	143.25	.013
9.67	2.159	43.08	.171	76.50	.087	109.92	.031	143.33	.013
9.75	2.121	43.17	.170	76.58	.087	110.00	.031	143.42	.013
9.83	2.086	43.25	.170	76.67	.087	110.08	.031	143.50	.013
9.92	2.051	43.33	.170	76.75	.087	110.17	.031	143.58	.013
10.00	2.019	43.42	.170	76.83	.086	110.25	.031	143.67	.013
10.08	1.987	43.50	.170	76.92	.086	110.33	.031	143.75	.013
10.17	1.956	43.58	.169	77.00	.086	110.42	.031	143.83	.012
10.25	1.927	43.67	.169	77.08	.086	110.50	.031	143.92	.012
10.33	1.898	43.75	.169	77.17	.085	110.58	.030	144.00	.012
10.42	1.870	43.83	.169	77.25	.085	110.67	.030	144.08	.012
10.50	1.843	43.92	.169	77.33	.085	110.75	.030	144.17	.012
10.58	1.817	44.00	.168	77.42	.085	110.83	.030	144.25	.012
10.67	1.791	44.08	.168	77.50	.085	110.92	.030	144.33	.012
10.75	1.766	44.17	.168	77.58	.084	111.00	.030	144.42	.012
10.83	1.741	44.25	.168	77.67	.084	111.08	.030	144.50	.012
10.92	1.717	44.33	.168	77.75	.084	111.17	.030	144.58	.012
11.00	1.692	44.42	.167	77.83	.084	111.25	.030	144.67	.012
11.08	1.667	44.50	.167	77.92	.083	111.33	.030	144.75	.012
11.17	1.643	44.58	.167	78.00	.083	111.42	.030	144.83	.012
11.25	1.618	44.67	.167	78.08	.083	111.50	.030	144.92	.012
11.33	1.593	44.75	.166	78.17	.083	111.58	.030	145.00	.012
11.42	1.568	44.83	.166	78.25	.082	111.67	.030	145.08	.012
11.50	1.543	44.92	.166	78.33	.082	111.75	.030	145.17	.012
11.58	1.518	45.00	.166	78.42	.082	111.83	.029	145.25	.012
11.67	1.494	45.08	.166	78.50	.082	111.92	.029	145.33	.012
11.75	1.470	45.17	.165	78.58	.082	112.00	.029	145.42	.012
11.83	1.446	45.25	.165	78.67	.081	112.08	.029	145.50	.012
11.92	1.423	45.33	.165	78.75	.081	112.17	.029	145.58	.012
12.00	1.399	45.42	.165	78.83	.081	112.25	.029	145.67	.012
12.08	1.377	45.50	.165	78.92	.081	112.33	.029	145.75	.012
12.17	1.354	45.58	.164	79.00	.080	112.42	.029	145.83	.012
12.25	1.331	45.67	.164	79.08	.080	112.50	.029	145.92	.012
12.33	1.307	45.75	.164	79.17	.080	112.58	.029	146.00	.012
12.42	1.282	45.83	.164	79.25	.080	112.67	.029	146.08	.012
12.50	1.255	45.92	.164	79.33	.079	112.75	.029	146.17	.012
12.58	1.227	46.00	.163	79.42	.079	112.83	.029	146.25	.012
12.67	1.199	46.08	.163	79.50	.079	112.92	.029	146.33	.012
12.75	1.171	46.17	.163	79.58	.079	113.00	.029	146.42	.012
12.83	1.143	46.25	.163	79.67	.079	113.08	.028	146.50	.012
12.92	1.115	46.33	.163	79.75	.078	113.17	.028	146.58	.012
13.00	1.088	46.42	.162	79.83	.078	113.25	.028	146.67	.012
13.08	1.061	46.50	.162	79.92	.078	113.33	.028	146.75	.012
13.17	1.034	46.58	.162	80.00	.078	113.42	.028	146.83	.012
13.25	1.008	46.67	.162	80.08	.078	113.50	.028	146.92	.012
13.33	.983	46.75	.162	80.17	.077	113.58	.028	147.00	.011
13.42	.958	46.83	.161	80.25	.077	113.67	.028	147.08	.011
13.50	.934	46.92	.161	80.33	.077	113.75	.028	147.17	.011
13.58	.911	47.00	.161	80.42	.077	113.83	.028	147.25	.011
13.67	.888	47.08	.161	80.50	.076	113.92	.028	147.33	.011
13.75	.867	47.17	.161	80.58	.076	114.00	.028	147.42	.011
13.83	.845	47.25	.160	80.67	.076	114.08	.028	147.50	.011
13.92	.825	47.33	.160	80.75	.076	114.17	.028	147.58	.011
14.00	.805	47.42	.160	80.83	.076	114.25	.028	147.67	.011
14.08	.787	47.50	.160	80.92	.075	114.33	.028	147.75	.011
14.17	.768	47.58	.160	81.00	.075	114.42	.027	147.83	.011
14.25	.751	47.67	.159	81.08	.075	114.50	.027	147.92	.011

14.33	.734	47.75	.159	81.17	.075	114.58	.027	148.00	.011	19.92	.325	53.33	.144	86.75	.062	120.17	.024	153.58	.010
14.42	.717	47.83	.159	81.25	.075	114.67	.027	148.08	.011	20.00	.324	53.42	.144	86.83	.062	120.25	.023	153.67	.010
14.50	.702	47.92	.159	81.33	.074	114.75	.027	148.17	.011	20.08	.322	53.50	.144	86.92	.062	120.33	.023	153.75	.010
14.58	.687	48.00	.159	81.42	.074	114.83	.027	148.25	.011	20.17	.320	53.58	.144	87.00	.062	120.42	.023	153.83	.010
14.67	.672	48.08	.158	81.50	.074	114.92	.027	148.33	.011	20.25	.319	53.67	.143	87.08	.061	120.50	.023	153.92	.010
14.75	.658	48.17	.158	81.58	.074	115.00	.027	148.42	.011	20.33	.317	53.75	.143	87.17	.061	120.58	.023	154.00	.010
14.83	.645	48.25	.158	81.67	.073	115.08	.027	148.50	.011	20.42	.315	53.83	.143	87.25	.061	120.67	.023	154.08	.010
14.92	.632	48.33	.158	81.75	.073	115.17	.027	148.58	.011	20.50	.314	53.92	.143	87.33	.061	120.75	.023	154.17	.010
15.00	.619	48.42	.157	81.83	.073	115.25	.027	148.67	.011	20.58	.312	54.00	.142	87.42	.061	120.83	.023	154.25	.010
15.08	.607	48.50	.157	81.92	.073	115.33	.027	148.75	.011	20.67	.311	54.08	.142	87.50	.061	120.92	.023	154.33	.010
15.17	.596	48.58	.157	82.00	.073	115.42	.027	148.83	.011	20.75	.309	54.17	.142	87.58	.060	121.00	.023	154.42	.010
15.25	.584	48.67	.157	82.08	.072	115.50	.027	148.92	.011	20.83	.308	54.25	.142	87.67	.060	121.08	.023	154.50	.010
15.33	.574	48.75	.157	82.17	.072	115.58	.027	149.00	.011	20.92	.306	54.33	.142	87.75	.060	121.17	.023	154.58	.010
15.42	.563	48.83	.156	82.25	.072	115.67	.027	149.08	.011	21.00	.305	54.42	.141	87.83	.060	121.25	.023	154.67	.010
15.50	.554	48.92	.156	82.33	.072	115.75	.026	149.17	.011	21.08	.303	54.50	.141	87.92	.060	121.33	.023	154.75	.010
15.58	.544	49.00	.156	82.42	.072	115.83	.026	149.25	.011	21.17	.301	54.58	.141	88.00	.060	121.42	.023	154.83	.010
15.67	.535	49.08	.156	82.50	.071	115.92	.026	149.33	.011	21.25	.300	54.67	.141	88.08	.059	121.50	.023	154.92	.010
15.75	.526	49.17	.156	82.58	.071	116.00	.026	149.42	.011	21.33	.298	54.75	.140	88.17	.059	121.58	.023	155.00	.010
15.83	.517	49.25	.155	82.67	.071	116.08	.026	149.50	.011	21.42	.297	54.83	.140	88.25	.059	121.67	.023	155.08	.010
15.92	.509	49.33	.155	82.75	.071	116.17	.026	149.58	.011	21.50	.295	54.92	.140	88.33	.059	121.75	.023	155.17	.010
16.00	.501	49.42	.155	82.83	.071	116.25	.026	149.67	.011	21.58	.293	55.00	.140	88.42	.059	121.83	.022	155.25	.010
16.08	.494	49.50	.155	82.92	.070	116.33	.026	149.75	.011	21.67	.291	55.08	.140	88.50	.059	121.92	.022	155.33	.010
16.17	.486	49.58	.154	83.00	.070	116.42	.026	149.83	.011	21.75	.290	55.17	.139	88.58	.058	122.00	.022	155.42	.010
16.25	.479	49.67	.154	83.08	.070	116.50	.026	149.92	.011	21.83	.288	55.25	.139	88.67	.058	122.08	.022	155.50	.010
16.33	.472	49.75	.154	83.17	.070	116.58	.026	150.00	.011	21.92	.286	55.33	.139	88.75	.058	122.17	.022	155.58	.010
16.42	.466	49.83	.154	83.25	.070	116.67	.026	150.08	.011	22.00	.284	55.42	.139	88.83	.058	122.25	.022	155.67	.010
16.50	.459	49.92	.154	83.33	.070	116.75	.026	150.17	.011	22.08	.283	55.50	.138	88.92	.058	122.33	.022	155.75	.010
16.58	.453	50.00	.153	83.42	.069	116.83	.026	150.25	.011	22.17	.281	55.58	.138	89.00	.058	122.42	.022	155.83	.010
16.67	.447	50.08	.153	83.50	.069	116.92	.026	150.33	.011	22.25	.279	55.67	.138	89.08	.057	122.50	.022	155.92	.010
16.75	.442	50.17	.153	83.58	.069	117.00	.026	150.42	.010	22.33	.277	55.75	.138	89.17	.057	122.58	.022	156.00	.010
16.83	.436	50.25	.153	83.67	.069	117.08	.026	150.50	.010	22.42	.276	55.83	.138	89.25	.057	122.67	.022	156.08	.010
16.92	.431	50.33	.152	83.75	.069	117.17	.025	150.58	.010	22.50	.274	55.92	.137	89.33	.057	122.75	.022	156.17	.010
17.00	.426	50.42	.152	83.83	.068	117.25	.025	150.67	.010	22.58	.272	56.00	.137	89.42	.057	122.83	.022	156.25	.010
17.08	.422	50.50	.152	83.92	.068	117.33	.025	150.75	.010	22.67	.270	56.08	.137	89.50	.057	122.92	.022	156.33	.010
17.17	.417	50.58	.152	84.00	.068	117.42	.025	150.83	.010	22.75	.269	56.17	.137	89.58	.056	123.00	.022	156.42	.010
17.25	.413	50.67	.152	84.08	.068	117.50	.025	150.92	.010	22.83	.267	56.25	.136	89.67	.056	123.08	.022	156.50	.010
17.33	.409	50.75	.151	84.17	.068	117.58	.025	151.00	.010	22.92	.266	56.33	.136	89.75	.056	123.17	.022	156.58	.010
17.42	.404	50.83	.151	84.25	.067	117.67	.025	151.08	.010	23.00	.264	56.42	.136	89.83	.056	123.25	.022	156.67	.010
17.50	.401	50.92	.151	84.33	.067	117.75	.025	151.17	.010	23.08	.262	56.50	.136	89.92	.056	123.33	.022	156.75	.010
17.58	.397	51.00	.151	84.42	.067	117.83	.025	151.25	.010	23.17	.261	56.58	.136	90.00	.056	123.42	.022	156.83	.010
17.67	.393	51.08	.150	84.50	.067	117.92	.025	151.33	.010	23.25	.260	56.67	.135	90.08	.056	123.50	.021	156.92	.010
17.75	.390	51.17	.150	84.58	.067	118.00	.025	151.42	.010	23.33	.258	56.75	.135	90.17	.055	123.58	.021	157.00	.010
17.83	.386	51.25	.150	84.67	.066	118.08	.025	151.50	.010	23.42	.257	56.83	.135	90.25	.055	123.67	.021	157.08	.010
17.92	.383	51.33	.150	84.75	.066	118.17	.025	151.58	.010	23.50	.256	56.92	.135	90.33	.055	123.75	.021	157.17	.010
18.00	.380	51.42	.149	84.83	.066	118.25	.025	151.67	.010	23.58	.254	57.00	.134	90.42	.055	123.83	.021	157.25	.010
18.08	.376	51.50	.149	84.92	.066	118.33	.025	151.75	.010	23.67	.253	57.08	.134	90.50	.055	123.92	.021	157.33	.010
18.17	.373	51.58	.149	85.00	.066	118.42	.025	151.83	.010	23.75	.252	57.17	.134	90.58	.055	124.00	.021	157.42	.010
18.25	.371	51.67	.149	85.08	.066	118.50	.025	151.92	.010	23.83	.251	57.25	.134	90.67	.054	124.08	.021	157.50	.010
18.33	.368	51.75	.149	85.17	.065	118.58	.025	152.00	.010	23.92	.249	57.33	.134	90.75	.054	124.17	.021	157.58	.010
18.42	.365	51.83	.148	85.25	.065	118.67	.024	152.08	.010	24.00	.248	57.42	.133	90.83	.054	124.25	.021	157.67	.010
18.50	.362	51.92	.148	85.33	.065	118.75	.024	152.17	.010	24.08	.247	57.50	.133	90.92	.054	124.33	.021	157.75	.010
18.58	.360	52.00	.148	85.42	.065	118.83	.024	152.25	.010	24.17	.246	57.58	.133	91.00	.054	124.42	.021	157.83	.010
18.67	.357	52.08	.148	85.50	.065	118.92	.024	152.33	.010	24.25	.245	57.67	.133	91.08	.054	124.50	.021	157.92	.010
18.75	.354	52.17	.147	85.58	.064	119.00	.024	152.42	.010	24.33	.244	57.75	.132	91.17	.054	124.58	.021	158.00	.010
18.83	.352	52.25	.147	85.67	.064	119.08	.024	152.50	.010	24.42	.243	57.83	.132	91.25	.053	124.67	.021	158.08	.010
18.92	.350	52.33	.147	85.75	.064	119.17	.024	152.58	.010	24.50	.242	57.92	.132	91.33	.053	124.75	.021	158.17	.010
19.00	.347	52.42	.147	85.83	.064	119.25	.024	152.67	.010	24.58	.241	58.00	.132	91.42	.053	124.83	.021	158.25	.010
19.08	.345	52.50	.146	85.92	.064	119.33	.024	152.75	.010	24.67	.241	58.08	.132	91.50	.053	124.92	.021	158.33	.010
19.17	.343	52.58	.146	86.00	.064	119.42	.024	152.83	.010	24.75	.240	58.17	.131	91.58	.053	125.00	.021	158.42	.010
19.25	.341	52.67	.146	86.08	.063	119.50	.024	152.92	.010	24.83	.239	58.25	.131	91.67	.053	125.08	.021	158.50	.010
19.33	.339	52.75	.146	86.17	.063	119.58	.024	153.00	.010	24.92	.238	58.33	.131	91.75	.053	125.17	.021	158.58	.010
19.42	.337	52.83	.146	86.25	.063	119.67	.024	153.08	.010	25.00	.237	58.42	.131	91.83	.052	125.25	.021	158.67	.010
19.50	.335	52.92	.145	86.33	.063	119.75	.024	153.17	.010	25.08	.236	58.50	.131	91.92	.052	125.33	.020	158.75	.010
19.58	.333	53.00	.145	86.42	.063	119.83	.024	153.25	.010	25.17	.236	58.58	.130	92.00	.052	125.42	.020	158.83	.010
19.67	.331	53.08	.145	86.50	.063	119.92	.024	153.33	.010	25.25	.235	58.67	.130	92.08	.052	125.50	.020	158.92	.010
19.75	.329	53.17	.145	86.58	.062	120.00	.024	153.42	.010	25.33	.234	58.75	.130	92.17	.052	125.58	.020	159.00	.010
19.83	.327	53.25	.144	86.67	.062	120.08	.024	153.50	.010	25.42	.234	58.83	.130	92.25	.052	125.67	.020	159.08	.010

25.50	.233	58.92	.129	92.33	.052	125.75	.020	159.17	.010
25.58	.232	59.00	.129	92.42	.051	125.83	.020	159.25	.010
25.67	.232	59.08	.129	92.50	.051	125.92	.020	159.33	.010
25.75	.231	59.17	.129	92.58	.051	126.00	.020	159.42	.010
25.83	.230	59.25	.129	92.67	.051	126.08	.020	159.50	.010
25.92	.230	59.33	.128	92.75	.051	126.17	.020	159.58	.010
26.00	.229	59.42	.128	92.83	.051	126.25	.020	159.67	.010
26.08	.229	59.50	.128	92.92	.051	126.33	.020	159.75	.010
26.17	.228	59.58	.128	93.00	.050	126.42	.020	159.83	.010
26.25	.227	59.67	.127	93.08	.050	126.50	.020	159.92	.010
26.33	.227	59.75	.127	93.17	.050	126.58	.020	160.00	.010
26.42	.226	59.83	.127	93.25	.050	126.67	.020	160.08	.010
26.50	.226	59.92	.127	93.33	.050	126.75	.020	160.17	.010
26.58	.225	60.00	.127	93.42	.050	126.83	.020	160.25	.010
26.67	.225	60.08	.126	93.50	.050	126.92	.020	160.33	.010
26.75	.224	60.17	.126	93.58	.050	127.00	.020	160.42	.010
26.83	.224	60.25	.126	93.67	.049	127.08	.020	160.50	.010
26.92	.223	60.33	.126	93.75	.049	127.17	.019	160.58	.010
27.00	.223	60.42	.126	93.83	.049	127.25	.019	160.67	.010
27.08	.222	60.50	.125	93.92	.049	127.33	.019	160.75	.010
27.17	.222	60.58	.125	94.00	.049	127.42	.019	160.83	.010
27.25	.221	60.67	.125	94.08	.049	127.50	.019	160.92	.010
27.33	.221	60.75	.125	94.17	.049	127.58	.019	161.00	.010
27.42	.220	60.83	.125	94.25	.048	127.67	.019	161.08	.010
27.50	.220	60.92	.124	94.33	.048	127.75	.019	161.17	.010
27.58	.220	61.00	.124	94.42	.048	127.83	.019	161.25	.010
27.67	.219	61.08	.124	94.50	.048	127.92	.019	161.33	.010
27.75	.219	61.17	.124	94.58	.048	128.00	.019	161.42	.010
27.83	.218	61.25	.123	94.67	.048	128.08	.019	161.50	.010
27.92	.218	61.33	.123	94.75	.048	128.17	.019	161.58	.010
28.00	.217	61.42	.123	94.83	.048	128.25	.019	161.67	.010
28.08	.217	61.50	.123	94.92	.047	128.33	.019	161.75	.010
28.17	.217	61.58	.123	95.00	.047	128.42	.019	161.83	.010
28.25	.216	61.67	.122	95.08	.047	128.50	.019	161.92	.010
28.33	.216	61.75	.122	95.17	.047	128.58	.019	162.00	.010
28.42	.216	61.83	.122	95.25	.047	128.67	.019	162.08	.010
28.50	.215	61.92	.122	95.33	.047	128.75	.019	162.17	.010
28.58	.215	62.00	.122	95.42	.047	128.83	.019	162.25	.010
28.67	.214	62.08	.121	95.50	.047	128.92	.019	162.33	.010
28.75	.214	62.17	.121	95.58	.046	129.00	.019	162.42	.010
28.83	.214	62.25	.121	95.67	.046	129.08	.019	162.50	.010
28.92	.213	62.33	.121	95.75	.046	129.17	.018	162.58	.010
29.00	.213	62.42	.121	95.83	.046	129.25	.018	162.67	.010
29.08	.213	62.50	.120	95.92	.046	129.33	.018	162.75	.010
29.17	.212	62.58	.120	96.00	.046	129.42	.018	162.83	.010
29.25	.212	62.67	.120	96.08	.046	129.50	.018	162.92	.010
29.33	.212	62.75	.120	96.17	.046	129.58	.018	163.00	.010
29.42	.211	62.83	.120	96.25	.045	129.67	.018	163.08	.010
29.50	.211	62.92	.119	96.33	.045	129.75	.018	163.17	.010
29.58	.211	63.00	.119	96.42	.045	129.83	.018	163.25	.010
29.67	.210	63.08	.119	96.50	.045	129.92	.018	163.33	.010
29.75	.210	63.17	.119	96.58	.045	130.00	.018	163.42	.010
29.83	.210	63.25	.119	96.67	.045	130.08	.018	163.50	.010
29.92	.209	63.33	.118	96.75	.045	130.17	.018	163.58	.010
30.00	.209	63.42	.118	96.83	.045	130.25	.018	163.67	.010
30.08	.209	63.50	.118	96.92	.045	130.33	.018	163.75	.010
30.17	.208	63.58	.118	97.00	.044	130.42	.018	163.83	.010
30.25	.208	63.67	.118	97.08	.044	130.50	.018	163.92	.010
30.33	.208	63.75	.118	97.17	.044	130.58	.018	164.00	.010
30.42	.207	63.83	.117	97.25	.044	130.67	.018	164.08	.010
30.50	.207	63.92	.117	97.33	.044	130.75	.018	164.17	.010
30.58	.207	64.00	.117	97.42	.044	130.83	.018	164.25	.010
30.67	.206	64.08	.117	97.50	.044	130.92	.018	164.33	.010
30.75	.206	64.17	.117	97.58	.044	131.00	.018	164.42	.010
30.83	.206	64.25	.116	97.67	.044	131.08	.018	164.50	.010
30.92	.206	64.33	.116	97.75	.044	131.17	.018	164.58	.010
31.00	.205	64.42	.116	97.83	.043	131.25	.017	164.67	.010
31.08	.205	64.50	.116	97.92	.043	131.33	.017	164.75	.010
31.17	.205	64.58	.116	98.00	.043	131.42	.017	164.83	.010
31.25	.204	64.67	.115	98.08	.043	131.50	.017	164.92	.010
31.33	.204	64.75	.115	98.17	.043	131.58	.017	165.00	.010
31.42	.204	64.83	.115	98.25	.043	131.67	.017	165.08	.010
31.50	.203	64.92	.115	98.33	.043	131.75	.017	165.17	.010
31.58	.203	65.00	.115	98.42	.043	131.83	.017	165.25	.010
31.67	.203	65.08	.114	98.50	.043	131.92	.017	165.33	.010
31.75	.203	65.17	.114	98.58	.043	132.00	.017	165.42	.010
31.83	.202	65.25	.114	98.67	.042	132.08	.017	165.50	.010
31.92	.202	65.33	.114	98.75	.042	132.17	.017	165.58	.010
32.00	.202	65.42	.114	98.83	.042	132.25	.017	165.67	.010
32.08	.201	65.50	.113	98.92	.042	132.33	.017	165.75	.010
32.17	.201	65.58	.113	99.00	.042	132.42	.017	165.83	.010
32.25	.201	65.67	.113	99.08	.042	132.50	.017	165.92	.010
32.33	.201	65.75	.113	99.17	.042	132.58	.017	166.00	.010
32.42	.200	65.83	.113	99.25	.042	132.67	.017	166.08	.010
32.50	.200	65.92	.113	99.33	.042	132.75	.017	166.17	.010
32.58	.200	66.00	.112	99.42	.042	132.83	.017	166.25	.010
32.67	.199	66.08	.112	99.50	.041	132.92	.017	166.33	.010
32.75	.199	66.17	.112	99.58	.041	133.00	.017	166.42	.010
32.83	.199	66.25	.112	99.67	.041	133.08	.017	166.50	.010
32.92	.199	66.33	.112	99.75	.041	133.17	.017	166.58	.010
33.00	.198	66.42	.111	99.83	.041	133.25	.017		
33.08	.198	66.50	.111	99.92	.041	133.33	.017		
33.17	.198	66.58	.111	100.00	.041	133.42	.016		
33.25	.198	66.67	.111	100.08	.041	133.50	.016		
33.33	.197	66.75	.111	100.17	.041	133.58	.016		

```
--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\December 2011 - TS\VO2 Input Hydr
| Ptotal= 47.81 mm |    Comments: 5yr/6hr
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	2.00	16.25	3.75	6.69	5.50	.96
.50	.96	2.25	16.25	4.00	3.82	5.75	.96
.75	.96	2.50	43.98	4.25	3.82	6.00	.96
1.00	.96	2.75	43.98	4.50	1.91	6.25	.96
1.25	.96	3.00	12.43	4.75	1.91		
1.50	5.74	3.25	12.43	5.00	.96		
1.75	5.74	3.50	6.69	5.25	.96		

```
--------------------
| ADD HYD   (0218) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0215):	124.65	7.640	3.00	41.11
+ ID2= 2 (0210):	576.91	11.391	3.25	36.96
ID = 3 (0218):	701.56	18.707	3.08	37.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| CALIB            |
| STANDHYD  (0231) |   Area    (ha)=  14.94
|ID= 1 DT= 5.0 min |   Total Imp(%)=  88.00   Dir. Conn.(%)=  88.00
--------------------
```

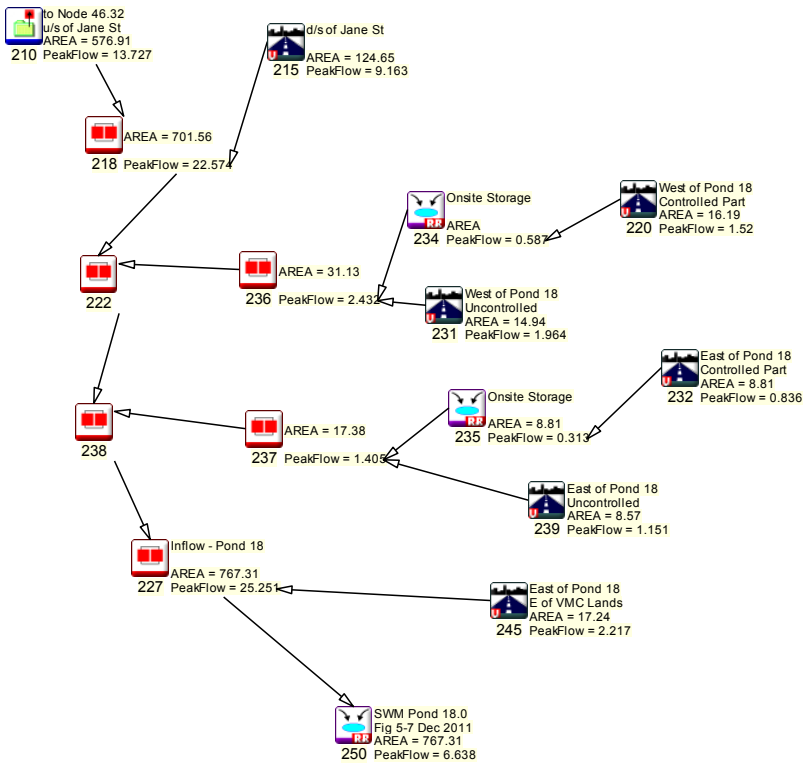
	IMPERVIOUS	PERVIOUS (i)

```
     Surface Area     (ha)=      13.15         1.79
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     315.60        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .083     .00 | 1.667    5.74 | 3.250   12.43 |  4.83     .96
               .167     .00 | 1.750    5.74 | 3.333    6.69 |  4.92     .96
               .250     .00 | 1.833   16.25 | 3.417    6.69 |  5.00     .96
               .333     .96 | 1.917   16.25 | 3.500    6.69 |  5.08     .96
               .417     .96 | 2.000   16.25 | 3.583    6.69 |  5.17     .96
               .500     .96 | 2.083   16.25 | 3.667    6.69 |  5.25     .96
               .583     .96 | 2.167   16.25 | 3.750    6.69 |  5.33     .96
               .667     .96 | 2.250   16.25 | 3.833    3.82 |  5.42     .96
               .750     .96 | 2.333   43.98 | 3.917    3.82 |  5.50     .96
               .833     .96 | 2.417   43.98 | 4.000    3.82 |  5.58     .96
               .917     .96 | 2.500   43.98 | 4.083    3.82 |  5.67     .96
              1.000     .96 | 2.583   43.98 | 4.167    3.82 |  5.75     .96
              1.083     .96 | 2.667   43.98 | 4.250    3.82 |  5.83     .96
              1.167     .96 | 2.750   43.98 | 4.333    1.91 |  5.92     .96
              1.250     .96 | 2.833   12.43 | 4.417    1.91 |  6.00     .96
              1.333    5.74 | 2.917   12.43 | 4.500    1.91 |  6.08     .96
              1.417    5.74 | 3.000   12.43 | 4.583    1.91 |  6.17     .96
              1.500    5.74 | 3.083   12.43 | 4.667    1.91 |  6.25     .96
              1.583    5.74 | 3.167   12.43 | 4.750    1.91 |

     Max.Eff.Inten.(mm/hr)=      43.98        23.12
               over (min)        5.00        15.00
     Storage Coeff.  (min)=      7.07 (ii)   11.49 (ii)
     Unit Hyd. Tpeak (min)=      5.00        15.00
     Unit Hyd. peak  (cms)=       .17          .09
                                                      *TOTALS*
     PEAK FLOW       (cms)=      1.59          .09        1.678 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.83         2.75
     RUNOFF VOLUME    (mm)=     46.81        19.53        43.54
     TOTAL RAINFALL   (mm)=     47.81        47.81        47.81
     RUNOFF COEFFICIENT   =       .98          .41          .91

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0220) |   Area    (ha)=  16.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  48.00   Dir. Conn.(%)=  48.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.77         8.42
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     328.50        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      43.98        20.80
               over (min)        5.00        25.00
     Storage Coeff.  (min)=      7.24 (ii)   20.47 (ii)
     Unit Hyd. Tpeak (min)=      5.00        25.00
     Unit Hyd. peak  (cms)=       .17          .05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       .94          .30        1.166 (iii)
     TIME TO PEAK    (hrs)=      2.75         3.00         2.75
     RUNOFF VOLUME    (mm)=     46.81        17.69        31.67
     TOTAL RAINFALL   (mm)=     47.81        47.81        47.81
     RUNOFF COEFFICIENT   =       .98          .37          .66

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0234) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   1.1510      .5700

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0220)      16.19      1.17      2.75       31.67
     OUTFLOW: ID= 1 (0234)      16.19       .46      3.33       31.66

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 39.55
                TIME SHIFT OF PEAK FLOW         (min)= 35.00
                MAXIMUM  STORAGE   USED        (ha.m.)=  .2288

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0236) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0231):    14.94   1.678     2.75    43.54
        + ID2= 2 (0234):    16.19    .461     3.33    31.66
          ================================================
          ID = 3 (0236):    31.13   2.037     2.75    37.36

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0222) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0218):   701.56  18.707     3.08    37.70
        + ID2= 2 (0236):    31.13   2.037     2.75    37.36
          ================================================
          ID = 3 (0222):   732.69  19.732     3.08    37.68

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0239) |   Area    (ha)=   8.57
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.71          .86
```

```
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     239.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      43.98        56.66
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.99 (ii)   10.06 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .19          .10
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .94          .04          .978 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83          2.75
     RUNOFF VOLUME    (mm)=      46.81        17.69         43.90
     TOTAL RAINFALL   (mm)=      47.81        47.81         47.81
     RUNOFF COEFFICIENT   =        .98          .37           .92


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0232) |   Area     (ha)=   8.81
|ID= 1 DT= 5.0 min |   Total Imp(%)=  48.00   Dir. Conn.(%)=  48.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.23         4.58
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     242.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      43.98        20.80
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.03 (ii)   19.26 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .19          .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .51          .17          .659 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92          2.75
     RUNOFF VOLUME    (mm)=      46.81        17.69         31.67
     TOTAL RAINFALL   (mm)=      47.81        47.81         47.81
     RUNOFF COEFFICIENT   =        .98          .37           .66


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0235) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)      (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |   .5820      .3000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0232)      8.81       .66      2.75      31.67
     OUTFLOW: ID= 1 (0235)      8.81       .25      3.33      31.65

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 37.65
                    TIME SHIFT OF PEAK FLOW         (min)= 35.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  .1283

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0237) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0239):     8.57     .978     2.75     43.90
        + ID2= 2 (0235):     8.81     .248     3.33     31.65
          ================================================
          ID = 3 (0237):    17.38   1.176     2.75     37.69

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0238) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0222):   732.69  19.732     3.08     37.68
        + ID2= 2 (0237):    17.38   1.176     2.75     37.69
          ================================================
          ID = 3 (0238):   750.07  20.289     3.08     37.68

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0227) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0245):    17.24   1.882     2.75     42.44
        + ID2= 2 (0238):   750.07  20.289     3.08     37.68
          ================================================
          ID = 3 (0227):   767.31  20.956     3.08     37.79

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0250) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)      (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    | 17.9700    18.1470
                          1.8900     1.0080    | 19.4300    18.8300
                          2.2330     1.9630    | 23.4600    19.3240
                          2.7950     6.4020    | 31.0300    19.8490
                          3.2760     9.1830    | 38.3600    20.2920
                          3.4270    10.6610    | 40.0000    20.3980
                          3.6700    12.2670    | 42.5000    21.3030
                          5.6440    13.9060    | 45.0000    22.1830
                          9.7990    15.5860    | 47.5000    23.5100
                         15.2400    17.3710    |    .0000      .0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0227)    767.31     20.96      3.08      37.79
     OUTFLOW: ID= 1 (0250)    767.31      4.24      6.75      37.78
```

```
                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 20.23
                  TIME SHIFT OF PEAK FLOW         (min)=220.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=12.7401

--------------------------------------------------------------------------------

 FINISH
================================================================================
===============
```

North East POND (10yr 6hr AES)



Summary Hydrograph Data

Run Number: 1

NHYD	DT [hr]	AREA [ha]	Peak flow [m³/s]	TP [hr]	Runoff Vol. [mm]	DWF [m³/s]
250	0.083	767.310	6.638	5.667	44.970	0.000

```
================================================================================
==============

       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM, Version 2.0
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O   Licensed To: TMIG
        OOO     T      T    H   H    Y    M   M   OOO                 vo2-0145

Developed and Distributed by Greenland International Consulting Inc.
Copyright 1996, 2001 Schaeffer & Associates Ltd.
All rights reserved.


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


  Input   filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat
  Output  filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final
submission\05PROP~1\10y6 w Dev VMC, Proposed Pond 18.out
  Summary filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final
submission\05PROP~1\10y6 w Dev VMC, Proposed Pond 18.sum


DATE: 4/10/2012                           TIME: 12:21:43 PM

USER:


COMMENTS: _____________________________________________________

--------------------------------------------------------------------------------
---------------
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\December 2011 - TS\VO2 Input Hydr
| Ptotal= 55.69 mm |    Comments: 10yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   18.94 |  3.75    7.80 |  5.50    1.11
                 .50    1.11 |  2.25   18.94 |  4.00    4.46 |  5.75    1.11
                 .75    1.11 |  2.50   51.24 |  4.25    4.46 |  6.00    1.11
                1.00    1.11 |  2.75   51.24 |  4.50    2.23 |  6.25    1.11
                1.25    1.11 |  3.00   14.48 |  4.75    2.23 |
                1.50    6.68 |  3.25   14.48 |  5.00    1.11 |
                1.75    6.68 |  3.50    7.80 |  5.25    1.11 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0215) |   Area     (ha)= 124.65
|ID= 1 DT= 5.0 min |   Total Imp(%)=  83.00   Dir. Conn.(%)=  79.00
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	103.46	21.19
Dep. Storage	(mm)=	.50	4.70
Average Slope	(%)=	.30	.40
Length	(m)=	1800.00	200.00
Mannings n	=	.016	.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.00	1.667	6.68	3.250	14.48	4.83	1.11
.167	.00	1.750	6.68	3.333	7.80	4.92	1.11
.250	.00	1.833	18.94	3.417	7.80	5.00	1.11
.333	1.11	1.917	18.94	3.500	7.80	5.08	1.11
.417	1.11	2.000	18.94	3.583	7.80	5.17	1.11
.500	1.11	2.083	18.94	3.667	7.80	5.25	1.11
.583	1.11	2.167	18.94	3.750	7.80	5.33	1.11
.667	1.11	2.250	18.94	3.833	4.46	5.42	1.11
.750	1.11	2.333	51.24	3.917	4.46	5.50	1.11
.833	1.11	2.417	51.24	4.000	4.46	5.58	1.11
.917	1.11	2.500	51.24	4.083	4.46	5.67	1.11
1.000	1.11	2.583	51.24	4.167	4.46	5.75	1.11
1.083	1.11	2.667	51.24	4.250	4.46	5.83	1.11
1.167	1.11	2.750	51.24	4.333	2.23	5.92	1.11
1.250	1.11	2.833	14.48	4.417	2.23	6.00	1.11
1.333	6.68	2.917	14.48	4.500	2.23	6.08	1.11
1.417	6.68	3.000	14.48	4.583	2.23	6.17	1.11
1.500	6.68	3.083	14.48	4.667	2.23	6.25	1.11
1.583	6.68	3.167	14.48	4.750	2.23		

				TOTALS
Max.Eff.Inten.	(mm/hr)=	51.24	19.46	
	over (min)	30.00	90.00	
Storage Coeff.	(min)=	30.73 (ii)	88.56 (ii)	
Unit Hyd. Tpeak	(min)=	30.00	90.00	
Unit Hyd. peak	(cms)=	.04	.01	
PEAK FLOW	(cms)=	9.00	.52	9.163 (iii)
TIME TO PEAK	(hrs)=	3.00	4.17	3.00
RUNOFF VOLUME	(mm)=	55.19	23.04	48.44
TOTAL RAINFALL	(mm)=	55.69	55.69	55.69
RUNOFF COEFFICIENT	=	.99	.41	.87

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 76.0 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.

READ HYD (0210)	AREA (ha)= 576.91
DT= 5.0 min	TPEAK (hrs)= 3.17
	VOLUME (mm)= 44.07

Filename: G:\Projects\2008\08104 - Vaughan Corporate Centre - Master Servicing Strategy\Design\SWM\December 20
Comments: Outflow at 46.32

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	33.42	.216	66.83	.130	100.25	.056	133.67	.022
.08	.000	33.50	.216	66.92	.130	100.33	.056	133.75	.022
.17	.000	33.58	.216	67.00	.129	100.42	.056	133.83	.022
.25	.000	33.67	.215	67.08	.129	100.50	.056	133.92	.022
.33	.000	33.75	.215	67.17	.129	100.58	.056	134.00	.022
.42	.000	33.83	.215	67.25	.129	100.67	.056	134.08	.022
.50	.000	33.92	.214	67.33	.129	100.75	.056	134.17	.022
.58	.000	34.00	.214	67.42	.128	100.83	.055	134.25	.022
.67	.000	34.08	.214	67.50	.128	100.92	.055	134.33	.022
.75	.000	34.17	.214	67.58	.128	101.00	.055	134.42	.022
.83	.000	34.25	.213	67.67	.128	101.08	.055	134.50	.022
.92	.000	34.33	.213	67.75	.128	101.17	.055	134.58	.022
1.00	.000	34.42	.213	67.83	.127	101.25	.055	134.67	.021
1.08	.000	34.50	.213	67.92	.127	101.33	.055	134.75	.021
1.17	.000	34.58	.212	68.00	.127	101.42	.054	134.83	.021
1.25	.000	34.67	.212	68.08	.127	101.50	.054	134.92	.021
1.33	.000	34.75	.212	68.17	.127	101.58	.054	135.00	.021
1.42	.000	34.83	.212	68.25	.126	101.67	.054	135.08	.021
1.50	.001	34.92	.211	68.33	.126	101.75	.054	135.17	.021
1.58	.002	35.00	.211	68.42	.126	101.83	.054	135.25	.021
1.67	.003	35.08	.211	68.50	.126	101.92	.053	135.33	.021
1.75	.005	35.17	.211	68.58	.126	102.00	.053	135.42	.021
1.83	.007	35.25	.210	68.67	.125	102.08	.053	135.50	.021
1.92	.010	35.33	.210	68.75	.125	102.17	.053	135.58	.021
2.00	.493	35.42	.210	68.83	.125	102.25	.053	135.67	.021
2.08	1.040	35.50	.210	68.92	.125	102.33	.053	135.75	.021
2.17	1.630	35.58	.209	69.00	.125	102.42	.053	135.83	.021
2.25	2.241	35.67	.209	69.08	.124	102.50	.053	135.92	.021
2.33	2.907	35.75	.209	69.17	.124	102.58	.052	136.00	.021
2.42	3.724	35.83	.209	69.25	.124	102.67	.052	136.08	.021
2.50	4.728	35.92	.208	69.33	.124	102.75	.052	136.17	.021
2.58	5.892	36.00	.208	69.42	.124	102.83	.052	136.25	.021
2.67	7.281	36.08	.208	69.50	.123	102.92	.052	136.33	.021
2.75	9.088	36.17	.208	69.58	.123	103.00	.052	136.42	.021
2.83	10.761	36.25	.207	69.67	.123	103.08	.052	136.50	.020
2.92	12.101	36.33	.207	69.75	.123	103.17	.051	136.58	.020
3.00	13.011	36.42	.207	69.83	.123	103.25	.051	136.67	.020
3.08	13.526	36.50	.207	69.92	.122	103.33	.051	136.75	.020
3.17	13.727	36.58	.207	70.00	.122	103.42	.051	136.83	.020
3.25	13.713	36.67	.206	70.08	.122	103.50	.051	136.92	.020
3.33	13.549	36.75	.206	70.17	.122	103.58	.051	137.00	.020
3.42	13.267	36.83	.206	70.25	.122	103.67	.051	137.08	.020
3.50	12.894	36.92	.206	70.33	.121	103.75	.050	137.17	.020
3.58	12.465	37.00	.205	70.42	.121	103.83	.050	137.25	.020
3.67	12.011	37.08	.205	70.50	.121	103.92	.050	137.33	.020
3.75	11.558	37.17	.205	70.58	.121	104.00	.050	137.42	.020
3.83	11.119	37.25	.205	70.67	.121	104.08	.050	137.50	.020
3.92	10.689	37.33	.204	70.75	.120	104.17	.050	137.58	.020
4.00	10.267	37.42	.204	70.83	.120	104.25	.050	137.67	.020
4.08	9.858	37.50	.204	70.92	.120	104.33	.050	137.75	.020
4.17	9.467	37.58	.204	71.00	.120	104.42	.049	137.83	.020
4.25	9.101	37.67	.203	71.08	.120	104.50	.049	137.92	.020
4.33	8.759	37.75	.203	71.17	.119	104.58	.049	138.00	.020
4.42	8.433	37.83	.203	71.25	.119	104.67	.049	138.08	.020
4.50	8.117	37.92	.203	71.33	.119	104.75	.049	138.17	.020
4.58	7.812	38.00	.203	71.42	.119	104.83	.049	138.25	.020
4.67	7.521	38.08	.202	71.50	.119	104.92	.049	138.33	.019
4.75	7.246	38.17	.202	71.58	.118	105.00	.048	138.42	.019
4.83	6.988	38.25	.202	71.67	.118	105.08	.048	138.50	.019
4.92	6.780	38.33	.202	71.75	.118	105.17	.048	138.58	.019
5.00	6.600	38.42	.201	71.83	.118	105.25	.048	138.67	.019
5.08	6.420	38.50	.201	71.92	.118	105.33	.048	138.75	.019
5.17	6.242	38.58	.201	72.00	.117	105.42	.048	138.83	.019
5.25	6.068	38.67	.201	72.08	.117	105.50	.048	138.92	.019
5.33	5.900	38.75	.201	72.17	.117	105.58	.048	139.00	.019
5.42	5.739	38.83	.200	72.25	.117	105.67	.047	139.08	.019
5.50	5.587	38.92	.200	72.33	.117	105.75	.047	139.17	.019
5.58	5.443	39.00	.200	72.42	.116	105.83	.047	139.25	.019
5.67	5.309	39.08	.200	72.50	.116	105.92	.047	139.33	.019
5.75	5.186	39.17	.199	72.58	.116	106.00	.047	139.42	.019

5.83	5.074	39.25	.199	72.67	.116	106.08	.047	139.50	.019	11.42	1.891	44.83	.185	78.25	.104	111.67	.040	145.08	.016
5.92	4.972	39.33	.199	72.75	.116	106.17	.047	139.58	.019	11.50	1.859	44.92	.185	78.33	.104	111.75	.040	145.17	.016
6.00	4.879	39.42	.199	72.83	.116	106.25	.047	139.67	.019	11.58	1.827	45.00	.184	78.42	.104	111.83	.040	145.25	.016
6.08	4.794	39.50	.199	72.92	.115	106.33	.046	139.75	.019	11.67	1.795	45.08	.184	78.50	.104	111.92	.040	145.33	.016
6.17	4.716	39.58	.198	73.00	.115	106.42	.046	139.83	.019	11.75	1.765	45.17	.184	78.58	.104	112.00	.040	145.42	.016
6.25	4.644	39.67	.198	73.08	.115	106.50	.046	139.92	.019	11.83	1.735	45.25	.184	78.67	.104	112.08	.039	145.50	.016
6.33	4.576	39.75	.198	73.17	.115	106.58	.046	140.00	.019	11.92	1.706	45.33	.184	78.75	.103	112.17	.039	145.58	.016
6.42	4.507	39.83	.198	73.25	.115	106.67	.046	140.08	.019	12.00	1.677	45.42	.183	78.83	.103	112.25	.039	145.67	.016
6.50	4.434	39.92	.198	73.33	.114	106.75	.046	140.17	.019	12.08	1.649	45.50	.183	78.92	.103	112.33	.039	145.75	.016
6.58	4.358	40.00	.197	73.42	.114	106.83	.046	140.25	.019	12.17	1.622	45.58	.183	79.00	.103	112.42	.039	145.83	.016
6.67	4.280	40.08	.197	73.50	.114	106.92	.046	140.33	.018	12.25	1.595	45.67	.183	79.08	.103	112.50	.039	145.92	.016
6.75	4.201	40.17	.197	73.58	.114	107.00	.045	140.42	.018	12.33	1.569	45.75	.183	79.17	.103	112.58	.039	146.00	.016
6.83	4.122	40.25	.197	73.67	.114	107.08	.045	140.50	.018	12.42	1.544	45.83	.182	79.25	.102	112.67	.039	146.08	.016
6.92	4.045	40.33	.196	73.75	.113	107.17	.045	140.58	.018	12.50	1.519	45.92	.182	79.33	.102	112.75	.039	146.17	.016
7.00	3.971	40.42	.196	73.83	.113	107.25	.045	140.67	.018	12.58	1.495	46.00	.182	79.42	.102	112.83	.039	146.25	.016
7.08	3.900	40.50	.196	73.92	.113	107.33	.045	140.75	.018	12.67	1.471	46.08	.182	79.50	.102	112.92	.039	146.33	.016
7.17	3.833	40.58	.196	74.00	.113	107.42	.045	140.83	.018	12.75	1.448	46.17	.181	79.58	.102	113.00	.038	146.42	.016
7.25	3.769	40.67	.196	74.08	.113	107.50	.045	140.92	.018	12.83	1.425	46.25	.181	79.67	.102	113.08	.038	146.50	.016
7.33	3.708	40.75	.195	74.17	.113	107.58	.045	141.00	.018	12.92	1.403	46.33	.181	79.75	.102	113.17	.038	146.58	.016
7.42	3.650	40.83	.195	74.25	.112	107.67	.045	141.08	.018	13.00	1.381	46.42	.181	79.83	.101	113.25	.038	146.67	.016
7.50	3.595	40.92	.195	74.33	.112	107.75	.044	141.17	.018	13.08	1.360	46.50	.181	79.92	.101	113.33	.038	146.75	.016
7.58	3.542	41.00	.195	74.42	.112	107.83	.044	141.25	.018	13.17	1.339	46.58	.180	80.00	.101	113.42	.038	146.83	.016
7.67	3.493	41.08	.195	74.50	.112	107.92	.044	141.33	.018	13.25	1.319	46.67	.180	80.08	.101	113.50	.038	146.92	.016
7.75	3.445	41.17	.194	74.58	.112	108.00	.044	141.42	.018	13.33	1.299	46.75	.180	80.17	.101	113.58	.038	147.00	.015
7.83	3.400	41.25	.194	74.67	.112	108.08	.044	141.50	.018	13.42	1.280	46.83	.180	80.25	.101	113.67	.038	147.08	.015
7.92	3.356	41.33	.194	74.75	.111	108.17	.044	141.58	.018	13.50	1.261	46.92	.180	80.33	.100	113.75	.038	147.17	.015
8.00	3.314	41.42	.194	74.83	.111	108.25	.044	141.67	.018	13.58	1.242	47.00	.179	80.42	.100	113.83	.038	147.25	.015
8.08	3.273	41.50	.193	74.92	.111	108.33	.044	141.75	.018	13.67	1.224	47.08	.179	80.50	.100	113.92	.038	147.33	.015
8.17	3.234	41.58	.193	75.00	.111	108.42	.044	141.83	.018	13.75	1.206	47.17	.179	80.58	.100	114.00	.037	147.42	.015
8.25	3.195	41.67	.193	75.08	.111	108.50	.044	141.92	.018	13.83	1.189	47.25	.179	80.67	.100	114.08	.037	147.50	.015
8.33	3.157	41.75	.193	75.17	.110	108.58	.043	142.00	.018	13.92	1.172	47.33	.179	80.75	.100	114.17	.037	147.58	.015
8.42	3.119	41.83	.193	75.25	.110	108.67	.043	142.08	.018	14.00	1.153	47.42	.178	80.83	.100	114.25	.037	147.67	.015
8.50	3.082	41.92	.192	75.33	.110	108.75	.043	142.17	.018	14.08	1.133	47.50	.178	80.92	.099	114.33	.037	147.75	.015
8.58	3.046	42.00	.192	75.42	.110	108.83	.043	142.25	.018	14.17	1.112	47.58	.178	81.00	.099	114.42	.037	147.83	.015
8.67	3.010	42.08	.192	75.50	.110	108.92	.043	142.33	.018	14.25	1.091	47.67	.178	81.08	.099	114.50	.037	147.92	.015
8.75	2.975	42.17	.192	75.58	.110	109.00	.043	142.42	.017	14.33	1.069	47.75	.178	81.17	.099	114.58	.037	148.00	.015
8.83	2.940	42.25	.192	75.67	.109	109.08	.043	142.50	.017	14.42	1.047	47.83	.177	81.25	.099	114.67	.037	148.08	.015
8.92	2.905	42.33	.191	75.75	.109	109.17	.043	142.58	.017	14.50	1.024	47.92	.177	81.33	.099	114.75	.037	148.17	.015
9.00	2.871	42.42	.191	75.83	.109	109.25	.043	142.67	.017	14.58	1.002	48.00	.177	81.42	.099	114.83	.037	148.25	.015
9.08	2.837	42.50	.191	75.92	.109	109.33	.043	142.75	.017	14.67	.979	48.08	.177	81.50	.098	114.92	.037	148.33	.015
9.17	2.803	42.58	.191	76.00	.109	109.42	.042	142.83	.017	14.75	.957	48.17	.176	81.58	.098	115.00	.036	148.42	.015
9.25	2.770	42.67	.190	76.08	.109	109.50	.042	142.92	.017	14.83	.935	48.25	.176	81.67	.098	115.08	.036	148.50	.015
9.33	2.738	42.75	.190	76.17	.108	109.58	.042	143.00	.017	14.92	.914	48.33	.176	81.75	.098	115.17	.036	148.58	.015
9.42	2.705	42.83	.190	76.25	.108	109.67	.042	143.08	.017	15.00	.893	48.42	.176	81.83	.098	115.25	.036	148.67	.015
9.50	2.673	42.92	.190	76.33	.108	109.75	.042	143.17	.017	15.08	.872	48.50	.176	81.92	.098	115.33	.036	148.75	.015
9.58	2.642	43.00	.190	76.42	.108	109.83	.042	143.25	.017	15.17	.851	48.58	.175	82.00	.098	115.42	.036	148.83	.015
9.67	2.610	43.08	.189	76.50	.108	109.92	.042	143.33	.017	15.25	.831	48.67	.175	82.08	.097	115.50	.036	148.92	.015
9.75	2.579	43.17	.189	76.58	.108	110.00	.042	143.42	.017	15.33	.812	48.75	.175	82.17	.097	115.58	.036	149.00	.015
9.83	2.548	43.25	.189	76.67	.107	110.08	.042	143.50	.017	15.42	.793	48.83	.175	82.25	.097	115.67	.036	149.08	.015
9.92	2.518	43.33	.189	76.75	.107	110.17	.042	143.58	.017	15.50	.774	48.92	.175	82.33	.097	115.75	.036	149.17	.015
10.00	2.487	43.42	.189	76.83	.107	110.25	.041	143.67	.017	15.58	.756	49.00	.174	82.42	.097	115.83	.036	149.25	.015
10.08	2.456	43.50	.188	76.92	.107	110.33	.041	143.75	.017	15.67	.739	49.08	.174	82.50	.097	115.92	.036	149.33	.015
10.17	2.425	43.58	.188	77.00	.107	110.42	.041	143.83	.017	15.75	.722	49.17	.174	82.58	.097	116.00	.035	149.42	.015
10.25	2.394	43.67	.188	77.08	.107	110.50	.041	143.92	.017	15.83	.706	49.25	.174	82.67	.096	116.08	.035	149.50	.015
10.33	2.362	43.75	.188	77.17	.106	110.58	.041	144.00	.017	15.92	.691	49.33	.174	82.75	.096	116.17	.035	149.58	.014
10.42	2.330	43.83	.187	77.25	.106	110.67	.041	144.08	.017	16.00	.675	49.42	.173	82.83	.096	116.25	.035	149.67	.014
10.50	2.296	43.92	.187	77.33	.106	110.75	.041	144.17	.017	16.08	.661	49.50	.173	82.92	.096	116.33	.035	149.75	.014
10.58	2.262	44.00	.187	77.42	.106	110.83	.041	144.25	.017	16.17	.647	49.58	.173	83.00	.096	116.42	.035	149.83	.014
10.67	2.226	44.08	.187	77.50	.106	110.92	.041	144.33	.017	16.25	.634	49.67	.173	83.08	.096	116.50	.035	149.92	.014
10.75	2.189	44.17	.187	77.58	.106	111.00	.041	144.42	.017	16.33	.621	49.75	.172	83.17	.096	116.58	.035	150.00	.014
10.83	2.151	44.25	.186	77.67	.105	111.08	.041	144.50	.017	16.42	.608	49.83	.172	83.25	.095	116.67	.035	150.08	.014
10.92	2.113	44.33	.186	77.75	.105	111.17	.040	144.58	.017	16.50	.596	49.92	.172	83.33	.095	116.75	.035	150.17	.014
11.00	2.074	44.42	.186	77.83	.105	111.25	.040	144.67	.016	16.58	.585	50.00	.172	83.42	.095	116.83	.035	150.25	.014
11.08	2.035	44.50	.186	77.92	.105	111.33	.040	144.75	.016	16.67	.574	50.08	.172	83.50	.095	116.92	.035	150.33	.014
11.17	1.997	44.58	.186	78.00	.105	111.42	.040	144.83	.016	16.75	.563	50.17	.171	83.58	.095	117.00	.035	150.42	.014
11.25	1.960	44.67	.185	78.08	.105	111.50	.040	144.92	.016	16.83	.553	50.25	.171	83.67	.095	117.08	.034	150.50	.014
11.33	1.925	44.75	.185	78.17	.104	111.58	.040	145.00	.016	16.92	.543	50.33	.171	83.75	.095	117.17	.034	150.58	.014

17.00	.534	50.42	.171	83.83	.094	117.25	.034	150.67	.014	22.58	.312	56.00	.157	89.42	.080	122.83	.029	156.25	.012
17.08	.525	50.50	.171	83.92	.094	117.33	.034	150.75	.014	22.67	.311	56.08	.157	89.50	.080	122.92	.029	156.33	.012
17.17	.516	50.58	.170	84.00	.094	117.42	.034	150.83	.014	22.75	.310	56.17	.157	89.58	.080	123.00	.029	156.42	.012
17.25	.508	50.67	.170	84.08	.094	117.50	.034	150.92	.014	22.83	.309	56.25	.157	89.67	.080	123.08	.029	156.50	.012
17.33	.500	50.75	.170	84.17	.094	117.58	.034	151.00	.014	22.92	.308	56.33	.156	89.75	.079	123.17	.029	156.58	.012
17.42	.493	50.83	.170	84.25	.094	117.67	.034	151.08	.014	23.00	.307	56.42	.156	89.83	.079	123.25	.029	156.67	.012
17.50	.486	50.92	.170	84.33	.093	117.75	.034	151.17	.014	23.08	.306	56.50	.156	89.92	.079	123.33	.029	156.75	.012
17.58	.479	51.00	.169	84.42	.093	117.83	.034	151.25	.014	23.17	.305	56.58	.156	90.00	.079	123.42	.029	156.83	.012
17.67	.472	51.08	.169	84.50	.093	117.92	.034	151.33	.014	23.25	.304	56.67	.156	90.08	.078	123.50	.029	156.92	.012
17.75	.466	51.17	.169	84.58	.093	118.00	.034	151.42	.014	23.33	.303	56.75	.155	90.17	.078	123.58	.029	157.00	.012
17.83	.460	51.25	.169	84.67	.093	118.08	.034	151.50	.014	23.42	.302	56.83	.155	90.25	.078	123.67	.029	157.08	.012
17.92	.454	51.33	.169	84.75	.092	118.17	.033	151.58	.014	23.50	.301	56.92	.155	90.33	.078	123.75	.029	157.17	.012
18.00	.449	51.42	.168	84.83	.092	118.25	.033	151.67	.014	23.58	.300	57.00	.155	90.42	.078	123.83	.029	157.25	.012
18.08	.444	51.50	.168	84.92	.092	118.33	.033	151.75	.014	23.67	.299	57.08	.155	90.50	.077	123.92	.029	157.33	.012
18.17	.439	51.58	.168	85.00	.092	118.42	.033	151.83	.014	23.75	.298	57.17	.154	90.58	.077	124.00	.029	157.42	.012
18.25	.434	51.67	.168	85.08	.092	118.50	.033	151.92	.014	23.83	.297	57.25	.154	90.67	.077	124.08	.029	157.50	.012
18.33	.429	51.75	.168	85.17	.091	118.58	.033	152.00	.014	23.92	.296	57.33	.154	90.75	.077	124.17	.028	157.58	.012
18.42	.424	51.83	.167	85.25	.091	118.67	.033	152.08	.014	24.00	.296	57.42	.154	90.83	.077	124.25	.028	157.67	.012
18.50	.420	51.92	.167	85.33	.091	118.75	.033	152.17	.014	24.08	.295	57.50	.154	90.92	.076	124.33	.028	157.75	.012
18.58	.416	52.00	.167	85.42	.091	118.83	.033	152.25	.013	24.17	.294	57.58	.153	91.00	.076	124.42	.028	157.83	.012
18.67	.412	52.08	.167	85.50	.091	118.92	.033	152.33	.013	24.25	.293	57.67	.153	91.08	.076	124.50	.028	157.92	.012
18.75	.408	52.17	.167	85.58	.090	119.00	.033	152.42	.013	24.33	.292	57.75	.153	91.17	.076	124.58	.028	158.00	.012
18.83	.404	52.25	.166	85.67	.090	119.08	.033	152.50	.013	24.42	.291	57.83	.153	91.25	.076	124.67	.028	158.08	.012
18.92	.401	52.33	.166	85.75	.090	119.17	.033	152.58	.013	24.50	.290	57.92	.153	91.33	.075	124.75	.028	158.17	.012
19.00	.397	52.42	.166	85.83	.090	119.25	.032	152.67	.013	24.58	.289	58.00	.152	91.42	.075	124.83	.028	158.25	.012
19.08	.394	52.50	.166	85.92	.089	119.33	.032	152.75	.013	24.67	.287	58.08	.152	91.50	.075	124.92	.028	158.33	.011
19.17	.390	52.58	.166	86.00	.089	119.42	.032	152.83	.013	24.75	.286	58.17	.152	91.58	.075	125.00	.028	158.42	.011
19.25	.387	52.67	.165	86.08	.089	119.50	.032	152.92	.013	24.83	.285	58.25	.152	91.67	.075	125.08	.028	158.50	.011
19.33	.384	52.75	.165	86.17	.089	119.58	.032	153.00	.013	24.92	.284	58.33	.152	91.75	.074	125.17	.028	158.58	.011
19.42	.381	52.83	.165	86.25	.089	119.67	.032	153.08	.013	25.00	.283	58.42	.152	91.83	.074	125.25	.028	158.67	.011
19.50	.378	52.92	.165	86.33	.088	119.75	.032	153.17	.013	25.08	.281	58.50	.151	91.92	.074	125.33	.028	158.75	.011
19.58	.375	53.00	.164	86.42	.088	119.83	.032	153.25	.013	25.17	.280	58.58	.151	92.00	.074	125.42	.028	158.83	.011
19.67	.373	53.08	.164	86.50	.088	119.92	.032	153.33	.013	25.25	.279	58.67	.151	92.08	.074	125.50	.027	158.92	.011
19.75	.370	53.17	.164	86.58	.088	120.00	.032	153.42	.013	25.33	.277	58.75	.151	92.17	.073	125.58	.027	159.00	.011
19.83	.368	53.25	.164	86.67	.087	120.08	.032	153.50	.013	25.42	.276	58.83	.151	92.25	.073	125.67	.027	159.08	.011
19.92	.365	53.33	.164	86.75	.087	120.17	.032	153.58	.013	25.50	.274	58.92	.150	92.33	.073	125.75	.027	159.17	.011
20.00	.363	53.42	.163	86.83	.087	120.25	.032	153.67	.013	25.58	.273	59.00	.150	92.42	.073	125.83	.027	159.25	.011
20.08	.360	53.50	.163	86.92	.087	120.33	.032	153.75	.013	25.67	.272	59.08	.150	92.50	.073	125.92	.027	159.33	.011
20.17	.358	53.58	.163	87.00	.087	120.42	.031	153.83	.013	25.75	.270	59.17	.150	92.58	.072	126.00	.027	159.42	.011
20.25	.356	53.67	.163	87.08	.086	120.50	.031	153.92	.013	25.83	.269	59.25	.150	92.67	.072	126.08	.027	159.50	.011
20.33	.354	53.75	.163	87.17	.086	120.58	.031	154.00	.013	25.92	.267	59.33	.149	92.75	.072	126.17	.027	159.58	.011
20.42	.352	53.83	.162	87.25	.086	120.67	.031	154.08	.013	26.00	.266	59.42	.149	92.83	.072	126.25	.027	159.67	.011
20.50	.350	53.92	.162	87.33	.086	120.75	.031	154.17	.013	26.08	.265	59.50	.149	92.92	.072	126.33	.027	159.75	.011
20.58	.348	54.00	.162	87.42	.085	120.83	.031	154.25	.013	26.17	.263	59.58	.149	93.00	.071	126.42	.027	159.83	.011
20.67	.346	54.08	.162	87.50	.085	120.92	.031	154.33	.013	26.25	.262	59.67	.149	93.08	.071	126.50	.027	159.92	.011
20.75	.344	54.17	.162	87.58	.085	121.00	.031	154.42	.013	26.33	.261	59.75	.148	93.17	.071	126.58	.027	160.00	.011
20.83	.342	54.25	.161	87.67	.085	121.08	.031	154.50	.013	26.42	.260	59.83	.148	93.25	.071	126.67	.027	160.08	.011
20.92	.340	54.33	.161	87.75	.085	121.17	.031	154.58	.013	26.50	.258	59.92	.148	93.33	.071	126.75	.027	160.17	.011
21.00	.339	54.42	.161	87.83	.084	121.25	.031	154.67	.013	26.58	.257	60.00	.148	93.42	.070	126.83	.026	160.25	.011
21.08	.337	54.50	.161	87.92	.084	121.33	.031	154.75	.013	26.67	.256	60.08	.148	93.50	.070	126.92	.026	160.33	.011
21.17	.335	54.58	.161	88.00	.084	121.42	.031	154.83	.013	26.75	.255	60.17	.147	93.58	.070	127.00	.026	160.42	.011
21.25	.334	54.67	.160	88.08	.084	121.50	.031	154.92	.013	26.83	.254	60.25	.147	93.67	.070	127.08	.026	160.50	.011
21.33	.332	54.75	.160	88.17	.083	121.58	.030	155.00	.013	26.92	.253	60.33	.147	93.75	.070	127.17	.026	160.58	.011
21.42	.331	54.83	.160	88.25	.083	121.67	.030	155.08	.013	27.00	.252	60.42	.147	93.83	.069	127.25	.026	160.67	.011
21.50	.329	54.92	.160	88.33	.083	121.75	.030	155.17	.012	27.08	.251	60.50	.147	93.92	.069	127.33	.026	160.75	.011
21.58	.328	55.00	.160	88.42	.083	121.83	.030	155.25	.012	27.17	.250	60.58	.146	94.00	.069	127.42	.026	160.83	.011
21.67	.326	55.08	.159	88.50	.083	121.92	.030	155.33	.012	27.25	.249	60.67	.146	94.08	.069	127.50	.026	160.92	.011
21.75	.325	55.17	.159	88.58	.082	122.00	.030	155.42	.012	27.33	.248	60.75	.146	94.17	.069	127.58	.026	161.00	.011
21.83	.323	55.25	.159	88.67	.082	122.08	.030	155.50	.012	27.42	.247	60.83	.146	94.25	.069	127.67	.026	161.08	.011
21.92	.322	55.33	.159	88.75	.082	122.17	.030	155.58	.012	27.50	.247	60.92	.145	94.33	.068	127.75	.026	161.17	.011
22.00	.321	55.42	.159	88.83	.082	122.25	.030	155.67	.012	27.58	.246	61.00	.145	94.42	.068	127.83	.026	161.25	.011
22.08	.319	55.50	.158	88.92	.081	122.33	.030	155.75	.012	27.67	.245	61.08	.145	94.50	.068	127.92	.026	161.33	.011
22.17	.318	55.58	.158	89.00	.081	122.42	.030	155.83	.012	27.75	.244	61.17	.145	94.58	.068	128.00	.026	161.42	.011
22.25	.317	55.67	.158	89.08	.081	122.50	.030	155.92	.012	27.83	.243	61.25	.145	94.67	.068	128.08	.026	161.50	.011
22.33	.316	55.75	.158	89.17	.081	122.58	.030	156.00	.012	27.92	.243	61.33	.144	94.75	.067	128.17	.026	161.58	.011
22.42	.315	55.83	.158	89.25	.081	122.67	.030	156.08	.012	28.00	.242	61.42	.144	94.83	.067	128.25	.026	161.67	.011
22.50	.313	55.92	.157	89.33	.080	122.75	.030	156.17	.012	28.08	.241	61.50	.144	94.92	.067	128.33	.025	161.75	.010

28.17	.241	61.58	.144	95.00	.067	128.42	.025	161.83	.010
28.25	.240	61.67	.143	95.08	.067	128.50	.025	161.92	.010
28.33	.239	61.75	.143	95.17	.067	128.58	.025	162.00	.010
28.42	.239	61.83	.143	95.25	.066	128.67	.025	162.08	.010
28.50	.238	61.92	.143	95.33	.066	128.75	.025	162.17	.010
28.58	.238	62.00	.143	95.42	.066	128.83	.025	162.25	.010
28.67	.237	62.08	.142	95.50	.066	128.92	.025	162.33	.010
28.75	.236	62.17	.142	95.58	.066	129.00	.025	162.42	.010
28.83	.236	62.25	.142	95.67	.065	129.08	.025	162.50	.010
28.92	.235	62.33	.142	95.75	.065	129.17	.025	162.58	.010
29.00	.235	62.42	.141	95.83	.065	129.25	.025	162.67	.010
29.08	.234	62.50	.141	95.92	.065	129.33	.025	162.75	.010
29.17	.234	62.58	.141	96.00	.065	129.42	.025	162.83	.010
29.25	.233	62.67	.141	96.08	.065	129.50	.025	162.92	.010
29.33	.233	62.75	.141	96.17	.064	129.58	.025	163.00	.010
29.42	.232	62.83	.140	96.25	.064	129.67	.025	163.08	.010
29.50	.232	62.92	.140	96.33	.064	129.75	.025	163.17	.010
29.58	.231	63.00	.140	96.42	.064	129.83	.024	163.25	.010
29.67	.231	63.08	.140	96.50	.064	129.92	.024	163.33	.010
29.75	.231	63.17	.139	96.58	.064	130.00	.024	163.42	.010
29.83	.230	63.25	.139	96.67	.063	130.08	.024	163.50	.010
29.92	.230	63.33	.139	96.75	.063	130.17	.024	163.58	.010
30.00	.229	63.42	.139	96.83	.063	130.25	.024	163.67	.010
30.08	.229	63.50	.138	96.92	.063	130.33	.024	163.75	.010
30.17	.229	63.58	.138	97.00	.063	130.42	.024	163.83	.010
30.25	.228	63.67	.138	97.08	.063	130.50	.024	163.92	.010
30.33	.228	63.75	.138	97.17	.062	130.58	.024	164.00	.010
30.42	.227	63.83	.138	97.25	.062	130.67	.024	164.08	.010
30.50	.227	63.92	.137	97.33	.062	130.75	.024	164.17	.010
30.58	.227	64.00	.137	97.42	.062	130.83	.024	164.25	.010
30.67	.226	64.08	.137	97.50	.062	130.92	.024	164.33	.010
30.75	.226	64.17	.137	97.58	.062	131.00	.024	164.42	.010
30.83	.226	64.25	.137	97.67	.061	131.08	.024	164.50	.010
30.92	.225	64.33	.136	97.75	.061	131.17	.024	164.58	.010
31.00	.225	64.42	.136	97.83	.061	131.25	.024	164.67	.010
31.08	.224	64.50	.136	97.92	.061	131.33	.023	164.75	.010
31.17	.224	64.58	.136	98.00	.061	131.42	.023	164.83	.010
31.25	.224	64.67	.135	98.08	.061	131.50	.023	164.92	.010
31.33	.223	64.75	.135	98.17	.060	131.58	.023	165.00	.010
31.42	.223	64.83	.135	98.25	.060	131.67	.023	165.08	.010
31.50	.223	64.92	.135	98.33	.060	131.75	.023	165.17	.010
31.58	.223	65.00	.135	98.42	.060	131.83	.023	165.25	.010
31.67	.222	65.08	.134	98.50	.060	131.92	.023	165.33	.010
31.75	.222	65.17	.134	98.58	.060	132.00	.023	165.42	.010
31.83	.222	65.25	.134	98.67	.059	132.08	.023	165.50	.010
31.92	.221	65.33	.134	98.75	.059	132.17	.023	165.58	.010
32.00	.221	65.42	.133	98.83	.059	132.25	.023	165.67	.010
32.08	.221	65.50	.133	98.92	.059	132.33	.023	165.75	.010
32.17	.220	65.58	.133	99.00	.059	132.42	.023	165.83	.010
32.25	.220	65.67	.133	99.08	.059	132.50	.023	165.92	.010
32.33	.220	65.75	.133	99.17	.058	132.58	.023	166.00	.010
32.42	.219	65.83	.132	99.25	.058	132.67	.023	166.08	.010
32.50	.219	65.92	.132	99.33	.058	132.75	.023	166.17	.010
32.58	.219	66.00	.132	99.42	.058	132.83	.023	166.25	.010
32.67	.219	66.08	.132	99.50	.058	132.92	.023	166.33	.010
32.75	.218	66.17	.132	99.58	.058	133.00	.022	166.42	.010
32.83	.218	66.25	.131	99.67	.058	133.08	.022	166.50	.010
32.92	.218	66.33	.131	99.75	.057	133.17	.022	166.58	.010
33.00	.217	66.42	.131	99.83	.057	133.25	.022		
33.08	.217	66.50	.131	99.92	.057	133.33	.022		
33.17	.217	66.58	.131	100.00	.057	133.42	.022		
33.25	.217	66.67	.130	100.08	.057	133.50	.022		
33.33	.216	66.75	.130	100.17	.057	133.58	.022		

READ STORM	Filename: G:\Projects\2008\

	08104 - Vaughan Corporate Centre - Master Ser
	\Design\SWM\December 2011 - TS\VO2 Input Hydr
Ptotal= 55.69 mm	Comments: 10yr/6hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	2.00	18.94	3.75	7.80	5.50	1.11
.50	1.11	2.25	18.94	4.00	4.46	5.75	1.11
.75	1.11	2.50	51.24	4.25	4.46	6.00	1.11
1.00	1.11	2.75	51.24	4.50	2.23	6.25	1.11
1.25	1.11	3.00	14.48	4.75	2.23		
1.50	6.68	3.25	14.48	5.00	1.11		
1.75	6.68	3.50	7.80	5.25	1.11		

ADD HYD (0218)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0215):	124.65	9.163	3.00	48.44
+ ID2= 2 (0210):	576.91	13.727	3.17	44.07
ID = 3 (0218):	701.56	22.574	3.08	44.85

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
STANDHYD (0231) | Area (ha)= 14.94
ID= 1 DT= 5.0 min | Total Imp(%)= 88.00 Dir. Conn.(%)= 88.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.15	1.79
Dep. Storage	(mm)=	1.00	4.30
Average Slope	(%)=	1.00	2.00
Length	(m)=	315.60	40.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.00	1.667	6.68	3.250	14.48	4.83	1.11
.167	.00	1.750	6.68	3.333	7.80	4.92	1.11
.250	.00	1.833	18.94	3.417	7.80	5.00	1.11
.333	1.11	1.917	18.94	3.500	7.80	5.08	1.11
.417	1.11	2.000	18.94	3.583	7.80	5.17	1.11
.500	1.11	2.083	18.94	3.667	7.80	5.25	1.11
.583	1.11	2.167	18.94	3.750	7.80	5.33	1.11
.667	1.11	2.250	18.94	3.833	4.46	5.42	1.11
.750	1.11	2.333	51.24	3.917	4.46	5.50	1.11
.833	1.11	2.417	51.24	4.000	4.46	5.58	1.11
.917	1.11	2.500	51.24	4.083	4.46	5.67	1.11
1.000	1.11	2.583	51.24	4.167	4.46	5.75	1.11
1.083	1.11	2.667	51.24	4.250	4.46	5.83	1.11
1.167	1.11	2.750	51.24	4.333	2.23	5.92	1.11
1.250	1.11	2.833	14.48	4.417	2.23	6.00	1.11
1.333	6.68	2.917	14.48	4.500	2.23	6.08	1.11
1.417	6.68	3.000	14.48	4.583	2.23	6.17	1.11
1.500	6.68	3.083	14.48	4.667	2.23	6.25	1.11
1.583	6.68	3.167	14.48	4.750	2.23		

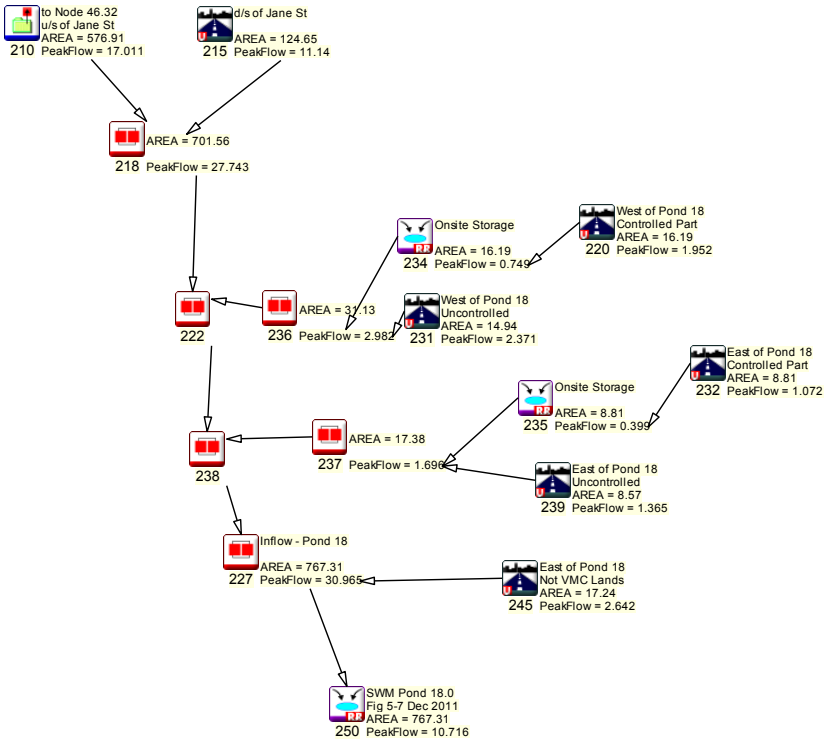
```
     Max.Eff.Inten.(mm/hr)=      51.24        28.04
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       6.65 (ii)   10.81 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .18          .09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.86          .11      1.964 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83       2.75
     RUNOFF VOLUME    (mm)=      54.69        22.99      50.89
     TOTAL RAINFALL   (mm)=      55.69        55.69      55.69
     RUNOFF COEFFICIENT   =        .98          .41        .91


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0220) |   Area    (ha)=  16.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  52.00   Dir. Conn.(%)=  52.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.42         7.77
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     328.50        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      51.24        26.89
               over (min)         5.00        20.00
     Storage Coeff.  (min)=       6.81 (ii)   18.75 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .18          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.19          .39      1.520 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92       2.75
     RUNOFF VOLUME    (mm)=      54.69        22.99      39.47
     TOTAL RAINFALL   (mm)=      55.69        55.69      55.69
     RUNOFF COEFFICIENT   =        .98          .41        .71


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0234) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         .0000      .0000    |   1.1510      .5700

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0220)     16.19      1.52      2.75      39.47
     OUTFLOW: ID= 1 (0234)     16.19       .59      3.25      39.46

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 38.62
                TIME SHIFT OF PEAK FLOW         (min)= 30.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  .2913

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0236) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0231):    14.94    1.964     2.75    50.89
        + ID2= 2 (0234):    16.19     .587     3.25    39.46
          ================================================
          ID = 3 (0236):    31.13   2.432     2.75    44.95

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0222) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0218):   701.56  22.574     3.08    44.85
        + ID2= 2 (0236):    31.13   2.432     2.75    44.95
          ================================================
          ID = 3 (0222):   732.69  23.813     3.08    44.85

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0239) |   Area    (ha)=   8.57
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.71          .86
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     239.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      51.24        67.30
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       5.63 (ii)    9.46 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .20          .12
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.09          .06      1.151 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75       2.75
     RUNOFF VOLUME    (mm)=      54.69        22.99      51.52
     TOTAL RAINFALL   (mm)=      55.69        55.69      55.69
     RUNOFF COEFFICIENT   =        .98          .41        .93


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0232) |   Area    (ha)=   8.81
|ID= 1 DT= 5.0 min |   Total Imp(%)=  52.00   Dir. Conn.(%)=  52.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.58         4.23
```

```
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     242.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      51.24        26.89
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       5.68 (ii)   17.61 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .20          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .65          .21          .836 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92          2.75
     RUNOFF VOLUME    (mm)=      54.69        22.99         39.47
     TOTAL RAINFALL   (mm)=      55.69        55.69         55.69
     RUNOFF COEFFICIENT   =        .98          .41           .71


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0235) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .5820      .3000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0232)      8.81       .84      2.75      39.47
     OUTFLOW: ID= 1 (0235)      8.81       .31      3.25      39.46

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 37.47
                   TIME SHIFT OF PEAK FLOW         (min)= 30.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .1617

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0237) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0239):     8.57   1.151     2.75     51.52
        + ID2= 2 (0235):     8.81    .313     3.25     39.46
          ================================================
          ID = 3 (0237):    17.38   1.405     2.75     45.40

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0238) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0222):   732.69  23.813     3.08     44.85
        + ID2= 2 (0237):    17.38   1.405     2.75     45.40
          ================================================
          ID = 3 (0238):   750.07  24.481     3.08     44.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
```

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0245) |   Area    (ha)=  17.24
|ID= 1 DT= 5.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.65         2.59
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     339.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      51.24        44.87
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       6.94 (ii)   11.55 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .17          .09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.07          .16          2.217 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83          2.75
     RUNOFF VOLUME    (mm)=      54.69        22.99         49.93
     TOTAL RAINFALL   (mm)=      55.69        55.69         55.69
     RUNOFF COEFFICIENT   =        .98          .41           .90


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0227) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0238):   750.07  24.481     3.08     44.86
        + ID2= 2 (0245):    17.24   2.217     2.75     49.93
          ================================================
          ID = 3 (0227):   767.31  25.251     3.08     44.98

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0250) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    | 17.9700    18.1470
                         1.8900     1.0080    | 19.4300    18.8300
                         2.2330     1.9630    | 23.4600    19.3240
                         2.7950     6.4020    | 31.0300    19.8490
                         3.2760     9.1830    | 38.3600    20.2920
                         3.4270    10.6610    | 40.0000    20.3980
                         3.6700    12.2670    | 42.5000    21.3030
                         5.6440    13.9060    | 45.0000    22.1830
                         9.7990    15.5860    | 47.5000    23.5100
                        15.2400    17.3710    |    .0000      .0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0227)    767.31     25.25      3.08      44.98
     OUTFLOW: ID= 1 (0250)    767.31      6.64      5.67      44.97
```

```
                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 26.29
                  TIME SHIFT OF PEAK FLOW         (min)=155.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=14.3082

--------------------------------------------------------------------------------

 FINISH
================================================================================
===============
```

North East POND (25yr 6hr AES)



Summary Hydrograph Data

Run Number : 1

NHYD	DT [hr]	AREA [ha]	Peak flow [m³/s]	TP [hr]	Runoff Vol. [mm]	DWF [m³/s]
250	0.083	767.310	10.716	4.917	54.214	0.000

==========

```
       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
         V V    I      SS   U   U  A   A  L
          VV    I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM, Version 2.0
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M  M  O   O   Licensed To:
        OOO     T      T    H   H    Y    M   M   OOO
```

Developed and Distributed by Greenland International Consulting Inc.
Copyright 1996, 2001 Schaeffer & Associates Ltd.
All rights reserved.

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

Input filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat
Output filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final submission\05PROP~1\25y6 w Dev VMC, ProposedPond 18.out
Summary filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final submission\05PROP~1\25y6 w Dev VMC, ProposedPond 18.sum

DATE: 4/5/2012 TIME: 12:24:46 PM

USER:

COMMENTS: _____

```
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\December 2011 - TS\VO2 Input Hydr
| Ptotal= 65.59 mm |    Comments: 25yr/6hr
--------------------
                TIME     RAIN |  TIME     RAIN |  TIME     RAIN |  TIME     RAIN
                 hrs    mm/hr |   hrs    mm/hr |   hrs    mm/hr |   hrs    mm/hr
                 .25      .00 |  2.00    22.30 |  3.75     9.18 |  5.50     1.31
                 .50     1.31 |  2.25    22.30 |  4.00     5.25 |  5.75     1.31
                 .75     1.31 |  2.50    60.35 |  4.25     5.25 |  6.00     1.31
                1.00     1.31 |  2.75    60.35 |  4.50     2.62 |  6.25     1.31
                1.25     1.31 |  3.00    17.06 |  4.75     2.62 |
                1.50     7.87 |  3.25    17.06 |  5.00     1.31 |
                1.75     7.87 |  3.50     9.18 |  5.25     1.31 |

---------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0245) |   Area     (ha)=  17.24
```

|ID= 1 DT= 5.0 min | Total Imp(%)= 85.00 Dir. Conn.(%)= 85.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	14.65	2.59
Dep. Storage	(mm)=	1.00	4.30
Average Slope	(%)=	1.00	2.00
Length	(m)=	339.00	40.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.00	1.667	7.87	3.250	17.06	4.83	1.31
.167	.00	1.750	7.87	3.333	9.18	4.92	1.31
.250	.00	1.833	22.30	3.417	9.18	5.00	1.31
.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Max.Eff.Inten.(mm/hr)=		60.35	36.31	
over (min)		5.00	15.00	
Storage Coeff. (min)=		6.50 (ii)	10.82 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		.18	.09	
				TOTALS
PEAK FLOW	(cms)=	2.44	.21	2.642 (iii)
TIME TO PEAK	(hrs)=	2.75	2.83	2.75
RUNOFF VOLUME	(mm)=	64.59	30.10	59.42
TOTAL RAINFALL	(mm)=	65.59	65.59	65.59
RUNOFF COEFFICIENT	=	.98	.46	.91

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

CALIB	
STANDHYD (0215)	Area (ha)= 124.65
ID= 1 DT= 5.0 min	Total Imp(%)= 83.00 Dir. Conn.(%)= 79.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	103.46	21.19
Dep. Storage	(mm)=	.50	4.70
Average Slope	(%)=	.30	.40
Length	(m)=	1800.00	200.00
Mannings n	=	.016	.250

Max.Eff.Inten.(mm/hr)=		60.35	26.44	
over (min)		30.00	80.00	
Storage Coeff. (min)=		28.79 (ii)	79.93 (ii)	
Unit Hyd. Tpeak (min)=		30.00	80.00	
Unit Hyd. peak (cms)=		.04	.01	
				TOTALS
PEAK FLOW	(cms)=	10.86	.73	11.140 (iii)
TIME TO PEAK	(hrs)=	3.00	4.00	3.00
RUNOFF VOLUME	(mm)=	65.09	30.12	57.75
TOTAL RAINFALL	(mm)=	65.59	65.59	65.59
RUNOFF COEFFICIENT	=	.99	.46	.88

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 76.0 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.

READ HYD (0210)	AREA (ha)= 576.91
DT= 5.0 min	TPEAK (hrs)= 3.17
	VOLUME (mm)= 53.22

Filename: G:\Projects\2008\08104 - Vaughan Corporate Centre - Master Servicing Strategy\Design\SWM\December 20
Comments: Outflow at 46.32

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	33.42	.224	66.83	.136	100.25	.060	133.67	.023
.08	.000	33.50	.223	66.92	.136	100.33	.059	133.75	.023
.17	.000	33.58	.223	67.00	.136	100.42	.059	133.83	.023
.25	.000	33.67	.222	67.08	.135	100.50	.059	133.92	.023
.33	.000	33.75	.222	67.17	.135	100.58	.059	134.00	.023
.42	.000	33.83	.222	67.25	.135	100.67	.059	134.08	.023
.50	.000	33.92	.221	67.33	.135	100.75	.059	134.17	.023
.58	.000	34.00	.221	67.42	.134	100.83	.058	134.25	.023
.67	.000	34.08	.221	67.50	.134	100.92	.058	134.33	.023
.75	.000	34.17	.220	67.58	.134	101.00	.058	134.42	.023
.83	.000	34.25	.220	67.67	.134	101.08	.058	134.50	.023
.92	.000	34.33	.220	67.75	.134	101.17	.058	134.58	.022
1.00	.000	34.42	.219	67.83	.133	101.25	.058	134.67	.022
1.08	.000	34.50	.219	67.92	.133	101.33	.058	134.75	.022
1.17	.000	34.58	.219	68.00	.133	101.42	.057	134.83	.022
1.25	.000	34.67	.218	68.08	.133	101.50	.057	134.92	.022
1.33	.000	34.75	.218	68.17	.132	101.58	.057	135.00	.022
1.42	.000	34.83	.218	68.25	.132	101.67	.057	135.08	.022
1.50	.001	34.92	.218	68.33	.132	101.75	.057	135.17	.022
1.58	.003	35.00	.217	68.42	.132	101.83	.057	135.25	.022
1.67	.004	35.08	.217	68.50	.132	101.92	.056	135.33	.022
1.75	.007	35.17	.217	68.58	.131	102.00	.056	135.42	.022
1.83	.010	35.25	.216	68.67	.131	102.08	.056	135.50	.022
1.92	.429	35.33	.216	68.75	.131	102.17	.056	135.58	.022
2.00	.984	35.42	.216	68.83	.131	102.25	.056	135.67	.022
2.08	1.611	35.50	.216	68.92	.131	102.33	.056	135.75	.022
2.17	2.291	35.58	.215	69.00	.130	102.42	.056	135.83	.022
2.25	3.000	35.67	.215	69.08	.130	102.50	.055	135.92	.022
2.33	3.771	35.75	.215	69.17	.130	102.58	.055	136.00	.022
2.42	4.721	35.83	.215	69.25	.130	102.67	.055	136.08	.022
2.50	5.903	35.92	.214	69.33	.130	102.75	.055	136.17	.022
2.58	7.429	36.00	.214	69.42	.129	102.83	.055	136.25	.021
2.67	9.481	36.08	.214	69.50	.129	102.92	.055	136.33	.021
2.75	11.562	36.17	.213	69.58	.129	103.00	.055	136.42	.021
2.83	13.503	36.25	.213	69.67	.129	103.08	.054	136.50	.021
2.92	15.067	36.33	.213	69.75	.128	103.17	.054	136.58	.021
3.00	16.149	36.42	.213	69.83	.128	103.25	.054	136.67	.021

3.08	16.772	36.50	.212	69.92	.128	103.33	.054	136.75	.021
3.17	17.011	36.58	.212	70.00	.128	103.42	.054	136.83	.021
3.25	16.983	36.67	.212	70.08	.128	103.50	.054	136.92	.021
3.33	16.769	36.75	.212	70.17	.127	103.58	.053	137.00	.021
3.42	16.409	36.83	.211	70.25	.127	103.67	.053	137.08	.021
3.50	15.935	36.92	.211	70.33	.127	103.75	.053	137.17	.021
3.58	15.391	37.00	.211	70.42	.127	103.83	.053	137.25	.021
3.67	14.814	37.08	.211	70.50	.127	103.92	.053	137.33	.021
3.75	14.236	37.17	.211	70.58	.126	104.00	.053	137.42	.021
3.83	13.675	37.25	.210	70.67	.126	104.08	.053	137.50	.021
3.92	13.123	37.33	.210	70.75	.126	104.17	.052	137.58	.021
4.00	12.579	37.42	.210	70.83	.126	104.25	.052	137.67	.021
4.08	12.050	37.50	.210	70.92	.126	104.33	.052	137.75	.021
4.17	11.542	37.58	.209	71.00	.125	104.42	.052	137.83	.021
4.25	11.065	37.67	.209	71.08	.125	104.50	.052	137.92	.021
4.33	10.617	37.75	.209	71.17	.125	104.58	.052	138.00	.020
4.42	10.188	37.83	.209	71.25	.125	104.67	.052	138.08	.020
4.50	9.772	37.92	.208	71.33	.125	104.75	.052	138.17	.020
4.58	9.371	38.00	.208	71.42	.124	104.83	.051	138.25	.020
4.67	8.986	38.08	.208	71.50	.124	104.92	.051	138.33	.020
4.75	8.624	38.17	.208	71.58	.124	105.00	.051	138.42	.020
4.83	8.287	38.25	.207	71.67	.124	105.08	.051	138.50	.020
4.92	7.971	38.33	.207	71.75	.124	105.17	.051	138.58	.020
5.00	7.671	38.42	.207	71.83	.123	105.25	.051	138.67	.020
5.08	7.387	38.50	.207	71.92	.123	105.33	.051	138.75	.020
5.17	7.119	38.58	.207	72.00	.123	105.42	.050	138.83	.020
5.25	6.874	38.67	.206	72.08	.123	105.50	.050	138.92	.020
5.33	6.703	38.75	.206	72.17	.123	105.58	.050	139.00	.020
5.42	6.538	38.83	.206	72.25	.122	105.67	.050	139.08	.020
5.50	6.381	38.92	.206	72.33	.122	105.75	.050	139.17	.020
5.58	6.232	39.00	.205	72.42	.122	105.83	.050	139.25	.020
5.67	6.092	39.08	.205	72.50	.122	105.92	.050	139.33	.020
5.75	5.960	39.17	.205	72.58	.122	106.00	.049	139.42	.020
5.83	5.837	39.25	.205	72.67	.121	106.08	.049	139.50	.020
5.92	5.722	39.33	.205	72.75	.121	106.17	.049	139.58	.020
6.00	5.614	39.42	.204	72.83	.121	106.25	.049	139.67	.020
6.08	5.515	39.50	.204	72.92	.121	106.33	.049	139.75	.020
6.17	5.426	39.58	.204	73.00	.121	106.42	.049	139.83	.020
6.25	5.346	39.67	.204	73.08	.120	106.50	.049	139.92	.019
6.33	5.271	39.75	.203	73.17	.120	106.58	.049	140.00	.019
6.42	5.196	39.83	.203	73.25	.120	106.67	.048	140.08	.019
6.50	5.117	39.92	.203	73.33	.120	106.75	.048	140.17	.019
6.58	5.034	40.00	.203	73.42	.120	106.83	.048	140.25	.019
6.67	4.947	40.08	.203	73.50	.119	106.92	.048	140.33	.019
6.75	4.860	40.17	.202	73.58	.119	107.00	.048	140.42	.019
6.83	4.774	40.25	.202	73.67	.119	107.08	.048	140.50	.019
6.92	4.690	40.33	.202	73.75	.119	107.17	.048	140.58	.019
7.00	4.609	40.42	.202	73.83	.119	107.25	.048	140.67	.019
7.08	4.532	40.50	.201	73.92	.118	107.33	.047	140.75	.019
7.17	4.458	40.58	.201	74.00	.118	107.42	.047	140.83	.019
7.25	4.388	40.67	.201	74.08	.118	107.50	.047	140.92	.019
7.33	4.322	40.75	.201	74.17	.118	107.58	.047	141.00	.019
7.42	4.258	40.83	.201	74.25	.118	107.67	.047	141.08	.019
7.50	4.198	40.92	.200	74.33	.117	107.75	.047	141.17	.019
7.58	4.140	41.00	.200	74.42	.117	107.83	.047	141.25	.019
7.67	4.084	41.08	.200	74.50	.117	107.92	.047	141.33	.019
7.75	4.030	41.17	.200	74.58	.117	108.00	.046	141.42	.019
7.83	3.978	41.25	.199	74.67	.117	108.08	.046	141.50	.019
7.92	3.928	41.33	.199	74.75	.117	108.17	.046	141.58	.019
8.00	3.880	41.42	.199	74.83	.116	108.25	.046	141.67	.019
8.08	3.834	41.50	.199	74.92	.116	108.33	.046	141.75	.019
8.17	3.789	41.58	.199	75.00	.116	108.42	.046	141.83	.019
8.25	3.745	41.67	.198	75.08	.116	108.50	.046	141.92	.018
8.33	3.702	41.75	.198	75.17	.116	108.58	.046	142.00	.018
8.42	3.661	41.83	.198	75.25	.115	108.67	.045	142.08	.018
8.50	3.620	41.92	.198	75.33	.115	108.75	.045	142.17	.018
8.58	3.580	42.00	.198	75.42	.115	108.83	.045	142.25	.018
8.67	3.541	42.08	.197	75.50	.115	108.92	.045	142.33	.018
8.75	3.502	42.17	.197	75.58	.115	109.00	.045	142.42	.018
8.83	3.464	42.25	.197	75.67	.114	109.08	.045	142.50	.018
8.92	3.427	42.33	.197	75.75	.114	109.17	.045	142.58	.018
9.00	3.389	42.42	.196	75.83	.114	109.25	.045	142.67	.018
9.08	3.353	42.50	.196	75.92	.114	109.33	.045	142.75	.018
9.17	3.317	42.58	.196	76.00	.114	109.42	.044	142.83	.018
9.25	3.281	42.67	.196	76.08	.113	109.50	.044	142.92	.018
9.33	3.246	42.75	.196	76.17	.113	109.58	.044	143.00	.018
9.42	3.212	42.83	.195	76.25	.113	109.67	.044	143.08	.018
9.50	3.178	42.92	.195	76.33	.113	109.75	.044	143.17	.018
9.58	3.144	43.00	.195	76.42	.113	109.83	.044	143.25	.018
9.67	3.112	43.08	.195	76.50	.113	109.92	.044	143.33	.018
9.75	3.079	43.17	.195	76.58	.112	110.00	.044	143.42	.018
9.83	3.047	43.25	.194	76.67	.112	110.08	.044	143.50	.018
9.92	3.015	43.33	.194	76.75	.112	110.17	.044	143.58	.018
10.00	2.984	43.42	.194	76.83	.112	110.25	.043	143.67	.018
10.08	2.954	43.50	.194	76.92	.112	110.33	.043	143.75	.018
10.17	2.923	43.58	.193	77.00	.111	110.42	.043	143.83	.018
10.25	2.893	43.67	.193	77.08	.111	110.50	.043	143.92	.018
10.33	2.862	43.75	.193	77.17	.111	110.58	.043	144.00	.017
10.42	2.832	43.83	.193	77.25	.111	110.67	.043	144.08	.017
10.50	2.802	43.92	.193	77.33	.111	110.75	.043	144.17	.017
10.58	2.772	44.00	.192	77.42	.111	110.83	.043	144.25	.017
10.67	2.742	44.08	.192	77.50	.110	110.92	.043	144.33	.017
10.75	2.712	44.17	.192	77.58	.110	111.00	.042	144.42	.017
10.83	2.683	44.25	.192	77.67	.110	111.08	.042	144.50	.017
10.92	2.654	44.33	.192	77.75	.110	111.17	.042	144.58	.017
11.00	2.626	44.42	.191	77.83	.110	111.25	.042	144.67	.017
11.08	2.597	44.50	.191	77.92	.109	111.33	.042	144.75	.017
11.17	2.570	44.58	.191	78.00	.109	111.42	.042	144.83	.017
11.25	2.542	44.67	.191	78.08	.109	111.50	.042	144.92	.017
11.33	2.515	44.75	.191	78.17	.109	111.58	.042	145.00	.017
11.42	2.488	44.83	.190	78.25	.109	111.67	.042	145.08	.017
11.50	2.462	44.92	.190	78.33	.109	111.75	.042	145.17	.017
11.58	2.435	45.00	.190	78.42	.108	111.83	.042	145.25	.017
11.67	2.409	45.08	.190	78.50	.108	111.92	.041	145.33	.017
11.75	2.383	45.17	.189	78.58	.108	112.00	.041	145.42	.017
11.83	2.356	45.25	.189	78.67	.108	112.08	.041	145.50	.017
11.92	2.329	45.33	.189	78.75	.108	112.17	.041	145.58	.017
12.00	2.302	45.42	.189	78.83	.108	112.25	.041	145.67	.017
12.08	2.274	45.50	.189	78.92	.107	112.33	.041	145.75	.017
12.17	2.246	45.58	.188	79.00	.107	112.42	.041	145.83	.017
12.25	2.218	45.67	.188	79.08	.107	112.50	.041	145.92	.017
12.33	2.190	45.75	.188	79.17	.107	112.58	.041	146.00	.017
12.42	2.162	45.83	.188	79.25	.107	112.67	.041	146.08	.017
12.50	2.134	45.92	.188	79.33	.107	112.75	.040	146.17	.016
12.58	2.107	46.00	.187	79.42	.106	112.83	.040	146.25	.016
12.67	2.079	46.08	.187	79.50	.106	112.92	.040	146.33	.016
12.75	2.052	46.17	.187	79.58	.106	113.00	.040	146.42	.016
12.83	2.025	46.25	.187	79.67	.106	113.08	.040	146.50	.016
12.92	1.998	46.33	.187	79.75	.106	113.17	.040	146.58	.016
13.00	1.971	46.42	.186	79.83	.106	113.25	.040	146.67	.016
13.08	1.945	46.50	.186	79.92	.105	113.33	.040	146.75	.016
13.17	1.919	46.58	.186	80.00	.105	113.42	.040	146.83	.016
13.25	1.893	46.67	.186	80.08	.105	113.50	.040	146.92	.016
13.33	1.868	46.75	.186	80.17	.105	113.58	.040	147.00	.016
13.42	1.843	46.83	.185	80.25	.105	113.67	.039	147.08	.016
13.50	1.818	46.92	.185	80.33	.105	113.75	.039	147.17	.016
13.58	1.794	47.00	.185	80.42	.104	113.83	.039	147.25	.016
13.67	1.770	47.08	.185	80.50	.104	113.92	.039	147.33	.016
13.75	1.745	47.17	.184	80.58	.104	114.00	.039	147.42	.016
13.83	1.720	47.25	.184	80.67	.104	114.08	.039	147.50	.016
13.92	1.693	47.33	.184	80.75	.104	114.17	.039	147.58	.016
14.00	1.665	47.42	.184	80.83	.104	114.25	.039	147.67	.016
14.08	1.635	47.50	.184	80.92	.103	114.33	.039	147.75	.016
14.17	1.605	47.58	.183	81.00	.103	114.42	.039	147.83	.016

14.25	1.574	47.67	.183	81.08	.103	114.50	.039	147.92	.016
14.33	1.543	47.75	.183	81.17	.103	114.58	.038	148.00	.016
14.42	1.514	47.83	.183	81.25	.103	114.67	.038	148.08	.016
14.50	1.486	47.92	.183	81.33	.103	114.75	.038	148.17	.016
14.58	1.459	48.00	.182	81.42	.102	114.83	.038	148.25	.016
14.67	1.434	48.08	.182	81.50	.102	114.92	.038	148.33	.016
14.75	1.410	48.17	.182	81.58	.102	115.00	.038	148.42	.016
14.83	1.387	48.25	.182	81.67	.102	115.08	.038	148.50	.016
14.92	1.365	48.33	.182	81.75	.102	115.17	.038	148.58	.015
15.00	1.343	48.42	.181	81.83	.102	115.25	.038	148.67	.015
15.08	1.323	48.50	.181	81.92	.102	115.33	.038	148.75	.015
15.17	1.303	48.58	.181	82.00	.101	115.42	.038	148.83	.015
15.25	1.284	48.67	.181	82.08	.101	115.50	.038	148.92	.015
15.33	1.265	48.75	.181	82.17	.101	115.58	.037	149.00	.015
15.42	1.247	48.83	.180	82.25	.101	115.67	.037	149.08	.015
15.50	1.229	48.92	.180	82.33	.101	115.75	.037	149.17	.015
15.58	1.212	49.00	.180	82.42	.101	115.83	.037	149.25	.015
15.67	1.196	49.08	.180	82.50	.100	115.92	.037	149.33	.015
15.75	1.179	49.17	.180	82.58	.100	116.00	.037	149.42	.015
15.83	1.163	49.25	.179	82.67	.100	116.08	.037	149.50	.015
15.92	1.148	49.33	.179	82.75	.100	116.17	.037	149.58	.015
16.00	1.133	49.42	.179	82.83	.100	116.25	.037	149.67	.015
16.08	1.118	49.50	.179	82.92	.100	116.33	.037	149.75	.015
16.17	1.104	49.58	.179	83.00	.100	116.42	.037	149.83	.015
16.25	1.090	49.67	.178	83.08	.099	116.50	.037	149.92	.015
16.33	1.076	49.75	.178	83.17	.099	116.58	.036	150.00	.015
16.42	1.062	49.83	.178	83.25	.099	116.67	.036	150.08	.015
16.50	1.049	49.92	.178	83.33	.099	116.75	.036	150.17	.015
16.58	1.036	50.00	.177	83.42	.099	116.83	.036	150.25	.015
16.67	1.024	50.08	.177	83.50	.099	116.92	.036	150.33	.015
16.75	1.011	50.17	.177	83.58	.098	117.00	.036	150.42	.015
16.83	.999	50.25	.177	83.67	.098	117.08	.036	150.50	.015
16.92	.985	50.33	.177	83.75	.098	117.17	.036	150.58	.015
17.00	.970	50.42	.176	83.83	.098	117.25	.036	150.67	.015
17.08	.954	50.50	.176	83.92	.098	117.33	.036	150.75	.015
17.17	.937	50.58	.176	84.00	.098	117.42	.036	150.83	.015
17.25	.919	50.67	.176	84.08	.098	117.50	.036	150.92	.015
17.33	.900	50.75	.176	84.17	.097	117.58	.035	151.00	.015
17.42	.882	50.83	.175	84.25	.097	117.67	.035	151.08	.014
17.50	.864	50.92	.175	84.33	.097	117.75	.035	151.17	.014
17.58	.846	51.00	.175	84.42	.097	117.83	.035	151.25	.014
17.67	.828	51.08	.175	84.50	.097	117.92	.035	151.33	.014
17.75	.810	51.17	.175	84.58	.097	118.00	.035	151.42	.014
17.83	.793	51.25	.174	84.67	.097	118.08	.035	151.50	.014
17.92	.776	51.33	.174	84.75	.096	118.17	.035	151.58	.014
18.00	.760	51.42	.174	84.83	.096	118.25	.035	151.67	.014
18.08	.744	51.50	.174	84.92	.096	118.33	.035	151.75	.014
18.17	.729	51.58	.174	85.00	.096	118.42	.035	151.83	.014
18.25	.714	51.67	.173	85.08	.096	118.50	.035	151.92	.014
18.33	.700	51.75	.173	85.17	.096	118.58	.035	152.00	.014
18.42	.686	51.83	.173	85.25	.096	118.67	.034	152.08	.014
18.50	.672	51.92	.173	85.33	.095	118.75	.034	152.17	.014
18.58	.659	52.00	.173	85.42	.095	118.83	.034	152.25	.014
18.67	.646	52.08	.172	85.50	.095	118.92	.034	152.33	.014
18.75	.633	52.17	.172	85.58	.095	119.00	.034	152.42	.014
18.83	.621	52.25	.172	85.67	.095	119.08	.034	152.50	.014
18.92	.609	52.33	.172	85.75	.094	119.17	.034	152.58	.014
19.00	.598	52.42	.172	85.83	.094	119.25	.034	152.67	.014
19.08	.586	52.50	.171	85.92	.094	119.33	.034	152.75	.014
19.17	.575	52.58	.171	86.00	.094	119.42	.034	152.83	.014
19.25	.564	52.67	.171	86.08	.094	119.50	.034	152.92	.014
19.33	.554	52.75	.171	86.17	.094	119.58	.034	153.00	.014
19.42	.544	52.83	.171	86.25	.093	119.67	.034	153.08	.014
19.50	.534	52.92	.170	86.33	.093	119.75	.033	153.17	.014
19.58	.524	53.00	.170	86.42	.093	119.83	.033	153.25	.014
19.67	.515	53.08	.170	86.50	.093	119.92	.033	153.33	.014
19.75	.506	53.17	.170	86.58	.092	120.00	.033	153.42	.014
19.83	.497	53.25	.170	86.67	.092	120.08	.033	153.50	.014
19.92	.489	53.33	.169	86.75	.092	120.17	.033	153.58	.014
20.00	.481	53.42	.169	86.83	.092	120.25	.033	153.67	.014
20.08	.473	53.50	.169	86.92	.092	120.33	.033	153.75	.013
20.17	.466	53.58	.169	87.00	.091	120.42	.033	153.83	.013
20.25	.459	53.67	.169	87.08	.091	120.50	.033	153.92	.013
20.33	.452	53.75	.168	87.17	.091	120.58	.033	154.00	.013
20.42	.446	53.83	.168	87.25	.091	120.67	.033	154.08	.013
20.50	.439	53.92	.168	87.33	.091	120.75	.033	154.17	.013
20.58	.433	54.00	.168	87.42	.090	120.83	.032	154.25	.013
20.67	.428	54.08	.168	87.50	.090	120.92	.032	154.33	.013
20.75	.422	54.17	.167	87.58	.090	121.00	.032	154.42	.013
20.83	.417	54.25	.167	87.67	.090	121.08	.032	154.50	.013
20.92	.412	54.33	.167	87.75	.089	121.17	.032	154.58	.013
21.00	.407	54.42	.167	87.83	.089	121.25	.032	154.67	.013
21.08	.402	54.50	.167	87.92	.089	121.33	.032	154.75	.013
21.17	.398	54.58	.166	88.00	.089	121.42	.032	154.83	.013
21.25	.393	54.67	.166	88.08	.089	121.50	.032	154.92	.013
21.33	.389	54.75	.166	88.17	.088	121.58	.032	155.00	.013
21.42	.385	54.83	.166	88.25	.088	121.67	.032	155.08	.013
21.50	.382	54.92	.166	88.33	.088	121.75	.032	155.17	.013
21.58	.378	55.00	.165	88.42	.088	121.83	.032	155.25	.013
21.67	.374	55.08	.165	88.50	.087	121.92	.032	155.33	.013
21.75	.371	55.17	.165	88.58	.087	122.00	.031	155.42	.013
21.83	.368	55.25	.165	88.67	.087	122.08	.031	155.50	.013
21.92	.365	55.33	.165	88.75	.087	122.17	.031	155.58	.013
22.00	.362	55.42	.164	88.83	.086	122.25	.031	155.67	.013
22.08	.359	55.50	.164	88.92	.086	122.33	.031	155.75	.013
22.17	.356	55.58	.164	89.00	.086	122.42	.031	155.83	.013
22.25	.354	55.67	.164	89.08	.086	122.50	.031	155.92	.013
22.33	.351	55.75	.164	89.17	.086	122.58	.031	156.00	.013
22.42	.349	55.83	.163	89.25	.085	122.67	.031	156.08	.013
22.50	.346	55.92	.163	89.33	.085	122.75	.031	156.17	.013
22.58	.344	56.00	.163	89.42	.085	122.83	.031	156.25	.013
22.67	.342	56.08	.163	89.50	.085	122.92	.031	156.33	.013
22.75	.340	56.17	.163	89.58	.084	123.00	.031	156.42	.013
22.83	.338	56.25	.162	89.67	.084	123.08	.031	156.50	.013
22.92	.336	56.33	.162	89.75	.084	123.17	.030	156.58	.013
23.00	.334	56.42	.162	89.83	.084	123.25	.030	156.67	.012
23.08	.332	56.50	.162	89.92	.084	123.33	.030	156.75	.012
23.17	.330	56.58	.162	90.00	.083	123.42	.030	156.83	.012
23.25	.328	56.67	.161	90.08	.083	123.50	.030	156.92	.012
23.33	.327	56.75	.161	90.17	.083	123.58	.030	157.00	.012
23.42	.325	56.83	.161	90.25	.083	123.67	.030	157.08	.012
23.50	.324	56.92	.161	90.33	.082	123.75	.030	157.17	.012
23.58	.322	57.00	.161	90.42	.082	123.83	.030	157.25	.012
23.67	.321	57.08	.160	90.50	.082	123.92	.030	157.33	.012
23.75	.319	57.17	.160	90.58	.082	124.00	.030	157.42	.012
23.83	.318	57.25	.160	90.67	.082	124.08	.030	157.50	.012
23.92	.317	57.33	.160	90.75	.081	124.17	.030	157.58	.012
24.00	.315	57.42	.160	90.83	.081	124.25	.030	157.67	.012
24.08	.314	57.50	.159	90.92	.081	124.33	.030	157.75	.012
24.17	.313	57.58	.159	91.00	.081	124.42	.029	157.83	.012
24.25	.312	57.67	.159	91.08	.080	124.50	.029	157.92	.012
24.33	.310	57.75	.159	91.17	.080	124.58	.029	158.00	.012
24.42	.309	57.83	.159	91.25	.080	124.67	.029	158.08	.012
24.50	.308	57.92	.158	91.33	.080	124.75	.029	158.17	.012
24.58	.307	58.00	.158	91.42	.080	124.83	.029	158.25	.012
24.67	.306	58.08	.158	91.50	.079	124.92	.029	158.33	.012
24.75	.305	58.17	.158	91.58	.079	125.00	.029	158.42	.012
24.83	.304	58.25	.158	91.67	.079	125.08	.029	158.50	.012
24.92	.303	58.33	.157	91.75	.079	125.17	.029	158.58	.012
25.00	.302	58.42	.157	91.83	.078	125.25	.029	158.67	.012
25.08	.301	58.50	.157	91.92	.078	125.33	.029	158.75	.012
25.17	.300	58.58	.157	92.00	.078	125.42	.029	158.83	.012
25.25	.299	58.67	.157	92.08	.078	125.50	.029	158.92	.012
25.33	.298	58.75	.156	92.17	.078	125.58	.029	159.00	.012

25.42	.298	58.83	.156	92.25	.077	125.67	.029	159.08	.012
25.50	.297	58.92	.156	92.33	.077	125.75	.028	159.17	.012
25.58	.296	59.00	.156	92.42	.077	125.83	.028	159.25	.012
25.67	.295	59.08	.156	92.50	.077	125.92	.028	159.33	.012
25.75	.294	59.17	.155	92.58	.077	126.00	.028	159.42	.012
25.83	.293	59.25	.155	92.67	.076	126.08	.028	159.50	.012
25.92	.293	59.33	.155	92.75	.076	126.17	.028	159.58	.012
26.00	.292	59.42	.155	92.83	.076	126.25	.028	159.67	.012
26.08	.291	59.50	.155	92.92	.076	126.33	.028	159.75	.012
26.17	.290	59.58	.155	93.00	.076	126.42	.028	159.83	.011
26.25	.290	59.67	.154	93.08	.075	126.50	.028	159.92	.011
26.33	.289	59.75	.154	93.17	.075	126.58	.028	160.00	.011
26.42	.288	59.83	.154	93.25	.075	126.67	.028	160.08	.011
26.50	.288	59.92	.154	93.33	.075	126.75	.028	160.17	.011
26.58	.287	60.00	.154	93.42	.074	126.83	.028	160.25	.011
26.67	.286	60.08	.153	93.50	.074	126.92	.028	160.33	.011
26.75	.286	60.17	.153	93.58	.074	127.00	.028	160.42	.011
26.83	.285	60.25	.153	93.67	.074	127.08	.027	160.50	.011
26.92	.284	60.33	.153	93.75	.074	127.17	.027	160.58	.011
27.00	.284	60.42	.153	93.83	.073	127.25	.027	160.67	.011
27.08	.283	60.50	.152	93.92	.073	127.33	.027	160.75	.011
27.17	.282	60.58	.152	94.00	.073	127.42	.027	160.83	.011
27.25	.282	60.67	.152	94.08	.073	127.50	.027	160.92	.011
27.33	.281	60.75	.152	94.17	.073	127.58	.027	161.00	.011
27.42	.281	60.83	.152	94.25	.072	127.67	.027	161.08	.011
27.50	.280	60.92	.151	94.33	.072	127.75	.027	161.17	.011
27.58	.279	61.00	.151	94.42	.072	127.83	.027	161.25	.011
27.67	.279	61.08	.151	94.50	.072	127.92	.027	161.33	.011
27.75	.278	61.17	.151	94.58	.072	128.00	.027	161.42	.011
27.83	.278	61.25	.151	94.67	.071	128.08	.027	161.50	.011
27.92	.277	61.33	.150	94.75	.071	128.17	.027	161.58	.011
28.00	.276	61.42	.150	94.83	.071	128.25	.027	161.67	.011
28.08	.276	61.50	.150	94.92	.071	128.33	.027	161.75	.011
28.17	.275	61.58	.150	95.00	.071	128.42	.026	161.83	.011
28.25	.274	61.67	.150	95.08	.071	128.50	.026	161.92	.011
28.33	.274	61.75	.149	95.17	.070	128.58	.026	162.00	.011
28.42	.273	61.83	.149	95.25	.070	128.67	.026	162.08	.011
28.50	.272	61.92	.149	95.33	.070	128.75	.026	162.17	.011
28.58	.271	62.00	.149	95.42	.070	128.83	.026	162.25	.011
28.67	.270	62.08	.149	95.50	.070	128.92	.026	162.33	.011
28.75	.269	62.17	.148	95.58	.069	129.00	.026	162.42	.011
28.83	.269	62.25	.148	95.67	.069	129.08	.026	162.50	.011
28.92	.268	62.33	.148	95.75	.069	129.17	.026	162.58	.011
29.00	.266	62.42	.148	95.83	.069	129.25	.026	162.67	.011
29.08	.265	62.50	.148	95.92	.069	129.33	.026	162.75	.011
29.17	.264	62.58	.147	96.00	.068	129.42	.026	162.83	.011
29.25	.263	62.67	.147	96.08	.068	129.50	.026	162.92	.011
29.33	.262	62.75	.147	96.17	.068	129.58	.026	163.00	.011
29.42	.261	62.83	.147	96.25	.068	129.67	.026	163.08	.011
29.50	.260	62.92	.146	96.33	.068	129.75	.026	163.17	.011
29.58	.258	63.00	.146	96.42	.068	129.83	.025	163.25	.010
29.67	.257	63.08	.146	96.50	.067	129.92	.025	163.33	.010
29.75	.256	63.17	.146	96.58	.067	130.00	.025	163.42	.010
29.83	.255	63.25	.146	96.67	.067	130.08	.025	163.50	.010
29.92	.254	63.33	.145	96.75	.067	130.17	.025	163.58	.010
30.00	.252	63.42	.145	96.83	.067	130.25	.025	163.67	.010
30.08	.251	63.50	.145	96.92	.066	130.33	.025	163.75	.010
30.17	.250	63.58	.145	97.00	.066	130.42	.025	163.83	.010
30.25	.249	63.67	.144	97.08	.066	130.50	.025	163.92	.010
30.33	.248	63.75	.144	97.17	.066	130.58	.025	164.00	.010
30.42	.247	63.83	.144	97.25	.066	130.67	.025	164.08	.010
30.50	.246	63.92	.144	97.33	.066	130.75	.025	164.17	.010
30.58	.245	64.00	.144	97.42	.065	130.83	.025	164.25	.010
30.67	.244	64.08	.143	97.50	.065	130.92	.025	164.33	.010
30.75	.243	64.17	.143	97.58	.065	131.00	.025	164.42	.010
30.83	.242	64.25	.143	97.67	.065	131.08	.025	164.50	.010
30.92	.241	64.33	.143	97.75	.065	131.17	.025	164.58	.010
31.00	.240	64.42	.142	97.83	.064	131.25	.025	164.67	.010
31.08	.239	64.50	.142	97.92	.064	131.33	.024	164.75	.010
31.17	.238	64.58	.142	98.00	.064	131.42	.024	164.83	.010
31.25	.238	64.67	.142	98.08	.064	131.50	.024	164.92	.010
31.33	.237	64.75	.142	98.17	.064	131.58	.024	165.00	.010
31.42	.236	64.83	.141	98.25	.064	131.67	.024	165.08	.010
31.50	.235	64.92	.141	98.33	.063	131.75	.024	165.17	.010
31.58	.235	65.00	.141	98.42	.063	131.83	.024	165.25	.010
31.67	.234	65.08	.141	98.50	.063	131.92	.024	165.33	.010
31.75	.233	65.17	.140	98.58	.063	132.00	.024	165.42	.010
31.83	.233	65.25	.140	98.67	.063	132.08	.024	165.50	.010
31.92	.232	65.33	.140	98.75	.063	132.17	.024	165.58	.010
32.00	.232	65.42	.140	98.83	.062	132.25	.024	165.67	.010
32.08	.231	65.50	.140	98.92	.062	132.33	.024	165.75	.010
32.17	.230	65.58	.139	99.00	.062	132.42	.024	165.83	.010
32.25	.230	65.67	.139	99.08	.062	132.50	.024	165.92	.010
32.33	.229	65.75	.139	99.17	.062	132.58	.024	166.00	.010
32.42	.229	65.83	.139	99.25	.062	132.67	.024	166.08	.010
32.50	.228	65.92	.138	99.33	.061	132.75	.024	166.17	.010
32.58	.228	66.00	.138	99.42	.061	132.83	.024	166.25	.010
32.67	.227	66.08	.138	99.50	.061	132.92	.023	166.33	.010
32.75	.227	66.17	.138	99.58	.061	133.00	.023	166.42	.010
32.83	.227	66.25	.138	99.67	.061	133.08	.023	166.50	.010
32.92	.226	66.33	.137	99.75	.061	133.17	.023	166.58	.010
33.00	.226	66.42	.137	99.83	.060	133.25	.023		
33.08	.225	66.50	.137	99.92	.060	133.33	.023		
33.17	.225	66.58	.137	100.00	.060	133.42	.023		
33.25	.224	66.67	.136	100.08	.060	133.50	.023		
33.33	.224	66.75	.136	100.17	.060	133.58	.023		

READ STORM	Filename: G:\Projects\2008\ 08104 - Vaughan Corporate Centre - Master Ser \Design\SWM\December 2011 - TS\VO2 Input Hydr
Ptotal= 65.59 mm	Comments: 25yr/6hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	2.00	22.30	3.75	9.18	5.50	1.31
.50	1.31	2.25	22.30	4.00	5.25	5.75	1.31
.75	1.31	2.50	60.35	4.25	5.25	6.00	1.31
1.00	1.31	2.75	60.35	4.50	2.62	6.25	1.31
1.25	1.31	3.00	17.06	4.75	2.62		
1.50	7.87	3.25	17.06	5.00	1.31		
1.75	7.87	3.50	9.18	5.25	1.31		

ADD HYD (0218): 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0215):	124.65	11.140	3.00	57.75
+ ID2= 2 (0210):	576.91	17.011	3.17	53.22
ID = 3 (0218):	701.56	27.743	3.08	54.02

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (0231) |ID= 1 DT= 5.0 min |

Area (ha)= 14.94
Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.45	1.49
Dep. Storage	(mm)=	1.00	4.30
Average Slope	(%)=	1.00	2.00
Length	(m)=	315.60	40.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.00	1.667	7.87	3.250	17.06	4.83	1.31
.167	.00	1.750	7.87	3.333	9.18	4.92	1.31
.250	.00	1.833	22.30	3.417	9.18	5.00	1.31
.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

				TOTALS
Max.Eff.Inten.	(mm/hr)=	60.35	37.96	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	6.23 (ii)	9.82 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	.19	.11	
PEAK FLOW	(cms)=	2.24	.13	2.371 (iii)
TIME TO PEAK	(hrs)=	2.75	2.75	2.75
RUNOFF VOLUME	(mm)=	64.59	30.10	61.14
TOTAL RAINFALL	(mm)=	65.59	65.59	65.59
RUNOFF COEFFICIENT	=	.98	.46	.93

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

CALIB	
STANDHYD (0220)	Area (ha)= 16.19
ID= 1 DT= 5.0 min	Total Imp(%)= 57.00 Dir. Conn.(%)= 57.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	9.23	6.96
Dep. Storage	(mm)=	1.00	4.30
Average Slope	(%)=	1.00	2.00
Length	(m)=	328.50	40.00
Mannings n	=	.013	.250
Max.Eff.Inten.	(mm/hr)=	60.35	34.98
over	(min)	5.00	20.00
Storage Coeff.	(min)=	6.38 (ii)	17.13 (ii)
Unit Hyd. Tpeak	(min)=	5.00	20.00
Unit Hyd. peak	(cms)=	.18	.06

				TOTALS
PEAK FLOW	(cms)=	1.54	.47	1.952 (iii)
TIME TO PEAK	(hrs)=	2.75	2.92	2.75
RUNOFF VOLUME	(mm)=	64.59	30.10	49.76
TOTAL RAINFALL	(mm)=	65.59	65.59	65.59
RUNOFF COEFFICIENT	=	.98	.46	.76

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

RESERVOIR (0234)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	1.1510	.5700

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0220)	16.19	1.95	2.75	49.76
OUTFLOW: ID= 1 (0234)	16.19	.75	3.25	49.75

PEAK FLOW REDUCTION [Qout/Qin](%)= 38.39
TIME SHIFT OF PEAK FLOW (min)= 30.00
MAXIMUM STORAGE USED (ha.m.)= .3713

ADD HYD (0236)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0231):	14.94	2.371	2.75	61.14
+ ID2= 2 (0234):	16.19	.749	3.25	49.75
ID = 3 (0236):	31.13	2.982	2.75	55.22

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0222)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0218):	701.56	27.743	3.08	54.02
+ ID2= 2 (0236):	31.13	2.982	2.75	55.22
ID = 3 (0222):	732.69	29.250	3.08	54.07

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

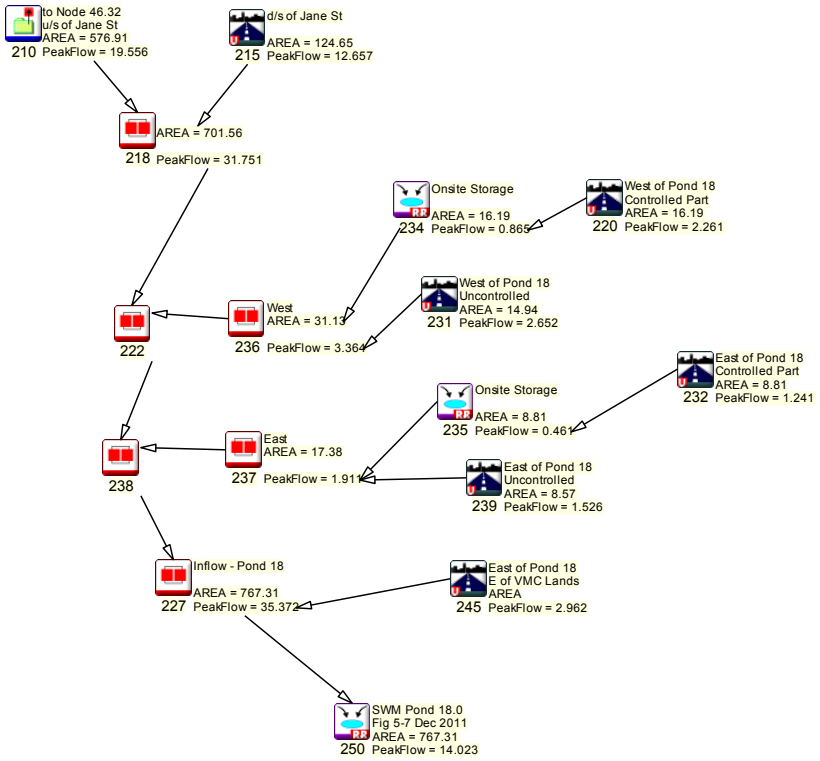
CALIB	
STANDHYD (0239)	Area (ha)= 8.57
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

	IMPERVIOUS	PERVIOUS (i)

```
     Surface Area     (ha)=       7.71          .86
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     239.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      60.35        78.07
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       5.27 (ii)    8.86 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .21          .12
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.29          .08          1.365 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75           2.75
     RUNOFF VOLUME    (mm)=      64.59        30.10          61.14
     TOTAL RAINFALL   (mm)=      65.59        65.59          65.59
     RUNOFF COEFFICIENT   =        .98          .46            .93


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0232) |   Area    (ha)=   8.81
|ID= 1 DT= 5.0 min |   Total Imp(%)=  57.00   Dir. Conn.(%)=  57.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.02         3.79
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     242.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      60.35        34.98
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       5.32 (ii)   16.06 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .21          .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .84          .26          1.072 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92           2.75
     RUNOFF VOLUME    (mm)=      64.59        30.10          49.76
     TOTAL RAINFALL   (mm)=      65.59        65.59          65.59
     RUNOFF COEFFICIENT   =        .98          .46            .76


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0235) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .5820      .3000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0232)      8.81      1.07      2.75      49.76
     OUTFLOW: ID= 1 (0235)      8.81       .40      3.25      49.74

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 37.28
                    TIME SHIFT OF PEAK FLOW         (min)= 30.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  .2061

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0237) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0239):     8.57    1.365     2.75    61.14
        + ID2= 2 (0235):     8.81     .399     3.25    49.74
          ================================================
          ID = 3 (0237):    17.38   1.696     2.75    55.36

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0238) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0222):   732.69  29.250     3.08    54.07
        + ID2= 2 (0237):    17.38   1.696     2.75    55.36
          ================================================
          ID = 3 (0238):   750.07  30.066     3.08    54.10

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0227) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0245):    17.24   2.642     2.75    59.42
        + ID2= 2 (0238):   750.07  30.066     3.08    54.10
          ================================================
          ID = 3 (0227):   767.31  30.965     3.08    54.22

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0250) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    | 17.9700    18.1470
                          1.8900     1.0080    | 19.4300    18.8300
                          2.2330     1.9630    | 23.4600    19.3240
                          2.7950     6.4020    | 31.0300    19.8490
                          3.2760     9.1830    | 38.3600    20.2920
                          3.4270    10.6610    | 40.0000    20.3980
                          3.6700    12.2670    | 42.5000    21.3030
                          5.6440    13.9060    | 45.0000    22.1830
                          9.7990    15.5860    | 47.5000    23.5100
                         15.2400    17.3710    |    .0000      .0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0227)    767.31     30.97      3.08      54.22
     OUTFLOW: ID= 1 (0250)    767.31     10.72      4.92      54.21
```

```
                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 34.61
                  TIME SHIFT OF PEAK FLOW         (min)=110.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=15.8872

--------------------------------------------------------------------------------

 FINISH
================================================================================
==============
```

North East POND (50yr 6hr AES)



Summary Hydrograph Data

Run Number : 1

NHYD	DT [hr]	AREA [ha]	Peak flow [m³/s]	TP [hr]	Runoff Vol. [mm]	DWF [m³/s]
250	0.083	767.310	14.023	4.667	61.187	0.000

```
================================================================================
================================================================================
================================

       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
         V V    I      SS   U   U  A   A  L
          VV    I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM, Version 2.0
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O   Licensed To: TMIG
        OOO     T      T    H   H    Y    M   M   OOO                vo2-0145

Developed and Distributed by Greenland International Consulting Inc.
Copyright 1996, 2001 Schaeffer & Associates Ltd.
All rights reserved.

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

  Input   filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat
  Output  filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final
submission\05PROP~1\50y6 w Dev VMC, Prop Pond 18 With %IMP Reduction.
  Summary filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final
submission\05PROP~1\50y6 w Dev VMC, Prop Pond 18 With %IMP Reduction.

DATE: 4/10/2012                          TIME: 12:25:45 PM

USER:

COMMENTS: _____________________________________________________

--------------------------------------------------------------------------------
---------------
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************

--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\December 2011 - TS\VO2 Input Hydr
| Ptotal= 73.00 mm |    Comments: 50yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25    .00 |  2.00   24.82 |  3.75   10.22 |  5.50    1.46
                 .50   1.46 |  2.25   24.82 |  4.00    5.84 |  5.75    1.46
                 .75   1.46 |  2.50   67.16 |  4.25    5.84 |  6.00    1.46
                1.00   1.46 |  2.75   67.16 |  4.50    2.92 |  6.25    1.46
                1.25   1.46 |  3.00   18.98 |  4.75    2.92 |
                1.50   8.76 |  3.25   18.98 |  5.00    1.46 |
                1.75   8.76 |  3.50   10.22 |  5.25    1.46 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0215) |   Area     (ha)= 124.65
```

|ID= 1 DT= 5.0 min | Total Imp(%)= 83.00 Dir. Conn.(%)= 79.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	103.46	21.19
Dep. Storage	(mm)=	.50	4.70
Average Slope	(%)=	.30	.40
Length	(m)=	1800.00	200.00
Mannings n	=	.016	.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.00	1.667	8.76	3.250	18.98	4.83	1.46
.167	.00	1.750	8.76	3.333	10.22	4.92	1.46
.250	.00	1.833	24.82	3.417	10.22	5.00	1.46
.333	1.46	1.917	24.82	3.500	10.22	5.08	1.46
.417	1.46	2.000	24.82	3.583	10.22	5.17	1.46
.500	1.46	2.083	24.82	3.667	10.22	5.25	1.46
.583	1.46	2.167	24.82	3.750	10.22	5.33	1.46
.667	1.46	2.250	24.82	3.833	5.84	5.42	1.46
.750	1.46	2.333	67.16	3.917	5.84	5.50	1.46
.833	1.46	2.417	67.16	4.000	5.84	5.58	1.46
.917	1.46	2.500	67.16	4.083	5.84	5.67	1.46
1.000	1.46	2.583	67.16	4.167	5.84	5.75	1.46
1.083	1.46	2.667	67.16	4.250	5.84	5.83	1.46
1.167	1.46	2.750	67.16	4.333	2.92	5.92	1.46
1.250	1.46	2.833	18.98	4.417	2.92	6.00	1.46
1.333	8.76	2.917	18.98	4.500	2.92	6.08	1.46
1.417	8.76	3.000	18.98	4.583	2.92	6.17	1.46
1.500	8.76	3.083	18.98	4.667	2.92	6.25	1.46
1.583	8.76	3.167	18.98	4.750	2.92		

				TOTALS
Max.Eff.Inten.	(mm/hr)=	67.16	32.81	
over	(min)	30.00	75.00	
Storage Coeff.	(min)=	27.58 (ii)	74.50 (ii)	
Unit Hyd. Tpeak	(min)=	30.00	75.00	
Unit Hyd. peak	(cms)=	.04	.02	
PEAK FLOW	(cms)=	12.27	.91	12.657 (iii)
TIME TO PEAK	(hrs)=	3.00	3.92	3.00
RUNOFF VOLUME	(mm)=	72.50	35.70	64.77
TOTAL RAINFALL	(mm)=	73.00	73.00	73.00
RUNOFF COEFFICIENT	=	.99	.49	.89

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 76.0 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.

READ HYD (0210)	AREA (ha)= 576.91
DT= 5.0 min	TPEAK (hrs)= 3.17
	VOLUME (mm)= 60.15

Filename: G:\Projects\2008\08104 - Vaughan Corporate Centre - Master Servicing Strategy\Design\SWM\December 20
Comments: Outflow at 46.32

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	33.42	.238	66.83	.140	100.25	.061	133.67	.023
.08	.000	33.50	.237	66.92	.139	100.33	.061	133.75	.023
.17	.000	33.58	.236	67.00	.139	100.42	.061	133.83	.023
.25	.000	33.67	.235	67.08	.139	100.50	.060	133.92	.023
.33	.000	33.75	.234	67.17	.139	100.58	.060	134.00	.023
.42	.000	33.83	.234	67.25	.138	100.67	.060	134.08	.023
.50	.000	33.92	.233	67.33	.138	100.75	.060	134.17	.023
.58	.000	34.00	.232	67.42	.138	100.83	.060	134.25	.023
.67	.000	34.08	.231	67.50	.138	100.92	.060	134.33	.023
.75	.000	34.17	.231	67.58	.138	101.00	.059	134.42	.023
.83	.000	34.25	.230	67.67	.137	101.08	.059	134.50	.023
.92	.000	34.33	.229	67.75	.137	101.17	.059	134.58	.023
1.00	.000	34.42	.228	67.83	.137	101.25	.059	134.67	.023
1.08	.000	34.50	.228	67.92	.137	101.33	.059	134.75	.023
1.17	.000	34.58	.227	68.00	.136	101.42	.059	134.83	.023
1.25	.000	34.67	.227	68.08	.136	101.50	.058	134.92	.023
1.33	.000	34.75	.226	68.17	.136	101.58	.058	135.00	.022
1.42	.001	34.83	.226	68.25	.136	101.67	.058	135.08	.022
1.50	.002	34.92	.225	68.33	.136	101.75	.058	135.17	.022
1.58	.003	35.00	.224	68.42	.135	101.83	.058	135.25	.022
1.67	.006	35.08	.224	68.50	.135	101.92	.058	135.33	.022
1.75	.008	35.17	.223	68.58	.135	102.00	.057	135.42	.022
1.83	.215	35.25	.223	68.67	.135	102.08	.057	135.50	.022
1.92	.722	35.33	.222	68.75	.134	102.17	.057	135.58	.022
2.00	1.327	35.42	.222	68.83	.134	102.25	.057	135.67	.022
2.08	2.017	35.50	.222	68.92	.134	102.33	.057	135.75	.022
2.17	2.770	35.58	.221	69.00	.134	102.42	.057	135.83	.022
2.25	3.550	35.67	.221	69.08	.134	102.50	.057	135.92	.022
2.33	4.396	35.75	.220	69.17	.133	102.58	.056	136.00	.022
2.42	5.449	35.83	.220	69.25	.133	102.67	.056	136.08	.022
2.50	6.772	35.92	.219	69.33	.133	102.75	.056	136.17	.022
2.58	8.840	36.00	.219	69.42	.133	102.83	.056	136.25	.022
2.67	11.101	36.08	.219	69.50	.132	102.92	.056	136.33	.022
2.75	13.408	36.17	.218	69.58	.132	103.00	.056	136.42	.022
2.83	15.593	36.25	.218	69.67	.132	103.08	.055	136.50	.022
2.92	17.376	36.33	.218	69.75	.132	103.17	.055	136.58	.022
3.00	18.606	36.42	.217	69.83	.132	103.25	.055	136.67	.022
3.08	19.305	36.50	.217	69.92	.131	103.33	.055	136.75	.021
3.17	19.556	36.58	.217	70.00	.131	103.42	.055	136.83	.021
3.25	19.495	36.67	.216	70.08	.131	103.50	.055	136.92	.021
3.33	19.223	36.75	.216	70.17	.131	103.58	.055	137.00	.021
3.42	18.782	36.83	.216	70.25	.131	103.67	.054	137.08	.021
3.50	18.213	36.92	.215	70.33	.130	103.75	.054	137.17	.021
3.58	17.565	37.00	.215	70.42	.130	103.83	.054	137.25	.021
3.67	16.881	37.08	.215	70.50	.130	103.92	.054	137.33	.021
3.75	16.201	37.17	.214	70.58	.130	104.00	.054	137.42	.021
3.83	15.543	37.25	.214	70.67	.129	104.08	.054	137.50	.021
3.92	14.898	37.33	.214	70.75	.129	104.17	.054	137.58	.021
4.00	14.263	37.42	.214	70.83	.129	104.25	.053	137.67	.021
4.08	13.647	37.50	.213	70.92	.129	104.33	.053	137.75	.021
4.17	13.058	37.58	.213	71.00	.129	104.42	.053	137.83	.021
4.25	12.507	37.67	.213	71.08	.128	104.50	.053	137.92	.021
4.33	11.995	37.75	.212	71.17	.128	104.58	.053	138.00	.021
4.42	11.509	37.83	.212	71.25	.128	104.67	.053	138.08	.021
4.50	11.041	37.92	.212	71.33	.128	104.75	.053	138.17	.021
4.58	10.594	38.00	.212	71.42	.128	104.83	.052	138.25	.021
4.67	10.169	38.08	.211	71.50	.127	104.92	.052	138.33	.021
4.75	9.774	38.17	.211	71.58	.127	105.00	.052	138.42	.021
4.83	9.407	38.25	.211	71.67	.127	105.08	.052	138.50	.020
4.92	9.062	38.33	.211	71.75	.127	105.17	.052	138.58	.020
5.00	8.736	38.42	.210	71.83	.127	105.25	.052	138.67	.020
5.08	8.432	38.50	.210	71.92	.126	105.33	.052	138.75	.020
5.17	8.151	38.58	.210	72.00	.126	105.42	.051	138.83	.020
5.25	7.893	38.67	.210	72.08	.126	105.50	.051	138.92	.020
5.33	7.659	38.75	.209	72.17	.126	105.58	.051	139.00	.020
5.42	7.448	38.83	.209	72.25	.126	105.67	.051	139.08	.020
5.50	7.259	38.92	.209	72.33	.125	105.75	.051	139.17	.020
5.58	7.089	39.00	.209	72.42	.125	105.83	.051	139.25	.020
5.67	6.936	39.08	.208	72.50	.125	105.92	.051	139.33	.020

5.75	6.821	39.17	.208	72.58	.125	106.00	.050	139.42	.020
5.83	6.726	39.25	.208	72.67	.125	106.08	.050	139.50	.020
5.92	6.635	39.33	.208	72.75	.124	106.17	.050	139.58	.020
6.00	6.549	39.42	.207	72.83	.124	106.25	.050	139.67	.020
6.08	6.467	39.50	.207	72.92	.124	106.33	.050	139.75	.020
6.17	6.388	39.58	.207	73.00	.124	106.42	.050	139.83	.020
6.25	6.313	39.67	.207	73.08	.124	106.50	.050	139.92	.020
6.33	6.241	39.75	.206	73.17	.123	106.58	.050	140.00	.020
6.42	6.166	39.83	.206	73.25	.123	106.67	.049	140.08	.020
6.50	6.086	39.92	.206	73.33	.123	106.75	.049	140.17	.020
6.58	5.999	40.00	.206	73.42	.123	106.83	.049	140.25	.020
6.67	5.907	40.08	.206	73.50	.123	106.92	.049	140.33	.020
6.75	5.813	40.17	.205	73.58	.122	107.00	.049	140.42	.019
6.83	5.719	40.25	.205	73.67	.122	107.08	.049	140.50	.019
6.92	5.627	40.33	.205	73.75	.122	107.17	.049	140.58	.019
7.00	5.538	40.42	.205	73.83	.122	107.25	.048	140.67	.019
7.08	5.452	40.50	.204	73.92	.122	107.33	.048	140.75	.019
7.17	5.369	40.58	.204	74.00	.121	107.42	.048	140.83	.019
7.25	5.290	40.67	.204	74.08	.121	107.50	.048	140.92	.019
7.33	5.214	40.75	.204	74.17	.121	107.58	.048	141.00	.019
7.42	5.140	40.83	.204	74.25	.121	107.67	.048	141.08	.019
7.50	5.070	40.92	.203	74.33	.121	107.75	.048	141.17	.019
7.58	5.001	41.00	.203	74.42	.120	107.83	.048	141.25	.019
7.67	4.934	41.08	.203	74.50	.120	107.92	.047	141.33	.019
7.75	4.870	41.17	.203	74.58	.120	108.00	.047	141.42	.019
7.83	4.806	41.25	.203	74.67	.120	108.08	.047	141.50	.019
7.92	4.744	41.33	.202	74.75	.120	108.17	.047	141.58	.019
8.00	4.683	41.42	.202	74.83	.119	108.25	.047	141.67	.019
8.08	4.622	41.50	.202	74.92	.119	108.33	.047	141.75	.019
8.17	4.562	41.58	.202	75.00	.119	108.42	.047	141.83	.019
8.25	4.503	41.67	.201	75.08	.119	108.50	.047	141.92	.019
8.33	4.444	41.75	.201	75.17	.119	108.58	.046	142.00	.019
8.42	4.386	41.83	.201	75.25	.118	108.67	.046	142.08	.019
8.50	4.328	41.92	.201	75.33	.118	108.75	.046	142.17	.019
8.58	4.271	42.00	.201	75.42	.118	108.83	.046	142.25	.019
8.67	4.214	42.08	.200	75.50	.118	108.92	.046	142.33	.018
8.75	4.157	42.17	.200	75.58	.118	109.00	.046	142.42	.018
8.83	4.102	42.25	.200	75.67	.117	109.08	.046	142.50	.018
8.92	4.046	42.33	.200	75.75	.117	109.17	.046	142.58	.018
9.00	3.992	42.42	.200	75.83	.117	109.25	.045	142.67	.018
9.08	3.938	42.50	.199	75.92	.117	109.33	.045	142.75	.018
9.17	3.884	42.58	.199	76.00	.117	109.42	.045	142.83	.018
9.25	3.832	42.67	.199	76.08	.116	109.50	.045	142.92	.018
9.33	3.781	42.75	.199	76.17	.116	109.58	.045	143.00	.018
9.42	3.730	42.83	.198	76.25	.116	109.67	.045	143.08	.018
9.50	3.680	42.92	.198	76.33	.116	109.75	.045	143.17	.018
9.58	3.631	43.00	.198	76.42	.116	109.83	.045	143.25	.018
9.67	3.584	43.08	.198	76.50	.116	109.92	.045	143.33	.018
9.75	3.537	43.17	.198	76.58	.115	110.00	.044	143.42	.018
9.83	3.491	43.25	.197	76.67	.115	110.08	.044	143.50	.018
9.92	3.445	43.33	.197	76.75	.115	110.17	.044	143.58	.018
10.00	3.401	43.42	.197	76.83	.115	110.25	.044	143.67	.018
10.08	3.358	43.50	.197	76.92	.115	110.33	.044	143.75	.018
10.17	3.315	43.58	.196	77.00	.114	110.42	.044	143.83	.018
10.25	3.274	43.67	.196	77.08	.114	110.50	.044	143.92	.018
10.33	3.233	43.75	.196	77.17	.114	110.58	.044	144.00	.018
10.42	3.192	43.83	.196	77.25	.114	110.67	.044	144.08	.018
10.50	3.152	43.92	.196	77.33	.114	110.75	.044	144.17	.018
10.58	3.112	44.00	.195	77.42	.113	110.83	.043	144.25	.018
10.67	3.072	44.08	.195	77.50	.113	110.92	.043	144.33	.018
10.75	3.033	44.17	.195	77.58	.113	111.00	.043	144.42	.017
10.83	2.995	44.25	.195	77.67	.113	111.08	.043	144.50	.017
10.92	2.958	44.33	.195	77.75	.113	111.17	.043	144.58	.017
11.00	2.920	44.42	.194	77.83	.112	111.25	.043	144.67	.017
11.08	2.884	44.50	.194	77.92	.112	111.33	.043	144.75	.017
11.17	2.848	44.58	.194	78.00	.112	111.42	.043	144.83	.017
11.25	2.813	44.67	.194	78.08	.112	111.50	.043	144.92	.017
11.33	2.778	44.75	.193	78.17	.112	111.58	.043	145.00	.017
11.42	2.744	44.83	.193	78.25	.112	111.67	.042	145.08	.017
11.50	2.711	44.92	.193	78.33	.111	111.75	.042	145.17	.017
11.58	2.678	45.00	.193	78.42	.111	111.83	.042	145.25	.017
11.67	2.645	45.08	.193	78.50	.111	111.92	.042	145.33	.017
11.75	2.614	45.17	.192	78.58	.111	112.00	.042	145.42	.017
11.83	2.583	45.25	.192	78.67	.111	112.08	.042	145.50	.017
11.92	2.552	45.33	.192	78.75	.110	112.17	.042	145.58	.017
12.00	2.521	45.42	.192	78.83	.110	112.25	.042	145.67	.017
12.08	2.489	45.50	.192	78.92	.110	112.33	.042	145.75	.017
12.17	2.458	45.58	.191	79.00	.110	112.42	.042	145.83	.017
12.25	2.427	45.67	.191	79.08	.110	112.50	.041	145.92	.017
12.33	2.395	45.75	.191	79.17	.110	112.58	.041	146.00	.017
12.42	2.364	45.83	.191	79.25	.109	112.67	.041	146.08	.017
12.50	2.334	45.92	.190	79.33	.109	112.75	.041	146.17	.017
12.58	2.303	46.00	.190	79.42	.109	112.83	.041	146.25	.017
12.67	2.272	46.08	.190	79.50	.109	112.92	.041	146.33	.017
12.75	2.242	46.17	.190	79.58	.109	113.00	.041	146.42	.017
12.83	2.212	46.25	.190	79.67	.108	113.08	.041	146.50	.017
12.92	2.183	46.33	.189	79.75	.108	113.17	.041	146.58	.017
13.00	2.154	46.42	.189	79.83	.108	113.25	.041	146.67	.016
13.08	2.125	46.50	.189	79.92	.108	113.33	.040	146.75	.016
13.17	2.096	46.58	.189	80.00	.108	113.42	.040	146.83	.016
13.25	2.068	46.67	.189	80.08	.108	113.50	.040	146.92	.016
13.33	2.040	46.75	.188	80.17	.107	113.58	.040	147.00	.016
13.42	2.012	46.83	.188	80.25	.107	113.67	.040	147.08	.016
13.50	1.985	46.92	.188	80.33	.107	113.75	.040	147.17	.016
13.58	1.958	47.00	.188	80.42	.107	113.83	.040	147.25	.016
13.67	1.932	47.08	.188	80.50	.107	113.92	.040	147.33	.016
13.75	1.906	47.17	.187	80.58	.107	114.00	.040	147.42	.016
13.83	1.880	47.25	.187	80.67	.106	114.08	.040	147.50	.016
13.92	1.855	47.33	.187	80.75	.106	114.17	.040	147.58	.016
14.00	1.830	47.42	.187	80.83	.106	114.25	.039	147.67	.016
14.08	1.805	47.50	.187	80.92	.106	114.33	.039	147.75	.016
14.17	1.781	47.58	.186	81.00	.106	114.42	.039	147.83	.016
14.25	1.757	47.67	.186	81.08	.105	114.50	.039	147.92	.016
14.33	1.733	47.75	.186	81.17	.105	114.58	.039	148.00	.016
14.42	1.709	47.83	.186	81.25	.105	114.67	.039	148.08	.016
14.50	1.683	47.92	.186	81.33	.105	114.75	.039	148.17	.016
14.58	1.656	48.00	.185	81.42	.105	114.83	.039	148.25	.016
14.67	1.629	48.08	.185	81.50	.105	114.92	.039	148.33	.016
14.75	1.600	48.17	.185	81.58	.104	115.00	.039	148.42	.016
14.83	1.570	48.25	.185	81.67	.104	115.08	.039	148.50	.016
14.92	1.539	48.33	.184	81.75	.104	115.17	.038	148.58	.016
15.00	1.509	48.42	.184	81.83	.104	115.25	.038	148.67	.016
15.08	1.480	48.50	.184	81.92	.104	115.33	.038	148.75	.016
15.17	1.452	48.58	.184	82.00	.104	115.42	.038	148.83	.016
15.25	1.426	48.67	.184	82.08	.103	115.50	.038	148.92	.016
15.33	1.402	48.75	.183	82.17	.103	115.58	.038	149.00	.015
15.42	1.378	48.83	.183	82.25	.103	115.67	.038	149.08	.015
15.50	1.356	48.92	.183	82.33	.103	115.75	.038	149.17	.015
15.58	1.335	49.00	.183	82.42	.103	115.83	.038	149.25	.015
15.67	1.314	49.08	.183	82.50	.103	115.92	.038	149.33	.015
15.75	1.294	49.17	.182	82.58	.102	116.00	.038	149.42	.015
15.83	1.275	49.25	.182	82.67	.102	116.08	.038	149.50	.015
15.92	1.257	49.33	.182	82.75	.102	116.17	.037	149.58	.015
16.00	1.239	49.42	.182	82.83	.102	116.25	.037	149.67	.015
16.08	1.222	49.50	.182	82.92	.102	116.33	.037	149.75	.015
16.17	1.205	49.58	.181	83.00	.102	116.42	.037	149.83	.015
16.25	1.188	49.67	.181	83.08	.102	116.50	.037	149.92	.015
16.33	1.172	49.75	.181	83.17	.101	116.58	.037	150.00	.015
16.42	1.157	49.83	.181	83.25	.101	116.67	.037	150.08	.015
16.50	1.142	49.92	.181	83.33	.101	116.75	.037	150.17	.015
16.58	1.127	50.00	.180	83.42	.101	116.83	.037	150.25	.015
16.67	1.113	50.08	.180	83.50	.101	116.92	.037	150.33	.015
16.75	1.099	50.17	.180	83.58	.101	117.00	.037	150.42	.015
16.83	1.085	50.25	.180	83.67	.100	117.08	.037	150.50	.015

16.92	1.072	50.33	.180	83.75	.100	117.17	.036	150.58	.015	22.50	.405	55.92	.166	89.33	.087	122.75	.031	156.17	.013
17.00	1.059	50.42	.179	83.83	.100	117.25	.036	150.67	.015	22.58	.401	56.00	.166	89.42	.087	122.83	.031	156.25	.013
17.08	1.046	50.50	.179	83.92	.100	117.33	.036	150.75	.015	22.67	.397	56.08	.166	89.50	.087	122.92	.031	156.33	.013
17.17	1.033	50.58	.179	84.00	.100	117.42	.036	150.83	.015	22.75	.392	56.17	.166	89.58	.086	123.00	.031	156.42	.013
17.25	1.021	50.67	.179	84.08	.100	117.50	.036	150.92	.015	22.83	.388	56.25	.166	89.67	.086	123.08	.031	156.50	.013
17.33	1.009	50.75	.179	84.17	.099	117.58	.036	151.00	.015	22.92	.384	56.33	.165	89.75	.086	123.17	.031	156.58	.013
17.42	.997	50.83	.178	84.25	.099	117.67	.036	151.08	.015	23.00	.380	56.42	.165	89.83	.086	123.25	.031	156.67	.013
17.50	.986	50.92	.178	84.33	.099	117.75	.036	151.17	.015	23.08	.377	56.50	.165	89.92	.086	123.33	.031	156.75	.013
17.58	.973	51.00	.178	84.42	.099	117.83	.036	151.25	.015	23.17	.373	56.58	.165	90.00	.085	123.42	.031	156.83	.013
17.67	.960	51.08	.178	84.50	.099	117.92	.036	151.33	.015	23.25	.370	56.67	.165	90.08	.085	123.50	.031	156.92	.013
17.75	.945	51.17	.178	84.58	.099	118.00	.036	151.42	.015	23.33	.366	56.75	.164	90.17	.085	123.58	.031	157.00	.013
17.83	.929	51.25	.177	84.67	.099	118.08	.036	151.50	.014	23.42	.363	56.83	.164	90.25	.085	123.67	.031	157.08	.012
17.92	.912	51.33	.177	84.75	.098	118.17	.035	151.58	.014	23.50	.360	56.92	.164	90.33	.084	123.75	.030	157.17	.012
18.00	.895	51.42	.177	84.83	.098	118.25	.035	151.67	.014	23.58	.357	57.00	.164	90.42	.084	123.83	.030	157.25	.012
18.08	.878	51.50	.177	84.92	.098	118.33	.035	151.75	.014	23.67	.354	57.08	.164	90.50	.084	123.92	.030	157.33	.012
18.17	.860	51.58	.177	85.00	.098	118.42	.035	151.83	.014	23.75	.351	57.17	.163	90.58	.084	124.00	.030	157.42	.012
18.25	.843	51.67	.176	85.08	.098	118.50	.035	151.92	.014	23.83	.348	57.25	.163	90.67	.083	124.08	.030	157.50	.012
18.33	.826	51.75	.176	85.17	.098	118.58	.035	152.00	.014	23.92	.346	57.33	.163	90.75	.083	124.17	.030	157.58	.012
18.42	.809	51.83	.176	85.25	.097	118.67	.035	152.08	.014	24.00	.343	57.42	.163	90.83	.083	124.25	.030	157.67	.012
18.50	.792	51.92	.176	85.33	.097	118.75	.035	152.17	.014	24.08	.341	57.50	.163	90.92	.083	124.33	.030	157.75	.012
18.58	.776	52.00	.176	85.42	.097	118.83	.035	152.25	.014	24.17	.339	57.58	.162	91.00	.083	124.42	.030	157.83	.012
18.67	.760	52.08	.175	85.50	.097	118.92	.035	152.33	.014	24.25	.336	57.67	.162	91.08	.082	124.50	.030	157.92	.012
18.75	.744	52.17	.175	85.58	.097	119.00	.035	152.42	.014	24.33	.334	57.75	.162	91.17	.082	124.58	.030	158.00	.012
18.83	.730	52.25	.175	85.67	.097	119.08	.035	152.50	.014	24.42	.332	57.83	.162	91.25	.082	124.67	.030	158.08	.012
18.92	.715	52.33	.175	85.75	.096	119.17	.034	152.58	.014	24.50	.330	57.92	.162	91.33	.082	124.75	.030	158.17	.012
19.00	.701	52.42	.175	85.83	.096	119.25	.034	152.67	.014	24.58	.328	58.00	.161	91.42	.081	124.83	.030	158.25	.012
19.08	.688	52.50	.174	85.92	.096	119.33	.034	152.75	.014	24.67	.327	58.08	.161	91.50	.081	124.92	.030	158.33	.012
19.17	.675	52.58	.174	86.00	.096	119.42	.034	152.83	.014	24.75	.325	58.17	.161	91.58	.081	125.00	.029	158.42	.012
19.25	.662	52.67	.174	86.08	.096	119.50	.034	152.92	.014	24.83	.323	58.25	.161	91.67	.081	125.08	.029	158.50	.012
19.33	.650	52.75	.174	86.17	.096	119.58	.034	153.00	.014	24.92	.321	58.33	.161	91.75	.081	125.17	.029	158.58	.012
19.42	.639	52.83	.174	86.25	.095	119.67	.034	153.08	.014	25.00	.320	58.42	.161	91.83	.080	125.25	.029	158.67	.012
19.50	.628	52.92	.173	86.33	.095	119.75	.034	153.17	.014	25.08	.318	58.50	.160	91.92	.080	125.33	.029	158.75	.012
19.58	.617	53.00	.173	86.42	.095	119.83	.034	153.25	.014	25.17	.317	58.58	.160	92.00	.080	125.42	.029	158.83	.012
19.67	.607	53.08	.173	86.50	.095	119.92	.034	153.33	.014	25.25	.315	58.67	.160	92.08	.080	125.50	.029	158.92	.012
19.75	.597	53.17	.173	86.58	.095	120.00	.034	153.42	.014	25.33	.314	58.75	.160	92.17	.079	125.58	.029	159.00	.012
19.83	.588	53.25	.173	86.67	.094	120.08	.034	153.50	.014	25.42	.313	58.83	.160	92.25	.079	125.67	.029	159.08	.012
19.92	.579	53.33	.172	86.75	.094	120.17	.034	153.58	.014	25.50	.311	58.92	.159	92.33	.079	125.75	.029	159.17	.012
20.00	.570	53.42	.172	86.83	.094	120.25	.033	153.67	.014	25.58	.310	59.00	.159	92.42	.079	125.83	.029	159.25	.012
20.08	.562	53.50	.172	86.92	.094	120.33	.033	153.75	.014	25.67	.309	59.08	.159	92.50	.079	125.92	.029	159.33	.012
20.17	.554	53.58	.172	87.00	.094	120.42	.033	153.83	.014	25.75	.308	59.17	.159	92.58	.078	126.00	.029	159.42	.012
20.25	.547	53.67	.172	87.08	.093	120.50	.033	153.92	.014	25.83	.307	59.25	.159	92.67	.078	126.08	.029	159.50	.012
20.33	.539	53.75	.172	87.17	.093	120.58	.033	154.00	.014	25.92	.305	59.33	.158	92.75	.078	126.17	.029	159.58	.012
20.42	.532	53.83	.171	87.25	.093	120.67	.033	154.08	.014	26.00	.304	59.42	.158	92.83	.078	126.25	.028	159.67	.012
20.50	.526	53.92	.171	87.33	.093	120.75	.033	154.17	.014	26.08	.303	59.50	.158	92.92	.077	126.33	.028	159.75	.012
20.58	.519	54.00	.171	87.42	.092	120.83	.033	154.25	.013	26.17	.302	59.58	.158	93.00	.077	126.42	.028	159.83	.012
20.67	.513	54.08	.171	87.50	.092	120.92	.033	154.33	.013	26.25	.301	59.67	.158	93.08	.077	126.50	.028	159.92	.012
20.75	.507	54.17	.171	87.58	.092	121.00	.033	154.42	.013	26.33	.300	59.75	.157	93.17	.077	126.58	.028	160.00	.012
20.83	.502	54.25	.170	87.67	.092	121.08	.033	154.50	.013	26.42	.299	59.83	.157	93.25	.077	126.67	.028	160.08	.012
20.92	.496	54.33	.170	87.75	.092	121.17	.033	154.58	.013	26.50	.298	59.92	.157	93.33	.076	126.75	.028	160.17	.012
21.00	.491	54.42	.170	87.83	.091	121.25	.033	154.67	.013	26.58	.298	60.00	.157	93.42	.076	126.83	.028	160.25	.011
21.08	.486	54.50	.170	87.92	.091	121.33	.033	154.75	.013	26.67	.297	60.08	.157	93.50	.076	126.92	.028	160.33	.011
21.17	.481	54.58	.170	88.00	.091	121.42	.032	154.83	.013	26.75	.296	60.17	.156	93.58	.076	127.00	.028	160.42	.011
21.25	.476	54.67	.169	88.08	.091	121.50	.032	154.92	.013	26.83	.295	60.25	.156	93.67	.076	127.08	.028	160.50	.011
21.33	.472	54.75	.169	88.17	.090	121.58	.032	155.00	.013	26.92	.294	60.33	.156	93.75	.075	127.17	.028	160.58	.011
21.42	.467	54.83	.169	88.25	.090	121.67	.032	155.08	.013	27.00	.293	60.42	.156	93.83	.075	127.25	.028	160.67	.011
21.50	.462	54.92	.169	88.33	.090	121.75	.032	155.17	.013	27.08	.293	60.50	.156	93.92	.075	127.33	.028	160.75	.011
21.58	.458	55.00	.169	88.42	.090	121.83	.032	155.25	.013	27.17	.292	60.58	.156	94.00	.075	127.42	.028	160.83	.011
21.67	.453	55.08	.168	88.50	.089	121.92	.032	155.33	.013	27.25	.291	60.67	.155	94.08	.075	127.50	.028	160.92	.011
21.75	.448	55.17	.168	88.58	.089	122.00	.032	155.42	.013	27.33	.290	60.75	.155	94.17	.074	127.58	.027	161.00	.011
21.83	.443	55.25	.168	88.67	.089	122.08	.032	155.50	.013	27.42	.290	60.83	.155	94.25	.074	127.67	.027	161.08	.011
21.92	.439	55.33	.168	88.75	.089	122.17	.032	155.58	.013	27.50	.289	60.92	.155	94.33	.074	127.75	.027	161.17	.011
22.00	.434	55.42	.168	88.83	.089	122.25	.032	155.67	.013	27.58	.288	61.00	.155	94.42	.074	127.83	.027	161.25	.011
22.08	.429	55.50	.167	88.92	.088	122.33	.032	155.75	.013	27.67	.288	61.08	.154	94.50	.074	127.92	.027	161.33	.011
22.17	.424	55.58	.167	89.00	.088	122.42	.032	155.83	.013	27.75	.287	61.17	.154	94.58	.073	128.00	.027	161.42	.011
22.25	.419	55.67	.167	89.08	.088	122.50	.032	155.92	.013	27.83	.286	61.25	.154	94.67	.073	128.08	.027	161.50	.011
22.33	.415	55.75	.167	89.17	.088	122.58	.031	156.00	.013	27.92	.286	61.33	.154	94.75	.073	128.17	.027	161.58	.011
22.42	.410	55.83	.167	89.25	.087	122.67	.031	156.08	.013	28.00	.285	61.42	.154	94.83	.073	128.25	.027	161.67	.011

28.08	.284	61.50	.153	94.92	.073	128.33	.027	161.75	.011
28.17	.284	61.58	.153	95.00	.072	128.42	.027	161.83	.011
28.25	.283	61.67	.153	95.08	.072	128.50	.027	161.92	.011
28.33	.283	61.75	.153	95.17	.072	128.58	.027	162.00	.011
28.42	.282	61.83	.153	95.25	.072	128.67	.027	162.08	.011
28.50	.281	61.92	.152	95.33	.072	128.75	.027	162.17	.011
28.58	.281	62.00	.152	95.42	.071	128.83	.027	162.25	.011
28.67	.280	62.08	.152	95.50	.071	128.92	.026	162.33	.011
28.75	.280	62.17	.152	95.58	.071	129.00	.026	162.42	.011
28.83	.279	62.25	.151	95.67	.071	129.08	.026	162.50	.011
28.92	.279	62.33	.151	95.75	.071	129.17	.026	162.58	.011
29.00	.278	62.42	.151	95.83	.070	129.25	.026	162.67	.011
29.08	.277	62.50	.151	95.92	.070	129.33	.026	162.75	.011
29.17	.277	62.58	.151	96.00	.070	129.42	.026	162.83	.011
29.25	.276	62.67	.150	96.08	.070	129.50	.026	162.92	.011
29.33	.276	62.75	.150	96.17	.070	129.58	.026	163.00	.011
29.42	.275	62.83	.150	96.25	.069	129.67	.026	163.08	.011
29.50	.275	62.92	.150	96.33	.069	129.75	.026	163.17	.011
29.58	.274	63.00	.150	96.42	.069	129.83	.026	163.25	.011
29.67	.274	63.08	.149	96.50	.069	129.92	.026	163.33	.011
29.75	.273	63.17	.149	96.58	.069	130.00	.026	163.42	.011
29.83	.273	63.25	.149	96.67	.068	130.08	.026	163.50	.011
29.92	.272	63.33	.149	96.75	.068	130.17	.026	163.58	.011
30.00	.272	63.42	.148	96.83	.068	130.25	.026	163.67	.011
30.08	.271	63.50	.148	96.92	.068	130.33	.025	163.75	.010
30.17	.271	63.58	.148	97.00	.068	130.42	.025	163.83	.010
30.25	.270	63.67	.148	97.08	.068	130.50	.025	163.92	.010
30.33	.270	63.75	.148	97.17	.067	130.58	.025	164.00	.010
30.42	.269	63.83	.147	97.25	.067	130.67	.025	164.08	.010
30.50	.269	63.92	.147	97.33	.067	130.75	.025	164.17	.010
30.58	.269	64.00	.147	97.42	.067	130.83	.025	164.25	.010
30.67	.268	64.08	.147	97.50	.067	130.92	.025	164.33	.010
30.75	.268	64.17	.147	97.58	.066	131.00	.025	164.42	.010
30.83	.267	64.25	.146	97.67	.066	131.08	.025	164.50	.010
30.92	.267	64.33	.146	97.75	.066	131.17	.025	164.58	.010
31.00	.266	64.42	.146	97.83	.066	131.25	.025	164.67	.010
31.08	.265	64.50	.146	97.92	.066	131.33	.025	164.75	.010
31.17	.265	64.58	.145	98.00	.065	131.42	.025	164.83	.010
31.25	.264	64.67	.145	98.08	.065	131.50	.025	164.92	.010
31.33	.264	64.75	.145	98.17	.065	131.58	.025	165.00	.010
31.42	.263	64.83	.145	98.25	.065	131.67	.025	165.08	.010
31.50	.262	64.92	.145	98.33	.065	131.75	.025	165.17	.010
31.58	.261	65.00	.144	98.42	.065	131.83	.024	165.25	.010
31.67	.260	65.08	.144	98.50	.064	131.92	.024	165.33	.010
31.75	.259	65.17	.144	98.58	.064	132.00	.024	165.42	.010
31.83	.258	65.25	.144	98.67	.064	132.08	.024	165.50	.010
31.92	.257	65.33	.143	98.75	.064	132.17	.024	165.58	.010
32.00	.256	65.42	.143	98.83	.064	132.25	.024	165.67	.010
32.08	.255	65.50	.143	98.92	.064	132.33	.024	165.75	.010
32.17	.254	65.58	.143	99.00	.063	132.42	.024	165.83	.010
32.25	.253	65.67	.143	99.08	.063	132.50	.024	165.92	.010
32.33	.252	65.75	.142	99.17	.063	132.58	.024	166.00	.010
32.42	.251	65.83	.142	99.25	.063	132.67	.024	166.08	.010
32.50	.250	65.92	.142	99.33	.063	132.75	.024	166.17	.010
32.58	.249	66.00	.142	99.42	.063	132.83	.024	166.25	.010
32.67	.248	66.08	.142	99.50	.062	132.92	.024	166.33	.010
32.75	.246	66.17	.141	99.58	.062	133.00	.024	166.42	.010
32.83	.245	66.25	.141	99.67	.062	133.08	.024	166.50	.010
32.92	.244	66.33	.141	99.75	.062	133.17	.024	166.58	.010
33.00	.243	66.42	.141	99.83	.062	133.25	.024		
33.08	.242	66.50	.140	99.92	.062	133.33	.024		
33.17	.241	66.58	.140	100.00	.061	133.42	.023		
33.25	.240	66.67	.140	100.08	.061	133.50	.023		
33.33	.239	66.75	.140	100.17	.061	133.58	.023		

```
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\December 2011 - TS\VO2 Input Hydr
| Ptotal= 73.00 mm |    Comments: 50yr/6hr
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	2.00	24.82	3.75	10.22	5.50	1.46
.50	1.46	2.25	24.82	4.00	5.84	5.75	1.46
.75	1.46	2.50	67.16	4.25	5.84	6.00	1.46
1.00	1.46	2.75	67.16	4.50	2.92	6.25	1.46
1.25	1.46	3.00	18.98	4.75	2.92		
1.50	8.76	3.25	18.98	5.00	1.46		
1.75	8.76	3.50	10.22	5.25	1.46		

```
--------------------
| ADD HYD   (0218) |
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0215):	124.65	12.657	3.00	64.77
+ ID2= 2 (0210):	576.91	19.556	3.17	60.15
ID = 3 (0218):	701.56	31.751	3.08	60.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| CALIB            |
| STANDHYD  (0231) |   Area    (ha)=  14.94
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.45	1.49
Dep. Storage	(mm)=	1.00	4.30
Average Slope	(%)=	1.00	2.00
Length	(m)=	315.60	40.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

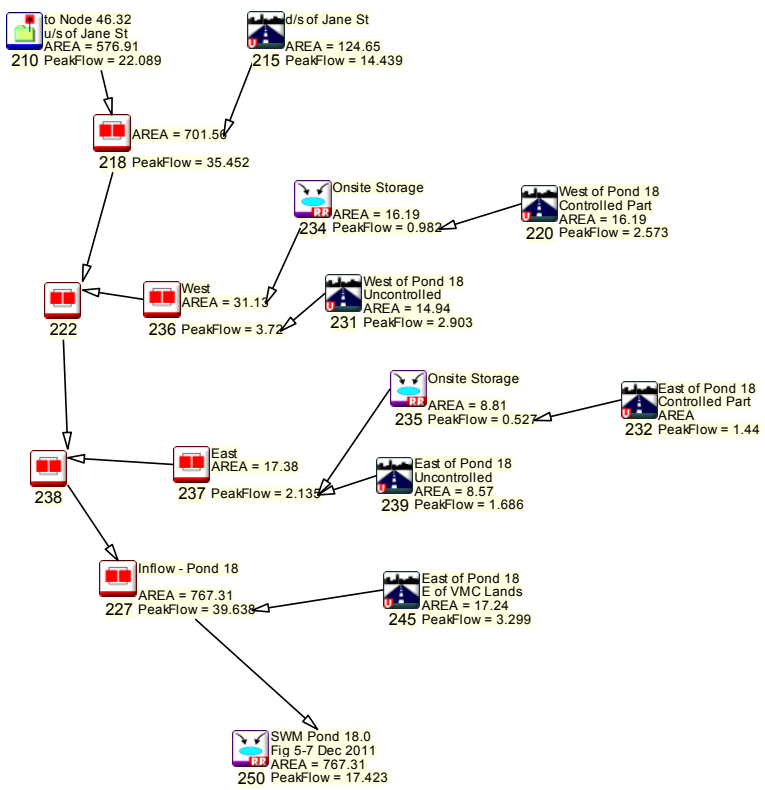
TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.00	1.667	8.76	3.250	18.98	4.83	1.46
.167	.00	1.750	8.76	3.333	10.22	4.92	1.46
.250	.00	1.833	24.82	3.417	10.22	5.00	1.46
.333	1.46	1.917	24.82	3.500	10.22	5.08	1.46
.417	1.46	2.000	24.82	3.583	10.22	5.17	1.46
.500	1.46	2.083	24.82	3.667	10.22	5.25	1.46
.583	1.46	2.167	24.82	3.750	10.22	5.33	1.46
.667	1.46	2.250	24.82	3.833	5.84	5.42	1.46
.750	1.46	2.333	67.16	3.917	5.84	5.50	1.46
.833	1.46	2.417	67.16	4.000	5.84	5.58	1.46
.917	1.46	2.500	67.16	4.083	5.84	5.67	1.46
1.000	1.46	2.583	67.16	4.167	5.84	5.75	1.46
1.083	1.46	2.667	67.16	4.250	5.84	5.83	1.46
1.167	1.46	2.750	67.16	4.333	2.92	5.92	1.46
1.250	1.46	2.833	18.98	4.417	2.92	6.00	1.46
1.333	8.76	2.917	18.98	4.500	2.92	6.08	1.46
1.417	8.76	3.000	18.98	4.583	2.92	6.17	1.46
1.500	8.76	3.083	18.98	4.667	2.92	6.25	1.46
1.583	8.76	3.167	18.98	4.750	2.92		

```
     Max.Eff.Inten.(mm/hr)=      67.16        44.65
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     5.97 (ii)    9.41 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .19          .12
                                                    *TOTALS*
     PEAK FLOW       (cms)=       2.50          .15      2.652 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75       2.75
     RUNOFF VOLUME    (mm)=      72.00        35.70      68.37
     TOTAL RAINFALL   (mm)=      73.00        73.00      73.00
     RUNOFF COEFFICIENT   =        .99          .49        .94


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0220) |   Area    (ha)=  16.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  59.00   Dir. Conn.(%)=  59.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       9.55         6.64
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     328.50        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      67.16        42.73
               over (min)        5.00        20.00
     Storage Coeff.  (min)=     6.12 (ii)   16.03 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .19          .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.77          .54      2.261 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92       2.75
     RUNOFF VOLUME    (mm)=      72.00        35.70      57.12
     TOTAL RAINFALL   (mm)=      73.00        73.00      73.00
     RUNOFF COEFFICIENT   =        .99          .49        .78


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0234) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)      (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |  1.1510      .5700

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0220)   16.19      2.26      2.75      57.12
     OUTFLOW: ID= 1 (0234)   16.19       .87      3.25      57.11

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 38.26
                TIME SHIFT OF PEAK FLOW         (min)= 30.00

                MAXIMUM  STORAGE   USED       (ha.m.)=  .4285

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0236) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
         ID1= 1 (0231):    14.94    2.652     2.75    68.37
       + ID2= 2 (0234):    16.19     .865     3.25    57.11
         ================================================
         ID = 3 (0236):    31.13    3.364     2.75    62.51

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0222) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
         ID1= 1 (0218):   701.56   31.751     3.08    60.97
       + ID2= 2 (0236):    31.13    3.364     2.75    62.51
         ================================================
         ID = 3 (0222):   732.69   33.453     3.08    61.03

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0239) |   Area    (ha)=   8.57
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.71          .86
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     239.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      67.16        87.60
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     5.05 (ii)    8.49 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .21          .12
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.44          .09      1.526 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75       2.75
     RUNOFF VOLUME    (mm)=      72.00        35.70      68.37
     TOTAL RAINFALL   (mm)=      73.00        73.00      73.00
     RUNOFF COEFFICIENT   =        .99          .49        .94


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0232) |   Area    (ha)=   8.81
|ID= 1 DT= 5.0 min |   Total Imp(%)=  59.00   Dir. Conn.(%)=  59.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
```

```
     Surface Area     (ha)=       5.20         3.61
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     242.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      67.16        42.73
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       5.09 (ii)   15.01 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .21          .07
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .97          .30          1.241 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92          2.75
     RUNOFF VOLUME    (mm)=      72.00        35.70         57.12
     TOTAL RAINFALL   (mm)=      73.00        73.00         73.00
     RUNOFF COEFFICIENT   =        .99          .49           .78


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0235) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .5820      .3000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0232)      8.81      1.24      2.75      57.12
     OUTFLOW: ID= 1 (0235)      8.81       .46      3.25      57.10

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 37.17
                  TIME SHIFT OF PEAK FLOW         (min)= 30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .2377

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0237) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0239):     8.57    1.526     2.75    68.37
        + ID2= 2 (0235):     8.81     .461     3.25    57.10
          ================================================
          ID = 3 (0237):    17.38    1.911     2.75    62.66

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0238) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0222):   732.69   33.453     3.08    61.03
        + ID2= 2 (0237):    17.38    1.911     2.75    62.66
          ================================================
          ID = 3 (0238):   750.07   34.377     3.08    61.07

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0245) |   Area    (ha)=  17.24
|ID= 1 DT= 5.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.65         2.59
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     339.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      67.16        58.40
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       6.23 (ii)   10.37 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .19          .09
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.72          .25          2.962 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83          2.75
     RUNOFF VOLUME    (mm)=      72.00        35.70         66.55
     TOTAL RAINFALL   (mm)=      73.00        73.00         73.00
     RUNOFF COEFFICIENT   =        .99          .49           .91


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0227) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0238):   750.07   34.377     3.08    61.07
        + ID2= 2 (0245):    17.24    2.962     2.75    66.55
          ================================================
          ID = 3 (0227):   767.31   35.372     3.08    61.19

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0250) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    | 17.9700    18.1470
                         1.8900     1.0080    | 19.4300    18.8300
                         2.2330     1.9630    | 23.4600    19.3240
                         2.7950     6.4020    | 31.0300    19.8490
                         3.2760     9.1830    | 38.3600    20.2920
                         3.4270    10.6610    | 40.0000    20.3980
                         3.6700    12.2670    | 42.5000    21.3030
                         5.6440    13.9060    | 45.0000    22.1830
                         9.7990    15.5860    | 47.5000    23.5100
                        15.2400    17.3710    |   .0000      .0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0227)     767.31     35.37      3.08      61.19
     OUTFLOW: ID= 1 (0250)     767.31     14.02      4.67      61.19
```

```
                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 39.64
                  TIME SHIFT OF PEAK FLOW         (min)= 95.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=16.9729

--------------------------------------------------------------------------------

 FINISH
================================================================================
==============
```

North East POND (100yr 6hr AES)



Summary Hydrograph Data

Run Number: 1

NHYD	DT [hr]	AREA [ha]	Peak flow [m³/s]	TP [hr]	Runoff Vol. [mm]	DWF [m³/s]
250	0.083	767.310	17.423	4.500	68.118	0.000

```
================================================================================
==============

       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM, Version 2.0
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M  M  O   O   Licensed To:
        OOO     T      T    H   H    Y    M   M   OOO

Developed and Distributed by Greenland International Consulting Inc.
Copyright 1996, 2001 Schaeffer & Associates Ltd.
All rights reserved.

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


  Input   filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat
  Output  filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final
submission\05PROP~1\100y6 w Dev VMC, Prop Pond 18, With RO Coeff Redu
  Summary filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final
submission\05PROP~1\100y6 w Dev VMC, Prop Pond 18, With RO Coeff Redu


DATE: 4/5/2012                          TIME: 12:25:58 PM

USER:


COMMENTS: _____________________________________________________

--------------------------------------------------------------------------------
---------------
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\December 2011 - TS\VO2 Input Hydr
| Ptotal= 80.31 mm |    Comments: 100yr/6hr
--------------------
                TIME     RAIN |  TIME     RAIN |  TIME     RAIN |  TIME     RAIN
                 hrs    mm/hr |   hrs    mm/hr |   hrs    mm/hr |   hrs    mm/hr
                 .25      .00 |  2.00    27.30 |  3.75    11.24 |  5.50     1.61
                 .50     1.61 |  2.25    27.30 |  4.00     6.42 |  5.75     1.61
                 .75     1.61 |  2.50    73.88 |  4.25     6.42 |  6.00     1.61
                1.00     1.61 |  2.75    73.88 |  4.50     3.21 |  6.25     1.61
                1.25     1.61 |  3.00    20.88 |  4.75     3.21 |
                1.50     9.64 |  3.25    20.88 |  5.00     1.61 |
                1.75     9.64 |  3.50    11.24 |  5.25     1.61 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0231) |   Area     (ha)=  14.94
```

```
|ID= 1 DT= 5.0 min |   Total Imp(%)=  88.00   Dir. Conn.(%)=  88.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.15         1.79
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     315.60        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .083     .00 | 1.667    9.64 | 3.250   20.88 |  4.83    1.61
               .167     .00 | 1.750    9.64 | 3.333   11.24 |  4.92    1.61
               .250     .00 | 1.833   27.30 | 3.417   11.24 |  5.00    1.61
               .333    1.61 | 1.917   27.30 | 3.500   11.24 |  5.08    1.61
               .417    1.61 | 2.000   27.30 | 3.583   11.24 |  5.17    1.61
               .500    1.61 | 2.083   27.30 | 3.667   11.24 |  5.25    1.61
               .583    1.61 | 2.167   27.30 | 3.750   11.24 |  5.33    1.61
               .667    1.61 | 2.250   27.30 | 3.833    6.42 |  5.42    1.61
               .750    1.61 | 2.333   73.88 | 3.917    6.42 |  5.50    1.61
               .833    1.61 | 2.417   73.88 | 4.000    6.42 |  5.58    1.61
               .917    1.61 | 2.500   73.88 | 4.083    6.42 |  5.67    1.61
              1.000    1.61 | 2.583   73.88 | 4.167    6.42 |  5.75    1.61
              1.083    1.61 | 2.667   73.88 | 4.250    6.42 |  5.83    1.61
              1.167    1.61 | 2.750   73.88 | 4.333    3.21 |  5.92    1.61
              1.250    1.61 | 2.833   20.88 | 4.417    3.21 |  6.00    1.61
              1.333    9.64 | 2.917   20.88 | 4.500    3.21 |  6.08    1.61
              1.417    9.64 | 3.000   20.88 | 4.583    3.21 |  6.17    1.61
              1.500    9.64 | 3.083   20.88 | 4.667    3.21 |  6.25    1.61
              1.583    9.64 | 3.167   20.88 | 4.750    3.21 |

     Max.Eff.Inten.(mm/hr)=      73.88        49.21
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      5.75 (ii)    9.34 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=       .20          .12
                                                    *TOTALS*
     PEAK FLOW       (cms)=      2.69          .21      2.903 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.75       2.75
     RUNOFF VOLUME    (mm)=     79.31        41.41      74.76
     TOTAL RAINFALL   (mm)=     80.31        80.31      80.31
     RUNOFF COEFFICIENT   =       .99          .52        .93


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0220) |   Area    (ha)=  16.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       9.88         6.31
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     328.50        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      73.88        49.21
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      5.89 (ii)   15.26 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=       .19          .07
                                                    *TOTALS*
     PEAK FLOW       (cms)=      2.02          .61      2.573 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.92       2.75
     RUNOFF VOLUME    (mm)=     79.31        41.41      64.53
     TOTAL RAINFALL   (mm)=     80.31        80.31      80.31
     RUNOFF COEFFICIENT   =       .99          .52        .80


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0234) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   1.1510      .5700

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0220)      16.19      2.57      2.75       64.53
     OUTFLOW: ID= 1 (0234)      16.19       .98      3.25       64.52

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 38.16
                TIME SHIFT OF PEAK FLOW         (min)= 30.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  .4865

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0236) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)     (cms)    (hrs)     (mm)
         ID1= 1 (0231):    14.94    2.903     2.75    74.76
       + ID2= 2 (0234):    16.19     .982     3.25    64.52
         ================================================
         ID = 3 (0236):    31.13   3.720     2.75    69.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0215) |   Area    (ha)= 124.65
|ID= 1 DT= 5.0 min |   Total Imp(%)=  83.00   Dir. Conn.(%)=  79.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     103.46        21.19
     Dep. Storage     (mm)=        .50         4.70
     Average Slope     (%)=        .30          .40
     Length            (m)=    1800.00       200.00
     Mannings n           =       .016         .250

     Max.Eff.Inten.(mm/hr)=      73.88        40.22
               over (min)       25.00        70.00
     Storage Coeff.  (min)=      26.55 (ii)   69.80 (ii)
     Unit Hyd. Tpeak (min)=      25.00        70.00
     Unit Hyd. peak  (cms)=        .04          .02
```

				TOTALS
PEAK FLOW	(cms)=	14.00	1.11	14.439 (iii)
TIME TO PEAK	(hrs)=	2.92	3.83	2.92
RUNOFF VOLUME	(mm)=	79.81	41.38	71.74
TOTAL RAINFALL	(mm)=	80.31	80.31	80.31
RUNOFF COEFFICIENT	=	.99	.52	.89

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 76.0 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.

READ HYD (0210)	AREA (ha)= 576.91
DT= 5.0 min	TPEAK (hrs)= 3.17
	VOLUME (mm)= 67.05

Filename: G:\Projects\2008\08104 - Vaughan Corporate Centre - Master Servicing Strategy\Design\SWM\December 20
Comments: Outflow at 46.32

TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
.00	.000	33.42	.261	66.83	.142	100.25	.062	133.67	.023
.08	.000	33.50	.260	66.92	.142	100.33	.062	133.75	.023
.17	.000	33.58	.260	67.00	.142	100.42	.061	133.83	.023
.25	.000	33.67	.259	67.08	.142	100.50	.061	133.92	.023
.33	.000	33.75	.259	67.17	.142	100.58	.061	134.00	.023
.42	.000	33.83	.258	67.25	.141	100.67	.061	134.08	.023
.50	.000	33.92	.258	67.33	.141	100.75	.061	134.17	.023
.58	.000	34.00	.257	67.42	.141	100.83	.061	134.25	.023
.67	.000	34.08	.256	67.50	.141	100.92	.060	134.33	.023
.75	.000	34.17	.256	67.58	.140	101.00	.060	134.42	.023
.83	.000	34.25	.255	67.67	.140	101.08	.060	134.50	.023
.92	.000	34.33	.254	67.75	.140	101.17	.060	134.58	.023
1.00	.000	34.42	.253	67.83	.140	101.25	.060	134.67	.023
1.08	.000	34.50	.252	67.92	.140	101.33	.060	134.75	.023
1.17	.000	34.58	.251	68.00	.139	101.42	.059	134.83	.023
1.25	.000	34.67	.250	68.08	.139	101.50	.059	134.92	.023
1.33	.000	34.75	.249	68.17	.139	101.58	.059	135.00	.023
1.42	.001	34.83	.248	68.25	.139	101.67	.059	135.08	.023
1.50	.002	34.92	.247	68.33	.139	101.75	.059	135.17	.023
1.58	.004	35.00	.246	68.42	.138	101.83	.059	135.25	.023
1.67	.007	35.08	.245	68.50	.138	101.92	.058	135.33	.022
1.75	.011	35.17	.244	68.58	.138	102.00	.058	135.42	.022
1.83	.471	35.25	.243	68.67	.138	102.08	.058	135.50	.022
1.92	1.014	35.33	.242	68.75	.137	102.17	.058	135.58	.022
2.00	1.671	35.42	.241	68.83	.137	102.25	.058	135.67	.022
2.08	2.424	35.50	.240	68.92	.137	102.33	.058	135.75	.022
2.17	3.247	35.58	.239	69.00	.137	102.42	.057	135.83	.022
2.25	4.095	35.67	.238	69.08	.137	102.50	.057	135.92	.022
2.33	5.017	35.75	.237	69.17	.136	102.58	.057	136.00	.022
2.42	6.176	35.83	.235	69.25	.136	102.67	.057	136.08	.022
2.50	7.915	35.92	.234	69.33	.136	102.75	.057	136.17	.022
2.58	10.223	36.00	.234	69.42	.136	102.83	.057	136.25	.022
2.67	12.707	36.08	.233	69.50	.136	102.92	.057	136.33	.022
2.75	15.273	36.17	.232	69.58	.135	103.00	.056	136.42	.022
2.83	17.728	36.25	.231	69.67	.135	103.08	.056	136.50	.022
2.92	19.732	36.33	.230	69.75	.135	103.17	.056	136.58	.022
3.00	21.097	36.42	.229	69.83	.135	103.25	.056	136.67	.022
3.08	21.845	36.50	.228	69.92	.134	103.33	.056	136.75	.022
3.17	22.089	36.58	.227	70.00	.134	103.42	.056	136.83	.022
3.25	21.987	36.67	.227	70.08	.134	103.50	.055	136.92	.022
3.33	21.653	36.75	.226	70.17	.134	103.58	.055	137.00	.021
3.42	21.134	36.83	.225	70.25	.134	103.67	.055	137.08	.021
3.50	20.471	36.92	.225	70.33	.133	103.75	.055	137.17	.021
3.58	19.721	37.00	.224	70.42	.133	103.83	.055	137.25	.021
3.67	18.933	37.08	.223	70.50	.133	103.92	.055	137.33	.021
3.75	18.155	37.17	.223	70.58	.133	104.00	.055	137.42	.021
3.83	17.407	37.25	.222	70.67	.132	104.08	.054	137.50	.021
3.92	16.681	37.33	.221	70.75	.132	104.17	.054	137.58	.021
4.00	15.972	37.42	.221	70.83	.132	104.25	.054	137.67	.021
4.08	15.289	37.50	.220	70.92	.132	104.33	.054	137.75	.021
4.17	14.644	37.58	.220	71.00	.132	104.42	.054	137.83	.021
4.25	14.046	37.67	.219	71.08	.131	104.50	.054	137.92	.021
4.33	13.498	37.75	.219	71.17	.131	104.58	.054	138.00	.021
4.42	12.992	37.83	.218	71.25	.131	104.67	.053	138.08	.021
4.50	12.521	37.92	.218	71.33	.131	104.75	.053	138.17	.021
4.58	12.082	38.00	.217	71.42	.131	104.83	.053	138.25	.021
4.67	11.675	38.08	.217	71.50	.130	104.92	.053	138.33	.021
4.75	11.303	38.17	.217	71.58	.130	105.00	.053	138.42	.021
4.83	10.962	38.25	.216	71.67	.130	105.08	.053	138.50	.021
4.92	10.644	38.33	.216	71.75	.130	105.17	.053	138.58	.021
5.00	10.342	38.42	.215	71.83	.129	105.25	.052	138.67	.021
5.08	10.054	38.50	.215	71.92	.129	105.33	.052	138.75	.020
5.17	9.782	38.58	.215	72.00	.129	105.42	.052	138.83	.020
5.25	9.530	38.67	.214	72.08	.129	105.50	.052	138.92	.020
5.33	9.301	38.75	.214	72.17	.129	105.58	.052	139.00	.020
5.42	9.092	38.83	.213	72.25	.128	105.67	.052	139.08	.020
5.50	8.902	38.92	.213	72.33	.128	105.75	.052	139.17	.020
5.58	8.729	39.00	.213	72.42	.128	105.83	.051	139.25	.020
5.67	8.569	39.08	.212	72.50	.128	105.92	.051	139.33	.020
5.75	8.420	39.17	.212	72.58	.128	106.00	.051	139.42	.020
5.83	8.281	39.25	.212	72.67	.127	106.08	.051	139.50	.020
5.92	8.150	39.33	.211	72.75	.127	106.17	.051	139.58	.020
6.00	8.024	39.42	.211	72.83	.127	106.25	.051	139.67	.020
6.08	7.904	39.50	.211	72.92	.127	106.33	.051	139.75	.020
6.17	7.787	39.58	.211	73.00	.126	106.42	.050	139.83	.020
6.25	7.673	39.67	.210	73.08	.126	106.50	.050	139.92	.020
6.33	7.558	39.75	.210	73.17	.126	106.58	.050	140.00	.020
6.42	7.430	39.83	.210	73.25	.126	106.67	.050	140.08	.020
6.50	7.288	39.92	.209	73.33	.126	106.75	.050	140.17	.020
6.58	7.138	40.00	.209	73.42	.125	106.83	.050	140.25	.020
6.67	6.980	40.08	.209	73.50	.125	106.92	.050	140.33	.020
6.75	6.838	40.17	.209	73.58	.125	107.00	.049	140.42	.020
6.83	6.718	40.25	.208	73.67	.125	107.08	.049	140.50	.020
6.92	6.596	40.33	.208	73.75	.125	107.17	.049	140.58	.020
7.00	6.473	40.42	.208	73.83	.124	107.25	.049	140.67	.019
7.08	6.350	40.50	.208	73.92	.124	107.33	.049	140.75	.019
7.17	6.228	40.58	.207	74.00	.124	107.42	.049	140.83	.019
7.25	6.108	40.67	.207	74.08	.124	107.50	.049	140.92	.019
7.33	5.990	40.75	.207	74.17	.124	107.58	.049	141.00	.019
7.42	5.874	40.83	.207	74.25	.123	107.67	.048	141.08	.019
7.50	5.760	40.92	.206	74.33	.123	107.75	.048	141.17	.019
7.58	5.651	41.00	.206	74.42	.123	107.83	.048	141.25	.019
7.67	5.550	41.08	.206	74.50	.123	107.92	.048	141.33	.019
7.75	5.455	41.17	.206	74.58	.123	108.00	.048	141.42	.019
7.83	5.366	41.25	.205	74.67	.122	108.08	.048	141.50	.019
7.92	5.281	41.33	.205	74.75	.122	108.17	.048	141.58	.019
8.00	5.201	41.42	.205	74.83	.122	108.25	.048	141.67	.019
8.08	5.123	41.50	.205	74.92	.122	108.33	.047	141.75	.019
8.17	5.048	41.58	.204	75.00	.122	108.42	.047	141.83	.019
8.25	4.975	41.67	.204	75.08	.121	108.50	.047	141.92	.019
8.33	4.904	41.75	.204	75.17	.121	108.58	.047	142.00	.019
8.42	4.835	41.83	.204	75.25	.121	108.67	.047	142.08	.019
8.50	4.767	41.92	.203	75.33	.121	108.75	.047	142.17	.019
8.58	4.700	42.00	.203	75.42	.121	108.83	.047	142.25	.019
8.67	4.633	42.08	.203	75.50	.120	108.92	.047	142.33	.019
8.75	4.568	42.17	.203	75.58	.120	109.00	.046	142.42	.019
8.83	4.503	42.25	.203	75.67	.120	109.08	.046	142.50	.019
8.92	4.438	42.33	.202	75.75	.120	109.17	.046	142.58	.018
9.00	4.374	42.42	.202	75.83	.120	109.25	.046	142.67	.018

9.08	4.310	42.50	.202	75.92	.119	109.33	.046	142.75	.018
9.17	4.247	42.58	.202	76.00	.119	109.42	.046	142.83	.018
9.25	4.185	42.67	.201	76.08	.119	109.50	.046	142.92	.018
9.33	4.124	42.75	.201	76.17	.119	109.58	.046	143.00	.018
9.42	4.064	42.83	.201	76.25	.119	109.67	.045	143.08	.018
9.50	4.005	42.92	.201	76.33	.118	109.75	.045	143.17	.018
9.58	3.947	43.00	.201	76.42	.118	109.83	.045	143.25	.018
9.67	3.890	43.08	.200	76.50	.118	109.92	.045	143.33	.018
9.75	3.834	43.17	.200	76.58	.118	110.00	.045	143.42	.018
9.83	3.780	43.25	.200	76.67	.118	110.08	.045	143.50	.018
9.92	3.726	43.33	.200	76.75	.118	110.17	.045	143.58	.018
10.00	3.674	43.42	.200	76.83	.117	110.25	.045	143.67	.018
10.08	3.623	43.50	.199	76.92	.117	110.33	.045	143.75	.018
10.17	3.572	43.58	.199	77.00	.117	110.42	.044	143.83	.018
10.25	3.523	43.67	.199	77.08	.117	110.50	.044	143.92	.018
10.33	3.475	43.75	.199	77.17	.117	110.58	.044	144.00	.018
10.42	3.428	43.83	.198	77.25	.116	110.67	.044	144.08	.018
10.50	3.382	43.92	.198	77.33	.116	110.75	.044	144.17	.018
10.58	3.336	44.00	.198	77.42	.116	110.83	.044	144.25	.018
10.67	3.291	44.08	.198	77.50	.116	110.92	.044	144.33	.018
10.75	3.246	44.17	.198	77.58	.116	111.00	.044	144.42	.018
10.83	3.202	44.25	.197	77.67	.115	111.08	.044	144.50	.018
10.92	3.159	44.33	.197	77.75	.115	111.17	.044	144.58	.018
11.00	3.117	44.42	.197	77.83	.115	111.25	.043	144.67	.017
11.08	3.075	44.50	.197	77.92	.115	111.33	.043	144.75	.017
11.17	3.034	44.58	.197	78.00	.115	111.42	.043	144.83	.017
11.25	2.994	44.67	.196	78.08	.114	111.50	.043	144.92	.017
11.33	2.955	44.75	.196	78.17	.114	111.58	.043	145.00	.017
11.42	2.916	44.83	.196	78.25	.114	111.67	.043	145.08	.017
11.50	2.878	44.92	.196	78.33	.114	111.75	.043	145.17	.017
11.58	2.841	45.00	.195	78.42	.114	111.83	.043	145.25	.017
11.67	2.804	45.08	.195	78.50	.114	111.92	.043	145.33	.017
11.75	2.768	45.17	.195	78.58	.113	112.00	.042	145.42	.017
11.83	2.733	45.25	.195	78.67	.113	112.08	.042	145.50	.017
11.92	2.699	45.33	.195	78.75	.113	112.17	.042	145.58	.017
12.00	2.665	45.42	.194	78.83	.113	112.25	.042	145.67	.017
12.08	2.632	45.50	.194	78.92	.113	112.33	.042	145.75	.017
12.17	2.598	45.58	.194	79.00	.112	112.42	.042	145.83	.017
12.25	2.564	45.67	.194	79.08	.112	112.50	.042	145.92	.017
12.33	2.530	45.75	.193	79.17	.112	112.58	.042	146.00	.017
12.42	2.497	45.83	.193	79.25	.112	112.67	.042	146.08	.017
12.50	2.464	45.92	.193	79.33	.112	112.75	.042	146.17	.017
12.58	2.431	46.00	.193	79.42	.111	112.83	.041	146.25	.017
12.67	2.399	46.08	.193	79.50	.111	112.92	.041	146.33	.017
12.75	2.367	46.17	.192	79.58	.111	113.00	.041	146.42	.017
12.83	2.335	46.25	.192	79.67	.111	113.08	.041	146.50	.017
12.92	2.304	46.33	.192	79.75	.111	113.17	.041	146.58	.017
13.00	2.272	46.42	.192	79.83	.111	113.25	.041	146.67	.017
13.08	2.242	46.50	.192	79.92	.110	113.33	.041	146.75	.017
13.17	2.212	46.58	.191	80.00	.110	113.42	.041	146.83	.017
13.25	2.182	46.67	.191	80.08	.110	113.50	.041	146.92	.016
13.33	2.152	46.75	.191	80.17	.110	113.58	.041	147.00	.016
13.42	2.123	46.83	.191	80.25	.110	113.67	.041	147.08	.016
13.50	2.094	46.92	.190	80.33	.109	113.75	.040	147.17	.016
13.58	2.066	47.00	.190	80.42	.109	113.83	.040	147.25	.016
13.67	2.038	47.08	.190	80.50	.109	113.92	.040	147.33	.016
13.75	2.011	47.17	.190	80.58	.109	114.00	.040	147.42	.016
13.83	1.983	47.25	.190	80.67	.109	114.08	.040	147.50	.016
13.92	1.957	47.33	.189	80.75	.108	114.17	.040	147.58	.016
14.00	1.930	47.42	.189	80.83	.108	114.25	.040	147.67	.016
14.08	1.904	47.50	.189	80.92	.108	114.33	.040	147.75	.016
14.17	1.879	47.58	.189	81.00	.108	114.42	.040	147.83	.016
14.25	1.853	47.67	.189	81.08	.108	114.50	.040	147.92	.016
14.33	1.828	47.75	.188	81.17	.108	114.58	.040	148.00	.016
14.42	1.804	47.83	.188	81.25	.107	114.67	.039	148.08	.016
14.50	1.780	47.92	.188	81.33	.107	114.75	.039	148.17	.016
14.58	1.756	48.00	.188	81.42	.107	114.83	.039	148.25	.016
14.67	1.733	48.08	.188	81.50	.107	114.92	.039	148.33	.016
14.75	1.709	48.17	.187	81.58	.107	115.00	.039	148.42	.016
14.83	1.685	48.25	.187	81.67	.107	115.08	.039	148.50	.016
14.92	1.660	48.33	.187	81.75	.106	115.17	.039	148.58	.016
15.00	1.633	48.42	.187	81.83	.106	115.25	.039	148.67	.016
15.08	1.606	48.50	.187	81.92	.106	115.33	.039	148.75	.016
15.17	1.577	48.58	.186	82.00	.106	115.42	.039	148.83	.016
15.25	1.548	48.67	.186	82.08	.106	115.50	.039	148.92	.016
15.33	1.518	48.75	.186	82.17	.105	115.58	.038	149.00	.016
15.42	1.488	48.83	.186	82.25	.105	115.67	.038	149.08	.016
15.50	1.460	48.92	.185	82.33	.105	115.75	.038	149.17	.016
15.58	1.433	49.00	.185	82.42	.105	115.83	.038	149.25	.015
15.67	1.408	49.08	.185	82.50	.105	115.92	.038	149.33	.015
15.75	1.384	49.17	.185	82.58	.105	116.00	.038	149.42	.015
15.83	1.361	49.25	.185	82.67	.104	116.08	.038	149.50	.015
15.92	1.340	49.33	.184	82.75	.104	116.17	.038	149.58	.015
16.00	1.319	49.42	.184	82.83	.104	116.25	.038	149.67	.015
16.08	1.299	49.50	.184	82.92	.104	116.33	.038	149.75	.015
16.17	1.280	49.58	.184	83.00	.104	116.42	.038	149.83	.015
16.25	1.261	49.67	.184	83.08	.104	116.50	.037	149.92	.015
16.33	1.243	49.75	.183	83.17	.103	116.58	.037	150.00	.015
16.42	1.226	49.83	.183	83.25	.103	116.67	.037	150.08	.015
16.50	1.209	49.92	.183	83.33	.103	116.75	.037	150.17	.015
16.58	1.193	50.00	.183	83.42	.103	116.83	.037	150.25	.015
16.67	1.177	50.08	.183	83.50	.103	116.92	.037	150.33	.015
16.75	1.162	50.17	.182	83.58	.103	117.00	.037	150.42	.015
16.83	1.147	50.25	.182	83.67	.102	117.08	.037	150.50	.015
16.92	1.132	50.33	.182	83.75	.102	117.17	.037	150.58	.015
17.00	1.118	50.42	.182	83.83	.102	117.25	.037	150.67	.015
17.08	1.104	50.50	.182	83.92	.102	117.33	.037	150.75	.015
17.17	1.091	50.58	.181	84.00	.102	117.42	.037	150.83	.015
17.25	1.077	50.67	.181	84.08	.102	117.50	.036	150.92	.015
17.33	1.064	50.75	.181	84.17	.101	117.58	.036	151.00	.015
17.42	1.052	50.83	.181	84.25	.101	117.67	.036	151.08	.015
17.50	1.039	50.92	.181	84.33	.101	117.75	.036	151.17	.015
17.58	1.027	51.00	.180	84.42	.101	117.83	.036	151.25	.015
17.67	1.015	51.08	.180	84.50	.101	117.92	.036	151.33	.015
17.75	1.004	51.17	.180	84.58	.101	118.00	.036	151.42	.015
17.83	.992	51.25	.180	84.67	.100	118.08	.036	151.50	.015
17.92	.981	51.33	.180	84.75	.100	118.17	.036	151.58	.015
18.00	.970	51.42	.179	84.83	.100	118.25	.036	151.67	.015
18.08	.958	51.50	.179	84.92	.100	118.33	.036	151.75	.014
18.17	.944	51.58	.179	85.00	.100	118.42	.036	151.83	.014
18.25	.929	51.67	.179	85.08	.100	118.50	.035	151.92	.014
18.33	.913	51.75	.179	85.17	.099	118.58	.035	152.00	.014
18.42	.897	51.83	.179	85.25	.099	118.67	.035	152.08	.014
18.50	.880	51.92	.178	85.33	.099	118.75	.035	152.17	.014
18.58	.863	52.00	.178	85.42	.099	118.83	.035	152.25	.014
18.67	.846	52.08	.178	85.50	.099	118.92	.035	152.33	.014
18.75	.830	52.17	.178	85.58	.099	119.00	.035	152.42	.014
18.83	.813	52.25	.178	85.67	.098	119.08	.035	152.50	.014
18.92	.797	52.33	.177	85.75	.098	119.17	.035	152.58	.014
19.00	.781	52.42	.177	85.83	.098	119.25	.035	152.67	.014
19.08	.765	52.50	.177	85.92	.098	119.33	.035	152.75	.014
19.17	.750	52.58	.177	86.00	.098	119.42	.035	152.83	.014
19.25	.735	52.67	.177	86.08	.098	119.50	.035	152.92	.014
19.33	.721	52.75	.176	86.17	.097	119.58	.034	153.00	.014
19.42	.707	52.83	.176	86.25	.097	119.67	.034	153.08	.014
19.50	.694	52.92	.176	86.33	.097	119.75	.034	153.17	.014
19.58	.681	53.00	.176	86.42	.097	119.83	.034	153.25	.014
19.67	.669	53.08	.176	86.50	.097	119.92	.034	153.33	.014
19.75	.657	53.17	.175	86.58	.096	120.00	.034	153.42	.014
19.83	.646	53.25	.175	86.67	.096	120.08	.034	153.50	.014
19.92	.635	53.33	.175	86.75	.096	120.17	.034	153.58	.014
20.00	.624	53.42	.175	86.83	.096	120.25	.034	153.67	.014
20.08	.614	53.50	.175	86.92	.096	120.33	.034	153.75	.014
20.17	.604	53.58	.174	87.00	.095	120.42	.034	153.83	.014

20.25	.595	53.67	.174	87.08	.095	120.50	.034	153.92	.014	25.83	.343	59.25	.161	92.67	.079	126.08	.029	159.50	.012
20.33	.586	53.75	.174	87.17	.095	120.58	.033	154.00	.014	25.92	.341	59.33	.161	92.75	.079	126.17	.029	159.58	.012
20.42	.578	53.83	.174	87.25	.095	120.67	.033	154.08	.014	26.00	.338	59.42	.161	92.83	.079	126.25	.029	159.67	.012
20.50	.570	53.92	.174	87.33	.094	120.75	.033	154.17	.014	26.08	.336	59.50	.161	92.92	.079	126.33	.029	159.75	.012
20.58	.562	54.00	.173	87.42	.094	120.83	.033	154.25	.014	26.17	.333	59.58	.161	93.00	.079	126.42	.029	159.83	.012
20.67	.554	54.08	.173	87.50	.094	120.92	.033	154.33	.014	26.25	.331	59.67	.160	93.08	.078	126.50	.029	159.92	.012
20.75	.547	54.17	.173	87.58	.094	121.00	.033	154.42	.013	26.33	.329	59.75	.160	93.17	.078	126.58	.028	160.00	.012
20.83	.540	54.25	.173	87.67	.094	121.08	.033	154.50	.013	26.42	.327	59.83	.160	93.25	.078	126.67	.028	160.08	.012
20.92	.534	54.33	.173	87.75	.093	121.17	.033	154.58	.013	26.50	.325	59.92	.160	93.33	.078	126.75	.028	160.17	.012
21.00	.527	54.42	.172	87.83	.093	121.25	.033	154.67	.013	26.58	.323	60.00	.160	93.42	.078	126.83	.028	160.25	.012
21.08	.521	54.50	.172	87.92	.093	121.33	.033	154.75	.013	26.67	.321	60.08	.159	93.50	.077	126.92	.028	160.33	.012
21.17	.515	54.58	.172	88.00	.093	121.42	.033	154.83	.013	26.75	.319	60.17	.159	93.58	.077	127.00	.028	160.42	.012
21.25	.510	54.67	.172	88.08	.092	121.50	.033	154.92	.013	26.83	.317	60.25	.159	93.67	.077	127.08	.028	160.50	.011
21.33	.505	54.75	.172	88.17	.092	121.58	.033	155.00	.013	26.92	.316	60.33	.159	93.75	.077	127.17	.028	160.58	.011
21.42	.499	54.83	.172	88.25	.092	121.67	.033	155.08	.013	27.00	.314	60.42	.159	93.83	.076	127.25	.028	160.67	.011
21.50	.495	54.92	.171	88.33	.092	121.75	.032	155.17	.013	27.08	.312	60.50	.158	93.92	.076	127.33	.028	160.75	.011
21.58	.490	55.00	.171	88.42	.091	121.83	.032	155.25	.013	27.17	.311	60.58	.158	94.00	.076	127.42	.028	160.83	.011
21.67	.485	55.08	.171	88.50	.091	121.92	.032	155.33	.013	27.25	.309	60.67	.158	94.08	.076	127.50	.028	160.92	.011
21.75	.481	55.17	.171	88.58	.091	122.00	.032	155.42	.013	27.33	.308	60.75	.158	94.17	.076	127.58	.028	161.00	.011
21.83	.477	55.25	.171	88.67	.091	122.08	.032	155.50	.013	27.42	.307	60.83	.158	94.25	.075	127.67	.028	161.08	.011
21.92	.473	55.33	.170	88.75	.090	122.17	.032	155.58	.013	27.50	.305	60.92	.157	94.33	.075	127.75	.028	161.17	.011
22.00	.469	55.42	.170	88.83	.090	122.25	.032	155.67	.013	27.58	.304	61.00	.157	94.42	.075	127.83	.027	161.25	.011
22.08	.465	55.50	.170	88.92	.090	122.33	.032	155.75	.013	27.67	.303	61.08	.157	94.50	.075	127.92	.027	161.33	.011
22.17	.462	55.58	.170	89.00	.090	122.42	.032	155.83	.013	27.75	.302	61.17	.157	94.58	.075	128.00	.027	161.42	.011
22.25	.458	55.67	.170	89.08	.089	122.50	.032	155.92	.013	27.83	.300	61.25	.157	94.67	.074	128.08	.027	161.50	.011
22.33	.455	55.75	.169	89.17	.089	122.58	.032	156.00	.013	27.92	.299	61.33	.157	94.75	.074	128.17	.027	161.58	.011
22.42	.451	55.83	.169	89.25	.089	122.67	.032	156.08	.013	28.00	.298	61.42	.156	94.83	.074	128.25	.027	161.67	.011
22.50	.448	55.92	.169	89.33	.089	122.75	.032	156.17	.013	28.08	.297	61.50	.156	94.92	.074	128.33	.027	161.75	.011
22.58	.445	56.00	.169	89.42	.089	122.83	.031	156.25	.013	28.17	.296	61.58	.156	95.00	.074	128.42	.027	161.83	.011
22.67	.442	56.08	.169	89.50	.088	122.92	.031	156.33	.013	28.25	.295	61.67	.156	95.08	.073	128.50	.027	161.92	.011
22.75	.440	56.17	.168	89.58	.088	123.00	.031	156.42	.013	28.33	.294	61.75	.156	95.17	.073	128.58	.027	162.00	.011
22.83	.437	56.25	.168	89.67	.088	123.08	.031	156.50	.013	28.42	.293	61.83	.155	95.25	.073	128.67	.027	162.08	.011
22.92	.434	56.33	.168	89.75	.088	123.17	.031	156.58	.013	28.50	.292	61.92	.155	95.33	.073	128.75	.027	162.17	.011
23.00	.432	56.42	.168	89.83	.087	123.25	.031	156.67	.013	28.58	.292	62.00	.155	95.42	.073	128.83	.027	162.25	.011
23.08	.429	56.50	.168	89.92	.087	123.33	.031	156.75	.013	28.67	.291	62.08	.155	95.50	.072	128.92	.027	162.33	.011
23.17	.427	56.58	.167	90.00	.087	123.42	.031	156.83	.013	28.75	.290	62.17	.155	95.58	.072	129.00	.027	162.42	.011
23.25	.425	56.67	.167	90.08	.087	123.50	.031	156.92	.013	28.83	.289	62.25	.154	95.67	.072	129.08	.027	162.50	.011
23.33	.422	56.75	.167	90.17	.086	123.58	.031	157.00	.013	28.92	.288	62.33	.154	95.75	.072	129.17	.027	162.58	.011
23.42	.420	56.83	.167	90.25	.086	123.67	.031	157.08	.013	29.00	.288	62.42	.154	95.83	.072	129.25	.026	162.67	.011
23.50	.418	56.92	.167	90.33	.086	123.75	.031	157.17	.013	29.08	.287	62.50	.154	95.92	.071	129.33	.026	162.75	.011
23.58	.416	57.00	.167	90.42	.086	123.83	.031	157.25	.013	29.17	.286	62.58	.154	96.00	.071	129.42	.026	162.83	.011
23.67	.414	57.08	.166	90.50	.085	123.92	.031	157.33	.012	29.25	.285	62.67	.153	96.08	.071	129.50	.026	162.92	.011
23.75	.412	57.17	.166	90.58	.085	124.00	.031	157.42	.012	29.33	.285	62.75	.153	96.17	.071	129.58	.026	163.00	.011
23.83	.410	57.25	.166	90.67	.085	124.08	.030	157.50	.012	29.42	.284	62.83	.153	96.25	.071	129.67	.026	163.08	.011
23.92	.408	57.33	.166	90.75	.085	124.17	.030	157.58	.012	29.50	.283	62.92	.153	96.33	.070	129.75	.026	163.17	.011
24.00	.406	57.42	.166	90.83	.085	124.25	.030	157.67	.012	29.58	.283	63.00	.152	96.42	.070	129.83	.026	163.25	.011
24.08	.404	57.50	.165	90.92	.084	124.33	.030	157.75	.012	29.67	.282	63.08	.152	96.50	.070	129.92	.026	163.33	.011
24.17	.402	57.58	.165	91.00	.084	124.42	.030	157.83	.012	29.75	.281	63.17	.152	96.58	.070	130.00	.026	163.42	.011
24.25	.400	57.67	.165	91.08	.084	124.50	.030	157.92	.012	29.83	.281	63.25	.152	96.67	.070	130.08	.026	163.50	.011
24.33	.397	57.75	.165	91.17	.084	124.58	.030	158.00	.012	29.92	.280	63.33	.152	96.75	.069	130.17	.026	163.58	.011
24.42	.394	57.83	.165	91.25	.083	124.67	.030	158.08	.012	30.00	.280	63.42	.151	96.83	.069	130.25	.026	163.67	.011
24.50	.392	57.92	.164	91.33	.083	124.75	.030	158.17	.012	30.08	.279	63.50	.151	96.92	.069	130.33	.026	163.75	.011
24.58	.389	58.00	.164	91.42	.083	124.83	.030	158.25	.012	30.17	.279	63.58	.151	97.00	.069	130.42	.026	163.83	.011
24.67	.386	58.08	.164	91.50	.083	124.92	.030	158.33	.012	30.25	.278	63.67	.151	97.08	.069	130.50	.026	163.92	.010
24.75	.383	58.17	.164	91.58	.082	125.00	.030	158.42	.012	30.33	.277	63.75	.151	97.17	.068	130.58	.026	164.00	.010
24.83	.380	58.25	.164	91.67	.082	125.08	.030	158.50	.012	30.42	.277	63.83	.150	97.25	.068	130.67	.025	164.08	.010
24.92	.377	58.33	.163	91.75	.082	125.17	.030	158.58	.012	30.50	.276	63.92	.150	97.33	.068	130.75	.025	164.17	.010
25.00	.373	58.42	.163	91.83	.082	125.25	.029	158.67	.012	30.58	.276	64.00	.150	97.42	.068	130.83	.025	164.25	.010
25.08	.370	58.50	.163	91.92	.082	125.33	.029	158.75	.012	30.67	.275	64.08	.150	97.50	.068	130.92	.025	164.33	.010
25.17	.367	58.58	.163	92.00	.081	125.42	.029	158.83	.012	30.75	.275	64.17	.149	97.58	.067	131.00	.025	164.42	.010
25.25	.364	58.67	.163	92.08	.081	125.50	.029	158.92	.012	30.83	.274	64.25	.149	97.67	.067	131.08	.025	164.50	.010
25.33	.361	58.75	.162	92.17	.081	125.58	.029	159.00	.012	30.92	.274	64.33	.149	97.75	.067	131.17	.025	164.58	.010
25.42	.358	58.83	.162	92.25	.081	125.67	.029	159.08	.012	31.00	.273	64.42	.149	97.83	.067	131.25	.025	164.67	.010
25.50	.355	58.92	.162	92.33	.080	125.75	.029	159.17	.012	31.08	.273	64.50	.149	97.92	.067	131.33	.025	164.75	.010
25.58	.352	59.00	.162	92.42	.080	125.83	.029	159.25	.012	31.17	.272	64.58	.148	98.00	.067	131.42	.025	164.83	.010
25.67	.349	59.08	.162	92.50	.080	125.92	.029	159.33	.012	31.25	.272	64.67	.148	98.08	.066	131.50	.025	164.92	.010
25.75	.346	59.17	.162	92.58	.080	126.00	.029	159.42	.012	31.33	.271	64.75	.148	98.17	.066	131.58	.025	165.00	.010

31.42	.271	64.83	.148	98.25	.066	131.67	.025	165.08	.010
31.50	.270	64.92	.147	98.33	.066	131.75	.025	165.17	.010
31.58	.270	65.00	.147	98.42	.066	131.83	.025	165.25	.010
31.67	.270	65.08	.147	98.50	.065	131.92	.025	165.33	.010
31.75	.269	65.17	.147	98.58	.065	132.00	.025	165.42	.010
31.83	.269	65.25	.147	98.67	.065	132.08	.025	165.50	.010
31.92	.268	65.33	.146	98.75	.065	132.17	.024	165.58	.010
32.00	.268	65.42	.146	98.83	.065	132.25	.024	165.67	.010
32.08	.267	65.50	.146	98.92	.065	132.33	.024	165.75	.010
32.17	.267	65.58	.146	99.00	.064	132.42	.024	165.83	.010
32.25	.266	65.67	.145	99.08	.064	132.50	.024	165.92	.010
32.33	.266	65.75	.145	99.17	.064	132.58	.024	166.00	.010
32.42	.266	65.83	.145	99.25	.064	132.67	.024	166.08	.010
32.50	.265	65.92	.145	99.33	.064	132.75	.024	166.17	.010
32.58	.265	66.00	.145	99.42	.063	132.83	.024	166.25	.010
32.67	.264	66.08	.144	99.50	.063	132.92	.024	166.33	.010
32.75	.264	66.17	.144	99.58	.063	133.00	.024	166.42	.010
32.83	.263	66.25	.144	99.67	.063	133.08	.024	166.50	.010
32.92	.263	66.33	.144	99.75	.063	133.17	.024	166.58	.010
33.00	.263	66.42	.143	99.83	.063	133.25	.024		
33.08	.262	66.50	.143	99.92	.062	133.33	.024		
33.17	.262	66.58	.143	100.00	.062	133.42	.024		
33.25	.261	66.67	.143	100.08	.062	133.50	.024		
33.33	.261	66.75	.143	100.17	.062	133.58	.024		

READ STORM | Filename: G:\Projects\2008\08104 - Vaughan Corporate Centre - Master Ser\Design\SWM\December 2011 - TS\VO2 Input Hydr
Ptotal= 80.31 mm | Comments: 100yr/6hr

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	2.00	27.30	3.75	11.24	5.50	1.61
.50	1.61	2.25	27.30	4.00	6.42	5.75	1.61
.75	1.61	2.50	73.88	4.25	6.42	6.00	1.61
1.00	1.61	2.75	73.88	4.50	3.21	6.25	1.61
1.25	1.61	3.00	20.88	4.75	3.21		
1.50	9.64	3.25	20.88	5.00	1.61		
1.75	9.64	3.50	11.24	5.25	1.61		

ADD HYD (0218) | 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0215):	124.65	14.439	2.92	71.74
+ ID2= 2 (0210):	576.91	22.089	3.17	67.05
ID = 3 (0218):	701.56	35.452	3.08	67.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0222) | 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0236):	31.13	3.720	2.75	69.44
+ ID2= 2 (0218):	701.56	35.452	3.08	67.89
ID = 3 (0222):	732.69	37.365	3.00	67.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB | STANDHYD (0239) | ID= 1 DT= 5.0 min | Area (ha)= 8.57 | Total Imp(%)= 90.00 | Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	7.71	.86
Dep. Storage	(mm)=	1.00	4.30
Average Slope	(%)=	1.00	2.00
Length	(m)=	239.00	40.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.00	1.667	9.64	3.250	20.88	4.83	1.61
.167	.00	1.750	9.64	3.333	11.24	4.92	1.61
.250	.00	1.833	27.30	3.417	11.24	5.00	1.61
.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61
.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61
.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61
.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61
.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61
.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61
1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61
1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61
1.250	1.61	2.833	20.88	4.417	3.21	6.00	1.61
1.333	9.64	2.917	20.88	4.500	3.21	6.08	1.61
1.417	9.64	3.000	20.88	4.583	3.21	6.17	1.61
1.500	9.64	3.083	20.88	4.667	3.21	6.25	1.61
1.583	9.64	3.167	20.88	4.750	3.21		

Max.Eff.Inten.(mm/hr)=		73.88	51.42	
over (min)		5.00	10.00	
Storage Coeff. (min)=		4.86 (ii)	8.17 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		.22	.13	
				TOTALS
PEAK FLOW	(cms)=	1.58	.10	1.686 (iii)
TIME TO PEAK	(hrs)=	2.75	2.75	2.75
RUNOFF VOLUME	(mm)=	79.31	41.41	75.52
TOTAL RAINFALL	(mm)=	80.31	80.31	80.31
RUNOFF COEFFICIENT	=	.99	.52	.94

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 80.0 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.

CALIB | STANDHYD (0232) | ID= 1 DT= 5.0 min | Area (ha)= 8.81 | Total Imp(%)= 61.00 | Dir. Conn.(%)= 61.00

```
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.37         3.44
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     242.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      73.88        49.21
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       4.90 (ii)   14.28 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .22          .08
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.10          .35         1.440 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83          2.75
     RUNOFF VOLUME    (mm)=      79.31        41.41         64.53
     TOTAL RAINFALL   (mm)=      80.31        80.31         80.31
     RUNOFF COEFFICIENT   =        .99          .52           .80

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0235) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .5820      .3000

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0232)      8.81      1.44      2.75      64.53
     OUTFLOW: ID= 1 (0235)      8.81       .53      3.17      64.51

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 36.58
                   TIME SHIFT OF PEAK FLOW         (min)= 25.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .2715

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0237) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0239):     8.57   1.686     2.75    75.52
        + ID2= 2 (0235):     8.81    .527     3.17    64.51
          ================================================
          ID = 3 (0237):    17.38   2.135     2.75    69.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0238) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0222):   732.69  37.365     3.00    67.95
        + ID2= 2 (0237):    17.38   2.135     2.75    69.94
          ================================================
          ID = 3 (0238):   750.07  38.439     3.00    68.00

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0245) |   Area    (ha)=  17.24
|ID= 1 DT= 5.0 min |   Total Imp(%)=  85.00   Dir. Conn.(%)=  85.00
--------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.65         2.59
     Dep. Storage     (mm)=       1.00         4.30
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     339.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      73.88        63.97
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       6.00 (ii)    9.98 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .19          .11
                                                        *TOTALS*
     PEAK FLOW       (cms)=       2.99          .30         3.299 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75          2.75
     RUNOFF VOLUME    (mm)=      79.31        41.41         73.63
     TOTAL RAINFALL   (mm)=      80.31        80.31         80.31
     RUNOFF COEFFICIENT   =        .99          .52           .92


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  80.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0227) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0238):   750.07  38.439     3.00    68.00
        + ID2= 2 (0245):    17.24   3.299     2.75    73.63
          ================================================
          ID = 3 (0227):   767.31  39.638     3.00    68.13

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0250) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   | 17.9700    18.1470
                          1.8900     1.0080   | 19.4300    18.8300
                          2.2330     1.9630   | 23.4600    19.3240
                          2.7950     6.4020   | 31.0300    19.8490
                          3.2760     9.1830   | 38.3600    20.2920
                          3.4270    10.6610   | 40.0000    20.3980
                          3.6700    12.2670   | 42.5000    21.3030
                          5.6440    13.9060   | 45.0000    22.1830
                          9.7990    15.5860   | 47.5000    23.5100
                         15.2400    17.3710   |    .0000      .0000

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

```
     INFLOW : ID= 2 (0227)    767.31     39.64      3.00      68.13
     OUTFLOW: ID= 1 (0250)    767.31     17.42      4.50      68.12

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 43.96
                   TIME SHIFT OF PEAK FLOW         (min)= 90.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=17.9930

--------------------------------------------------------------------------------

 FINISH
================================================================================
==============
```

Appendix D5

South-East SWM Pond Calculations

Vaughan Metropolitan Centre
City of Vaughan
SE Corner of Jane St. and Hwy 7

Project #: 08104

Date: April 2012

Storm Volume (6 hrs AES storms)

Storm Event	Rainfall Depth (mm)
25mm	25.00
2-Year	36.00
5-Year	47.80
10-Year	55.70
25-Year	65.60
50-Year	73.00
100-Year	80.30

Building base run-off coefficient = 0.90
Runoff reduction = 15 mm (According to LEED Gold Objective)

Adjustment to Building Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 15mm	C_{15}
25mm	25.00	22.50	7.50	0.30
2-Year	36.00	32.40	17.40	0.48
5-Year	**47.80**	**43.02**	**28.02**	**0.59**
10-Year	55.70	50.13	35.13	0.63
25-Year	65.60	59.04	44.04	0.67
50-Year	73.00	65.70	50.70	0.69
100-Year	80.30	72.27	57.27	0.71

Base run-off coefficient = 0.25
Runoff reduction = 10 mm (Assume 5mm initial abstraction to include for the total proposed 15mm)

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 10mm	C_{10}
25mm	25.00	6.25	0.00	0.00
2-Year	36.00	9.00	0.00	0.00
5-Year	**47.80**	**11.95**	**1.95**	**0.04**
10-Year	55.70	13.93	3.93	0.07
25-Year	65.60	16.40	6.40	0.10
50-Year	73.00	18.25	8.25	0.11
100-Year	80.30	20.08	10.08	0.13

Assumption:

Residential
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Commercial
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Mixed Area
For mixed area 50% is for residential and 50% is for commercial

Open Space and Parkland
C = 0.75 for Parkland (in accordance with the City's design criteria)
C = 0.25 for open space
An average runoff coefficient of 0.50 is used for the land indicated as major parks and open spaces

Area & Imperviousness for Permanent Pool Calculation (based on 5-year Runoff Coefficient)

SE Corner of Jane St. and Hwy 7

Area Directly to Pond

		Area (ha)	C	AC
Residential	Building	5.98	0.59	3.51
	Paved Area	1.99	0.90	1.80
	Landscape	2.12	0.04	0.09
Commercial	Building	0.41	0.59	0.24
	Paved Area	0.14	0.90	0.12
	Landscape	0.15	0.04	0.01
	Open Space / Parkland	1.88	0.50	0.94
	Open Channel	2.34	0.55	1.29
	SWM Pond Block	2.13	0.55	1.17
	Road	9.56	0.90	8.60
	Total	26.71		17.77

← Weighted "C" = **0.67**

Weighted Imperviousness = **0.66**

Area Not Directly to Pond

		Area (ha)	C	AC
Mized Use (Residential)	Building	0.60	0.59	0.35
	Paved Area	0.20	0.90	0.18
	Landscape	0.21	0.04	0.01
Mized Use (Commercial)	Building	0.60	0.59	0.35
	Paved Area	0.20	0.90	0.18
	Landscape	0.21	0.04	0.01

		Area (ha)	C	AC
Residential	Building	0.49	0.59	0.29
	Paved Area	0.16	0.90	0.15
	Landscape	0.17	0.04	0.01
	Road	2.31	0.90	2.08
	Total	5.17		3.61

← Weighted "C" = **0.70**

Weighted Imperviousness = **0.71**

Vaughan Metropolitan Centre
City of Vaughan

Project #: 08104

Date: April 2012

SWM Pond Permanent Pool/Extended Detention Volume

SE Corner of Jane St. and Hwy 7

Table A.1 – MOE Water Quality Storage Requirements (SWMP 2003)*

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced 80% long-term S.S. removal	Infiltration	25	30	35	40
	Wetlands	80	105	120	140
	Hybrid Wet Pond/Wetland	110	150	175	195
	Wet Pond	140	190	225	250
Normal 70% long-term S.S. removal	Infiltration	20	20	25	30
	Wetlands	60	70	80	90
	Hybrid Wet Pond/Wetland	75	90	105	120
	Wet Pond	90	110	130	150
Basic 60% long-term S.S. removal	Infiltration	20	20	20	20
	Wetlands	60	60	60	60
	Hybrid Wet Pond/Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

* Values in table for Wet Ponds and Wetlands include 40m^3/ha of extended detention storage.

SWM Facility Type = Wet Pond
Level of Protection = 1

Drainage Area = 31.88 ha
Area-Weighted Imperviousness = 67%

Water Quality Requirement =	218.00	m^3/ha	
Permanent Pool Unit Volume Requirement =	178.00	m^3/ha	
Total Permanent Pool Storage Volume Required =	**5,675**	m^3	
Extended Detention Unit Volume Requirement =	40	m^3/ha	
Total Extended Detention Volume Required =	**1,275**	m^3	(compare with Erosion Volume required)

Erosion Control Volume and Release Rate
SE Corner of Jane St. and Hwy 7

SWM Pond

Input:

Area = 31.88 (ha)

R.V = 18.959 (mm)

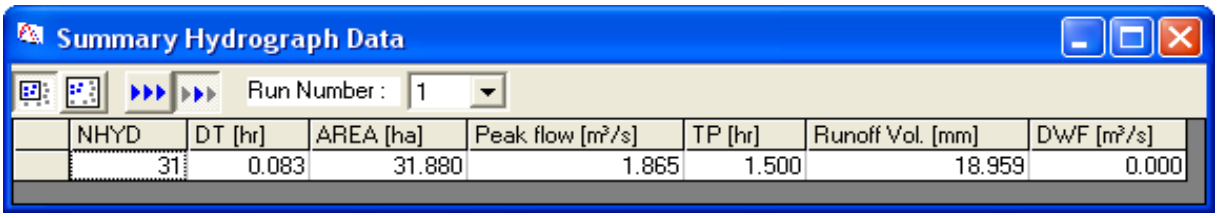
Draw Down Time = 48 (hrs)

Calculations:

Storage = 6,044 (m^3)

Average Outflow = 0.035 (m^3/s)

Peak Outflow = 0.052 (m^3/s) - Estimated at 1.5 times Average Outflow



NHYD	DT [hr]	AREA [ha]	Peak flow [m³/s]	TP [hr]	Runoff Vol. [mm]	DWF [m³/s]
31	0.083	31.880	1.865	1.500	18.959	0.000

Vaughan Metropolitan Centre
City of Vaughan
SE Corner of Jane St. and Hwy 7

Project #: 08104

Date: April 2012

Storm Volume (6 hrs AES storms)

Storm Event	Rainfall Depth (mm)
25mm	25.00
2-Year	36.00
5-Year	47.80
10-Year	55.70
25-Year	65.60
50-Year	73.00
100-Year	80.30

Building base run-off coefficient = 0.90
Runoff reduction = 15 mm (According to LEED Gold Objective)

Adjustment to Building Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 15mm	C_{15}
25mm	25.00	22.50	7.50	0.30
2-Year	36.00	32.40	17.40	0.48
5-Year	47.80	43.02	28.02	0.59
10-Year	55.70	50.13	35.13	0.63
25-Year	65.60	59.04	44.04	0.67
50-Year	73.00	65.70	50.70	0.69
100-Year	**80.30**	**72.27**	**57.27**	**0.71**

Base run-off coefficient = 0.25
Runoff reduction = 10 mm (Assume 5mm initial abstraction to include for the total proposed 15mm)

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 10mm	C_{10}
25mm	25.00	6.25	0.00	0.00
2-Year	36.00	9.00	0.00	0.00
5-Year	47.80	11.95	1.95	0.04
10-Year	55.70	13.93	3.93	0.07
25-Year	65.60	16.40	6.40	0.10
50-Year	73.00	18.25	8.25	0.11
100-Year	**80.30**	**20.08**	**10.08**	**0.13**

Assumption:

Residential
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Commercial
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Mixed Area
For mixed area 50% is for residential and 50% is for commercial

Open Space and Parkland
C = 0.75 for Parkland (in accordance with the City's design criteria)
C = 0.25 for open space
An average runoff coefficient of 0.50 is used for the land indicated as major parks and open spaces

Area & Imperviousness for Permanent Pool Calculation (based on 100-year Runoff Coefficient)

SE Corner of Jane St. and Hwy 7

Area Directly to Pond

		Area (ha)	C	AC
Residential	Building	5.98	0.71	4.27
	Paved Area	1.99	0.90	1.80
	Landscape	2.12	0.13	0.27
Commercial	Building	0.41	0.71	0.30
	Paved Area	0.14	0.90	0.12
	Landscape	0.15	0.13	0.02
	Total	10.80		6.77

← Weighted "C" = **0.63**
Weighted Imperviousness = **0.61**

	Area (ha)	C	AC
Open Space / Parkland	1.88	0.50	0.94
Open Channel	2.34	0.55	1.29
SWM Pond Block	2.13	0.55	1.17
Road	9.56	0.90	8.60
Total	15.91		12.00

← Weighted "C" = **0.75**
Weighted Imperviousness = **0.79**

Area Not Directly to Pond

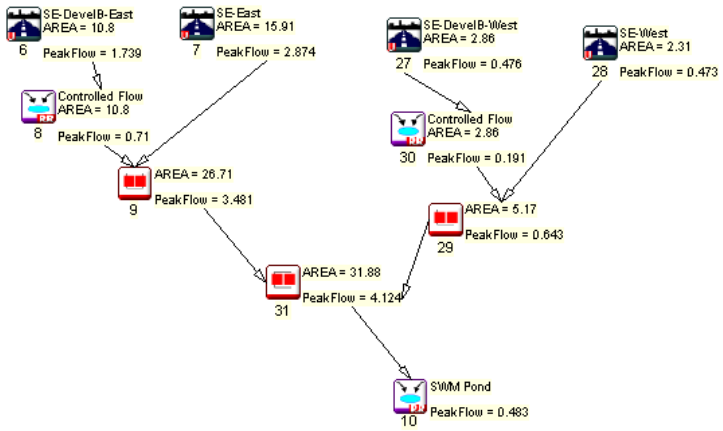
		Area (ha)	C	AC
Mized Use (Residential)	Building	0.60	0.71	0.43
	Paved Area	0.20	0.90	0.18
	Landscape	0.21	0.13	0.03
Mized Use (Commercial)	Building	0.60	0.71	0.43
	Paved Area	0.20	0.90	0.18
	Landscape	0.21	0.13	0.03
Residential	Building	0.49	0.71	0.35
	Paved Area	0.16	0.90	0.15
	Landscape	0.17	0.13	0.02
	Total	2.86		1.79

← Weighted "C" = **0.63**
Weighted Imperviousness = **0.61**

	Area (ha)	C	AC
Road	2.31	0.90	2.08
Total	2.31		2.08

← Weighted "C" = **0.90**
Weighted Imperviousness = **1.00**

South East POND



Summary Hydrograph Data

NHYD	DT [hr]	AREA [ha]	Peak flow [m³/s]	TP [hr]	Runoff Vol. [mm]	DWF [m³/s]
10	0.083	31.880	0.052	5.250	18.879	0.000
10	0.083	31.880	0.163	5.417	28.525	0.000
10	0.083	31.880	0.242	5.250	39.229	0.000
10	0.083	31.880	0.294	5.167	46.512	0.000
10	0.083	31.880	0.368	5.083	55.778	0.000
10	0.083	31.880	0.425	5.083	62.780	0.000
10	0.083	31.880	0.483	5.000	69.734	0.000

```
================================================================================
==============

       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM, Version 2.0
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O   Licensed To: TMIG
        OOO     T      T    H   H    Y    M   M   OOO                 VO2-0145

Developed and Distributed by Greenland International Consulting Inc.
Copyright 1996, 2001 Schaeffer & Associates Ltd.
All rights reserved.


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


  Input   filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat
  Output  filename: G:\Projects\2008\08104-~1\Design\SWM\201202~1\100-YE~1\On-Site Control
to 80% Imperv.out
  Summary filename: G:\Projects\2008\08104-~1\Design\SWM\201202~1\100-YE~1\On-Site Control
to 80% Imperv.sum


DATE: 3/26/2012                            TIME: 2:53:21 PM

USER:


COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------------------
---------------
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\25MM4HR.STM
| Ptotal= 25.00 mm |    Comments: Twenty-Five mm Four Hour Chicago Storm
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .17    2.07 |  1.17    5.70 |  2.17    5.19 |  3.17    2.80
                 .33    2.27 |  1.33   10.78 |  2.33    4.47 |  3.33    2.62
                 .50    2.52 |  1.50   50.21 |  2.50    3.95 |  3.50    2.48
                 .67    2.88 |  1.67   13.37 |  2.67    3.56 |  3.67    2.35
                 .83    3.38 |  1.83    8.29 |  2.83    3.25 |  3.83    2.23
                1.00    4.18 |  2.00    6.30 |  3.00    3.01 |  4.00    2.14

--------------------------------------------------------------------------------


--------------------
| CALIB            |
| STANDHYD  (0028) |   Area     (ha)=   2.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
```

```
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.29          .02
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     124.10        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08    2.80
               .167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17    2.80
               .250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25    2.62
               .333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33    2.62
               .417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42    2.48
               .500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50    2.48
               .583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58    2.35
               .667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67    2.35
               .750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75    2.23
               .833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83    2.23
               .917    4.17 | 1.917    6.30 | 2.917    3.01 |  3.92    2.14
              1.000    4.18 | 2.000    6.29 | 3.000    3.01 |  4.00    2.14

     Max.Eff.Inten.(mm/hr)=      50.21         7.91
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.83 (ii)    5.65 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .25          .15
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .30          .00          .301 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.58          1.50
     RUNOFF VOLUME    (mm)=      24.00         5.55         23.81
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .96          .22           .95

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0027) |   Area    (ha)=   2.86
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.74         1.12
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     138.10        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      50.21         4.90
               over (min)        5.00        35.00
     Storage Coeff.  (min)=       4.08 (ii)   33.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00        35.00
     Unit Hyd. peak  (cms)=        .24          .03
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .23          .01          .228 (iii)
     TIME TO PEAK    (hrs)=       1.50         2.17          1.50
     RUNOFF VOLUME    (mm)=      24.00         5.55         16.80
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .96          .22           .67

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0030) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .2190      .0960

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0027)        2.86       .23      1.50      16.80
     OUTFLOW: ID= 1 (0030)        2.86       .05      1.83      16.76

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 20.44
                TIME SHIFT OF PEAK FLOW          (min)= 20.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  .0204

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0029) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0028):     2.31     .301     1.50    23.81
        + ID2= 2 (0030):     2.86     .047     1.83    16.76
          ================================================
          ID = 3 (0029):     5.17     .332     1.50    19.91

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0006) |   Area    (ha)=  10.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.59         4.21
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     268.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      50.21         4.90
               over (min)        5.00        40.00
     Storage Coeff.  (min)=       6.08 (ii)   35.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00        40.00
     Unit Hyd. peak  (cms)=        .19          .03
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .78          .03          .779 (iii)
     TIME TO PEAK    (hrs)=       1.50         2.25          1.50
     RUNOFF VOLUME    (mm)=      24.00         5.55         16.80
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .96          .22           .67
```

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0008) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .8130      .3571

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0006)    10.80      .78      1.50      16.80
     OUTFLOW: ID= 1 (0008)    10.80      .17      1.92      16.79

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 22.30
                  TIME SHIFT OF PEAK FLOW         (min)= 25.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .0763

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0007) |   Area     (ha)=  15.91
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  79.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.57         3.34
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     325.70        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      50.21         4.90
               over (min)        5.00        40.00
     Storage Coeff.  (min)=       6.83 (ii)   35.86 (ii)
     Unit Hyd. Tpeak (min)=       5.00        40.00
     Unit Hyd. peak  (cms)=        .18          .03
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.42          .02          1.426 (iii)
     TIME TO PEAK    (hrs)=       1.50         2.25           1.50
     RUNOFF VOLUME    (mm)=      24.00         5.55          20.12
     TOTAL RAINFALL   (mm)=      25.00        25.00          25.00
     RUNOFF COEFFICIENT   =        .96          .22            .80


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0009) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0008):    10.80     .174     1.92    16.79
        + ID2= 2 (0007):    15.91    1.426     1.50    20.12
          ================================================
          ID = 3 (0009):    26.71    1.533     1.50    18.77

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0031) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0029):     5.17     .332     1.50    19.91
        + ID2= 2 (0009):    26.71   1.533     1.50    18.77
          ================================================
          ID = 3 (0031):    31.88   1.865     1.50    18.96

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0010) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .2940     1.1158
                           .0520      .5230   |    .3680     1.3234
                           .1630      .7202   |    .4250     1.4787
                           .2420      .9521   |    .4830     1.6325

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0031)    31.88      1.86      1.50      18.96
     OUTFLOW: ID= 1 (0010)    31.88       .05      5.25      18.88

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.79
                  TIME SHIFT OF PEAK FLOW         (min)=225.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .5229

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 36.00 mm |    Comments: 2yr/6hr
--------------------
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .25     .00 |  2.00   12.24 |  3.75    5.04 |  5.50     .72
                .50     .72 |  2.25   12.24 |  4.00    2.88 |  5.75     .72
                .75     .72 |  2.50   33.12 |  4.25    2.88 |  6.00     .72
               1.00     .72 |  2.75   33.12 |  4.50    1.44 |  6.25     .72
               1.25     .72 |  3.00    9.36 |  4.75    1.44 |
               1.50    4.32 |  3.25    9.36 |  5.00     .72 |
               1.75    4.32 |  3.50    5.04 |  5.25     .72 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0028) |   Area     (ha)=   2.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.29          .02
     Dep. Storage     (mm)=       1.00         5.00
```

```
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     124.10        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .083     .00 | 1.667    4.32 | 3.250    9.36 |  4.83     .72
               .167     .00 | 1.750    4.32 | 3.333    5.04 |  4.92     .72
               .250     .00 | 1.833   12.24 | 3.417    5.04 |  5.00     .72
               .333     .72 | 1.917   12.24 | 3.500    5.04 |  5.08     .72
               .417     .72 | 2.000   12.24 | 3.583    5.04 |  5.17     .72
               .500     .72 | 2.083   12.24 | 3.667    5.04 |  5.25     .72
               .583     .72 | 2.167   12.24 | 3.750    5.04 |  5.33     .72
               .667     .72 | 2.250   12.24 | 3.833    2.88 |  5.42     .72
               .750     .72 | 2.333   33.12 | 3.917    2.88 |  5.50     .72
               .833     .72 | 2.417   33.12 | 4.000    2.88 |  5.58     .72
               .917     .72 | 2.500   33.12 | 4.083    2.88 |  5.67     .72
              1.000     .72 | 2.583   33.12 | 4.167    2.88 |  5.75     .72
              1.083     .72 | 2.667   33.12 | 4.250    2.88 |  5.83     .72
              1.167     .72 | 2.750   33.12 | 4.333    1.44 |  5.92     .72
              1.250     .72 | 2.833    9.36 | 4.417    1.44 |  6.00     .72
              1.333    4.32 | 2.917    9.36 | 4.500    1.44 |  6.08     .72
              1.417    4.32 | 3.000    9.36 | 4.583    1.44 |  6.17     .72
              1.500    4.32 | 3.083    9.36 | 4.667    1.44 |  6.25     .72
              1.583    4.32 | 3.167    9.36 | 4.750    1.44 |

     Max.Eff.Inten.(mm/hr)=      33.12        83.11
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      4.52 (ii)    6.68 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=       .23          .14
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .21          .00          .211 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.75          2.75
     RUNOFF VOLUME    (mm)=     35.00        11.57         34.76
     TOTAL RAINFALL   (mm)=     36.00        36.00         36.00
     RUNOFF COEFFICIENT   =       .97          .32           .97

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0027) |   Area    (ha)=   2.86
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.74         1.12
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     138.10        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      33.12        13.05
               over (min)        5.00        25.00
     Storage Coeff.  (min)=      4.82 (ii)   24.44 (ii)
     Unit Hyd. Tpeak (min)=      5.00        25.00
     Unit Hyd. peak  (cms)=       .22          .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .16          .02          .177 (iii)
     TIME TO PEAK    (hrs)=      2.75         3.00          2.75
     RUNOFF VOLUME    (mm)=     35.00        11.57         25.86
     TOTAL RAINFALL   (mm)=     36.00        36.00         36.00
     RUNOFF COEFFICIENT   =       .97          .32           .72

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0030) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .2190      .0960

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0027)        2.86       .18      2.75      25.86
     OUTFLOW: ID= 1 (0030)        2.86       .07      3.08      25.82

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.99
                  TIME SHIFT OF PEAK FLOW         (min)= 20.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .0318

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0029) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
         ID1= 1 (0028):      2.31     .211     2.75     34.76
       + ID2= 2 (0030):      2.86     .072     3.08     25.82
         ================================================
         ID = 3 (0029):      5.17     .276     2.75     29.82

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0006) |   Area    (ha)=  10.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.59         4.21
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     268.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      33.12        13.05
               over (min)        5.00        30.00
     Storage Coeff.  (min)=      7.19 (ii)   26.81 (ii)
     Unit Hyd. Tpeak (min)=      5.00        30.00
     Unit Hyd. peak  (cms)=       .17          .04
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .60          .08          .650 (iii)
     TIME TO PEAK    (hrs)=      2.75         3.08          2.75
```

```
     RUNOFF VOLUME    (mm)=      35.00        11.57          25.86
     TOTAL RAINFALL   (mm)=      36.00        36.00          36.00
     RUNOFF COEFFICIENT   =        .97          .32           .72


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0008) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .8130     .3571

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0006)     10.80       .65      2.75      25.86
     OUTFLOW: ID= 1 (0008)     10.80       .27      3.17      25.85

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.52
                   TIME SHIFT OF PEAK FLOW         (min)= 25.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .1186

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0007) |   Area    (ha)=  15.91
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  79.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.57         3.34
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     325.70        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      33.12        13.05
                 over (min)      10.00        30.00
     Storage Coeff.  (min)=       8.07 (ii)   27.69 (ii)
     Unit Hyd. Tpeak (min)=      10.00        30.00
     Unit Hyd. peak  (cms)=        .13          .04
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.13          .07          1.168 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.08           2.75
     RUNOFF VOLUME    (mm)=      35.00        11.57          30.08
     TOTAL RAINFALL   (mm)=      36.00        36.00          36.00
     RUNOFF COEFFICIENT   =        .97          .32           .84


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

-------------------------------------------------------------------------------

--------------------
| ADD HYD   (0009) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0008):    10.80    .270     3.17    25.85
        + ID2= 2 (0007):    15.91   1.168     2.75    30.08
          ================================================
          ID = 3 (0009):    26.71   1.401     2.75    28.37

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------

--------------------
| ADD HYD   (0031) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0029):     5.17    .276     2.75    29.82
        + ID2= 2 (0009):    26.71   1.401     2.75    28.37
          ================================================
          ID = 3 (0031):    31.88   1.677     2.75    28.61

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-------------------------------------------------------------------------------
--------------------
| RESERVOIR (0010) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .2940     1.1158
                          .0520      .5230    |    .3680     1.3234
                          .1630      .7202    |    .4250     1.4787
                          .2420      .9521    |    .4830     1.6325

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0031)     31.88      1.68      2.75      28.61
     OUTFLOW: ID= 1 (0010)     31.88       .16      5.42      28.53

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.70
                   TIME SHIFT OF PEAK FLOW         (min)=160.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .7197

-------------------------------------------------------------------------------
  ***************************
  ** SIMULATION NUMBER:   3 **
  ***************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 47.81 mm |    Comments: 5yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   16.25 |  3.75    6.69 |  5.50     .96
                 .50     .96 |  2.25   16.25 |  4.00    3.82 |  5.75     .96
                 .75     .96 |  2.50   43.98 |  4.25    3.82 |  6.00     .96
                1.00     .96 |  2.75   43.98 |  4.50    1.91 |  6.25     .96
                1.25     .96 |  3.00   12.43 |  4.75    1.91 |
                1.50    5.74 |  3.25   12.43 |  5.00     .96 |
                1.75    5.74 |  3.50    6.69 |  5.25     .96 |

-------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0028) |   Area    (ha)=   2.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
```

```
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.29          .02
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     124.10        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .083     .00 | 1.667    5.74 | 3.250   12.43 |  4.83     .96
               .167     .00 | 1.750    5.74 | 3.333    6.69 |  4.92     .96
               .250     .00 | 1.833   16.25 | 3.417    6.69 |  5.00     .96
               .333     .96 | 1.917   16.25 | 3.500    6.69 |  5.08     .96
               .417     .96 | 2.000   16.25 | 3.583    6.69 |  5.17     .96
               .500     .96 | 2.083   16.25 | 3.667    6.69 |  5.25     .96
               .583     .96 | 2.167   16.25 | 3.750    6.69 |  5.33     .96
               .667     .96 | 2.250   16.25 | 3.833    3.82 |  5.42     .96
               .750     .96 | 2.333   43.98 | 3.917    3.82 |  5.50     .96
               .833     .96 | 2.417   43.98 | 4.000    3.82 |  5.58     .96
               .917     .96 | 2.500   43.98 | 4.083    3.82 |  5.67     .96
              1.000     .96 | 2.583   43.98 | 4.167    3.82 |  5.75     .96
              1.083     .96 | 2.667   43.98 | 4.250    3.82 |  5.83     .96
              1.167     .96 | 2.750   43.98 | 4.333    1.91 |  5.92     .96
              1.250     .96 | 2.833   12.43 | 4.417    1.91 |  6.00     .96
              1.333    5.74 | 2.917   12.43 | 4.500    1.91 |  6.08     .96
              1.417    5.74 | 3.000   12.43 | 4.583    1.91 |  6.17     .96
              1.500    5.74 | 3.083   12.43 | 4.667    1.91 |  6.25     .96
              1.583    5.74 | 3.167   12.43 | 4.750    1.91 |

     Max.Eff.Inten.(mm/hr)=      43.98       154.40
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       4.04 (ii)    5.96 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .24          .15
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .28          .00          .281 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75          2.75
     RUNOFF VOLUME    (mm)=      46.81        19.33         46.53
     TOTAL RAINFALL   (mm)=      47.81        47.81         47.81
     RUNOFF COEFFICIENT   =        .98          .40           .97

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0027) |   Area    (ha)=   2.86
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.74         1.12
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     138.10        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      43.98        21.81
               over (min)         5.00        25.00
     Storage Coeff.  (min)=       4.31 (ii)   20.28 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .23          .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .21          .04          .246 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00          2.75
     RUNOFF VOLUME    (mm)=      46.81        19.33         36.09
     TOTAL RAINFALL   (mm)=      47.81        47.81         47.81
     RUNOFF COEFFICIENT   =        .98          .40           .75

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0030) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         .0000      .0000    |    .2190      .0960

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0027)      2.86       .25      2.75      36.09
     OUTFLOW: ID= 1 (0030)      2.86       .10      3.17      36.05

               PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.03
               TIME SHIFT OF PEAK FLOW         (min)= 25.00
               MAXIMUM  STORAGE   USED       (ha.m.)=  .0443

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0029) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0028):     2.31    .281     2.75    46.53
        + ID2= 2 (0030):     2.86    .101     3.17    36.05
          ================================================
          ID = 3 (0029):     5.17    .371     2.75    40.73

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0006) |   Area    (ha)=  10.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.59         4.21
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     268.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      43.98        21.81
               over (min)         5.00        25.00
     Storage Coeff.  (min)=       6.42 (ii)   22.39 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
```

```
     Unit Hyd. peak  (cms)=        .18          .05
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .80          .16          .919 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00          2.75
     RUNOFF VOLUME    (mm)=      46.81        19.33         36.09
     TOTAL RAINFALL   (mm)=      47.81        47.81         47.81
     RUNOFF COEFFICIENT   =        .98          .40           .75


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0008) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)      (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .8130      .3571

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0006)     10.80       .92      2.75      36.09
     OUTFLOW: ID= 1 (0008)     10.80       .38      3.17      36.08

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.39
                  TIME SHIFT OF PEAK FLOW          (min)= 25.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .1671

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0007) |   Area    (ha)=  15.91
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  79.00
--------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.57         3.34
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     325.70        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      43.98        21.81
                 over (min)       5.00        25.00
     Storage Coeff.  (min)=       7.21 (ii)   23.18 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .17          .05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.52          .12          1.613 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00          2.75
     RUNOFF VOLUME    (mm)=      46.81        19.33         41.04
     TOTAL RAINFALL   (mm)=      47.81        47.81         47.81
     RUNOFF COEFFICIENT   =        .98          .40           .86


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0009) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0008):    10.80     .380     3.17    36.08
        + ID2= 2 (0007):    15.91    1.613     2.75    41.04
          ================================================
          ID = 3 (0009):    26.71    1.938     2.75    39.03

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0031) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0029):     5.17     .371     2.75    40.73
        + ID2= 2 (0009):    26.71    1.938     2.75    39.03
          ================================================
          ID = 3 (0031):    31.88    2.309     2.75    39.31

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0010) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)      (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .2940     1.1158
                           .0520      .5230    |    .3680     1.3234
                           .1630      .7202    |    .4250     1.4787
                           .2420      .9521    |    .4830     1.6325

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0031)     31.88       2.31      2.75      39.31
     OUTFLOW: ID= 1 (0010)     31.88        .24      5.25      39.23

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.48
                  TIME SHIFT OF PEAK FLOW          (min)=150.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .9518

--------------------------------------------------------------------------------
  ***************************
  ** SIMULATION NUMBER:   4 **
  ***************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 55.69 mm |    Comments: 10yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   18.94 |  3.75    7.80 |  5.50    1.11
                 .50    1.11 |  2.25   18.94 |  4.00    4.46 |  5.75    1.11
                 .75    1.11 |  2.50   51.24 |  4.25    4.46 |  6.00    1.11
                1.00    1.11 |  2.75   51.24 |  4.50    2.23 |  6.25    1.11
                1.25    1.11 |  3.00   14.48 |  4.75    2.23 |
                1.50    6.68 |  3.25   14.48 |  5.00    1.11 |
                1.75    6.68 |  3.50    7.80 |  5.25    1.11 |

--------------------------------------------------------------------------------
```

```
--------------------
| CALIB            |
| STANDHYD  (0028) |   Area    (ha)=   2.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.29          .02
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     124.10        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .083     .00 | 1.667    6.68 | 3.250   14.48 |  4.83    1.11
               .167     .00 | 1.750    6.68 | 3.333    7.80 |  4.92    1.11
               .250     .00 | 1.833   18.94 | 3.417    7.80 |  5.00    1.11
               .333    1.11 | 1.917   18.94 | 3.500    7.80 |  5.08    1.11
               .417    1.11 | 2.000   18.94 | 3.583    7.80 |  5.17    1.11
               .500    1.11 | 2.083   18.94 | 3.667    7.80 |  5.25    1.11
               .583    1.11 | 2.167   18.94 | 3.750    7.80 |  5.33    1.11
               .667    1.11 | 2.250   18.94 | 3.833    4.46 |  5.42    1.11
               .750    1.11 | 2.333   51.24 | 3.917    4.46 |  5.50    1.11
               .833    1.11 | 2.417   51.24 | 4.000    4.46 |  5.58    1.11
               .917    1.11 | 2.500   51.24 | 4.083    4.46 |  5.67    1.11
              1.000    1.11 | 2.583   51.24 | 4.167    4.46 |  5.75    1.11
              1.083    1.11 | 2.667   51.24 | 4.250    4.46 |  5.83    1.11
              1.167    1.11 | 2.750   51.24 | 4.333    2.23 |  5.92    1.11
              1.250    1.11 | 2.833   14.48 | 4.417    2.23 |  6.00    1.11
              1.333    6.68 | 2.917   14.48 | 4.500    2.23 |  6.08    1.11
              1.417    6.68 | 3.000   14.48 | 4.583    2.23 |  6.17    1.11
              1.500    6.68 | 3.083   14.48 | 4.667    2.23 |  6.25    1.11
              1.583    6.68 | 3.167   14.48 | 4.750    2.23 |

     Max.Eff.Inten.(mm/hr)=      51.24       252.17
                  over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.80 (ii)    5.61 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .25          .15
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .33          .00          .327 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75          2.75
     RUNOFF VOLUME    (mm)=      54.69        25.02         54.39
     TOTAL RAINFALL   (mm)=      55.69        55.69         55.69
     RUNOFF COEFFICIENT   =        .98          .45           .98

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0027) |   Area    (ha)=   2.86
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.74         1.12
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     138.10        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      51.24        29.52
                  over (min)        5.00        20.00
     Storage Coeff.  (min)=       4.05 (ii)   18.21 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .24          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .25          .06          .301 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92          2.75
     RUNOFF VOLUME    (mm)=      54.69        25.02         43.11
     TOTAL RAINFALL   (mm)=      55.69        55.69         55.69
     RUNOFF COEFFICIENT   =        .98          .45           .77

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0030) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .2190      .0960

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0027)        2.86       .30      2.75       43.11
     OUTFLOW: ID= 1 (0030)        2.86       .12      3.08       43.08

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.66
                  TIME SHIFT OF PEAK FLOW         (min)= 20.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .0537

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0029) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0028):     2.31     .327     2.75    54.39
        + ID2= 2 (0030):     2.86     .123     3.08    43.08
          ================================================
          ID = 3 (0029):     5.17     .436     2.75    48.13

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0006) |   Area    (ha)=  10.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.59         4.21
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     268.30        40.00
     Mannings n           =       .013         .250
```

```
     Max.Eff.Inten.(mm/hr)=      51.24        29.52
               over (min)         5.00        25.00
     Storage Coeff.  (min)=       6.03 (ii)   20.19 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .19          .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .93          .22          1.102 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00          2.75
     RUNOFF VOLUME    (mm)=      54.69        25.02         43.12
     TOTAL RAINFALL   (mm)=      55.69        55.69         55.69
     RUNOFF COEFFICIENT   =        .98          .45           .77


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0008) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)      (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .8130      .3571

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0006)     10.80      1.10      2.75      43.12
     OUTFLOW: ID= 1 (0008)     10.80       .46      3.17      43.11

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.39
                   TIME SHIFT OF PEAK FLOW         (min)= 25.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .2004

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0007) |   Area    (ha)=  15.91
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  79.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.57         3.34
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     325.70        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      51.24        29.52
               over (min)         5.00        25.00
     Storage Coeff.  (min)=       6.78 (ii)   20.94 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .18          .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.78          .17          1.906 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00          2.75
     RUNOFF VOLUME    (mm)=      54.69        25.02         48.46
     TOTAL RAINFALL   (mm)=      55.69        55.69         55.69
     RUNOFF COEFFICIENT   =        .98          .45           .87


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0009) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0008):    10.80     .456     3.17    43.11
        + ID2= 2 (0007):    15.91    1.906     2.75    48.46
          ================================================
          ID = 3 (0009):    26.71   2.295     2.75    46.29

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0031) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0029):     5.17     .436     2.75    48.13
        + ID2= 2 (0009):    26.71   2.295     2.75    46.29
          ================================================
          ID = 3 (0031):    31.88   2.731     2.75    46.59

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0010) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)      (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .2940     1.1158
                           .0520      .5230    |    .3680     1.3234
                           .1630      .7202    |    .4250     1.4787
                           .2420      .9521    |    .4830     1.6325

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0031)     31.88      2.73      2.75      46.59
     OUTFLOW: ID= 1 (0010)     31.88       .29      5.17      46.51

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.76
                   TIME SHIFT OF PEAK FLOW         (min)=145.00
                   MAXIMUM  STORAGE   USED       (ha.m.)= 1.1156

--------------------------------------------------------------------------------
  ***************************
  ** SIMULATION NUMBER:   5 **
  ***************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 65.59 mm |    Comments: 25yr/6hr
--------------------
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .25     .00 |  2.00   22.30 |  3.75    9.18 |  5.50    1.31
                .50    1.31 |  2.25   22.30 |  4.00    5.25 |  5.75    1.31
                .75    1.31 |  2.50   60.35 |  4.25    5.25 |  6.00    1.31
               1.00    1.31 |  2.75   60.35 |  4.50    2.62 |  6.25    1.31
               1.25    1.31 |  3.00   17.06 |  4.75    2.62 |
               1.50    7.87 |  3.25   17.06 |  5.00    1.31 |
```

```
                1.75    7.87 |  3.50    9.18 |  5.25    1.31 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0028) |   Area    (ha)=   2.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.29          .02
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     124.10        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .083     .00 | 1.667    7.87 | 3.250   17.06 |  4.83    1.31
               .167     .00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
               .250     .00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
               .333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
               .417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
               .500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
               .583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
               .667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
               .750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
               .833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
               .917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
              1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
              1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
              1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
              1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
              1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
              1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
              1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
              1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

     Max.Eff.Inten.(mm/hr)=      60.35       322.42
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.56 (ii)    5.25 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .26          .16
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .38          .00          .386 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75          2.75
     RUNOFF VOLUME    (mm)=      64.59        32.60         64.27
     TOTAL RAINFALL   (mm)=      65.59        65.59         65.59
     RUNOFF COEFFICIENT   =        .98          .50           .98

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0027) |   Area    (ha)=   2.86
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.74         1.12
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     138.10        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      60.35        38.12
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       3.79 (ii)   16.57 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .25          .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .29          .08          .366 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92          2.75
     RUNOFF VOLUME    (mm)=      64.59        32.60         52.11
     TOTAL RAINFALL   (mm)=      65.59        65.59         65.59
     RUNOFF COEFFICIENT   =        .98          .50           .79

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0030) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .2190      .0960

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0027)     2.86       .37      2.75      52.11
     OUTFLOW: ID= 1 (0030)     2.86       .15      3.08      52.07

               PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.61
               TIME SHIFT OF PEAK FLOW         (min)= 20.00
               MAXIMUM  STORAGE   USED       (ha.m.)=  .0653

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0029) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0028):     2.31     .386     2.75    64.27
       + ID2= 2 (0030):     2.86     .149     3.08    52.07
         ================================================
         ID = 3 (0029):     5.17     .518     2.75    57.52

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0006) |   Area    (ha)=  10.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.59         4.21
     Dep. Storage     (mm)=       1.00         5.00
```

```
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     268.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      60.35        38.12
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       5.65 (ii)   18.43 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .20          .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.10          .30          1.367 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92           2.75
     RUNOFF VOLUME    (mm)=      64.59        32.60          52.11
     TOTAL RAINFALL   (mm)=      65.59        65.59          65.59
     RUNOFF COEFFICIENT   =        .98          .50           .79


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0008) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .8130      .3571

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0006)     10.80      1.37      2.75      52.11
     OUTFLOW: ID= 1 (0008)     10.80       .56      3.17      52.10

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.91
                  TIME SHIFT OF PEAK FLOW         (min)= 25.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .2458

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0007) |   Area    (ha)=  15.91
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  79.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.57         3.34
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     325.70        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      60.35        38.12
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.35 (ii)   19.13 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .19          .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=       2.10          .24          2.303 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92           2.75
     RUNOFF VOLUME    (mm)=      64.59        32.60          57.87
     TOTAL RAINFALL   (mm)=      65.59        65.59          65.59
     RUNOFF COEFFICIENT   =        .98          .50           .88


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0009) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0008):     10.80     .559     3.17    52.10
       + ID2= 2 (0007):     15.91    2.303     2.75    57.87
         ================================================
         ID = 3 (0009):     26.71    2.781     2.75    55.54

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0031) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0029):      5.17     .518     2.75    57.52
       + ID2= 2 (0009):     26.71    2.781     2.75    55.54
         ================================================
         ID = 3 (0031):     31.88    3.298     2.75    55.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0010) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .2940     1.1158
                           .0520      .5230   |    .3680     1.3234
                           .1630      .7202   |    .4250     1.4787
                           .2420      .9521   |    .4830     1.6325

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0031)     31.88      3.30      2.75      55.86
     OUTFLOW: ID= 1 (0010)     31.88       .37      5.08      55.78

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.15
                  TIME SHIFT OF PEAK FLOW         (min)=140.00
                  MAXIMUM  STORAGE   USED       (ha.m.)= 1.3232

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   6 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 73.00 mm |    Comments: 50yr/6hr
--------------------
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .25     .00 |  2.00   24.82 |  3.75   10.22 |  5.50    1.46
                .50    1.46 |  2.25   24.82 |  4.00    5.84 |  5.75    1.46
```

```
                .75    1.46 |  2.50   67.16 |  4.25    5.84 |  6.00    1.46
               1.00    1.46 |  2.75   67.16 |  4.50    2.92 |  6.25    1.46
               1.25    1.46 |  3.00   18.98 |  4.75    2.92 |
               1.50    8.76 |  3.25   18.98 |  5.00    1.46 |
               1.75    8.76 |  3.50   10.22 |  5.25    1.46 |

--------------------------------------------------------------------------------


--------------------
| CALIB            |
| STANDHYD  (0028) |   Area    (ha)=   2.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  99.00   Dir. Conn.(%)=  99.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.29          .02
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     124.10        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                         ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .083     .00 | 1.667    8.76 | 3.250   18.98 |  4.83    1.46
               .167     .00 | 1.750    8.76 | 3.333   10.22 |  4.92    1.46
               .250     .00 | 1.833   24.82 | 3.417   10.22 |  5.00    1.46
               .333    1.46 | 1.917   24.82 | 3.500   10.22 |  5.08    1.46
               .417    1.46 | 2.000   24.82 | 3.583   10.22 |  5.17    1.46
               .500    1.46 | 2.083   24.82 | 3.667   10.22 |  5.25    1.46
               .583    1.46 | 2.167   24.82 | 3.750   10.22 |  5.33    1.46
               .667    1.46 | 2.250   24.82 | 3.833    5.84 |  5.42    1.46
               .750    1.46 | 2.333   67.16 | 3.917    5.84 |  5.50    1.46
               .833    1.46 | 2.417   67.16 | 4.000    5.84 |  5.58    1.46
               .917    1.46 | 2.500   67.16 | 4.083    5.84 |  5.67    1.46
              1.000    1.46 | 2.583   67.16 | 4.167    5.84 |  5.75    1.46
              1.083    1.46 | 2.667   67.16 | 4.250    5.84 |  5.83    1.46
              1.167    1.46 | 2.750   67.16 | 4.333    2.92 |  5.92    1.46
              1.250    1.46 | 2.833   18.98 | 4.417    2.92 |  6.00    1.46
              1.333    8.76 | 2.917   18.98 | 4.500    2.92 |  6.08    1.46
              1.417    8.76 | 3.000   18.98 | 4.583    2.92 |  6.17    1.46
              1.500    8.76 | 3.083   18.98 | 4.667    2.92 |  6.25    1.46
              1.583    8.76 | 3.167   18.98 | 4.750    2.92 |

     Max.Eff.Inten.(mm/hr)=      67.16       414.32
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.41 (ii)    5.03 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .26          .16
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .43          .00          .429 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75         2.75
     RUNOFF VOLUME    (mm)=      72.00        38.53        71.66
     TOTAL RAINFALL   (mm)=      73.00        73.00        73.00
     RUNOFF COEFFICIENT   =        .99          .53          .98

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
```

```
--------------------
| CALIB            |
| STANDHYD  (0027) |   Area    (ha)=   2.86
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.74         1.12
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     138.10        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      67.16        44.75
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       3.64 (ii)   15.62 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .25          .07
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .33          .10          .416 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92         2.75
     RUNOFF VOLUME    (mm)=      72.00        38.53        58.94
     TOTAL RAINFALL   (mm)=      73.00        73.00        73.00
     RUNOFF COEFFICIENT   =        .99          .53          .81

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0030) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .2190      .0960

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0027)      2.86       .42      2.75      58.94
     OUTFLOW: ID= 1 (0030)      2.86       .17      3.08      58.91

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.57
                TIME SHIFT OF PEAK FLOW         (min)= 20.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  .0741

--------------------------------------------------------------------------------


--------------------
| ADD HYD   (0029) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0028):     2.31    .429     2.75    71.66
        + ID2= 2 (0030):     2.86    .169     3.08    58.91
          ================================================
          ID = 3 (0029):     5.17    .579     2.75    64.61

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0006) |   Area    (ha)=  10.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
```

```
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.59         4.21
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     268.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      67.16        44.75
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       5.42 (ii)   17.40 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .20          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.23          .37          1.553 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92          2.75
     RUNOFF VOLUME    (mm)=      72.00        38.53         58.94
     TOTAL RAINFALL   (mm)=      73.00        73.00         73.00
     RUNOFF COEFFICIENT   =        .99          .53           .81


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0008) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .8130      .3571

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0006)     10.80      1.55      2.75      58.94
     OUTFLOW: ID= 1 (0008)     10.80       .63      3.17      58.93

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.87
                TIME SHIFT OF PEAK FLOW         (min)= 25.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  .2790

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0007) |   Area     (ha)=  15.91
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  79.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      12.57         3.34
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     325.70        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      67.16        44.75
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.08 (ii)   18.07 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .19          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.33          .29          2.589 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92          2.75
     RUNOFF VOLUME    (mm)=      72.00        38.53         64.97
     TOTAL RAINFALL   (mm)=      73.00        73.00         73.00
     RUNOFF COEFFICIENT   =        .99          .53           .89


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0009) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0008):    10.80     .635     3.17     58.93
        + ID2= 2 (0007):    15.91    2.589     2.75     64.97
          ================================================
          ID = 3 (0009):    26.71    3.131     2.75     62.53

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0031) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0029):     5.17     .579     2.75     64.61
        + ID2= 2 (0009):    26.71    3.131     2.75     62.53
          ================================================
          ID = 3 (0031):    31.88    3.710     2.75     62.87

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0010) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .2940      1.1158
                           .0520      .5230   |    .3680      1.3234
                           .1630      .7202   |    .4250      1.4787
                           .2420      .9521   |    .4830      1.6325

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0031)     31.88      3.71      2.75      62.87
     OUTFLOW: ID= 1 (0010)     31.88       .42      5.08      62.78

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.45
                TIME SHIFT OF PEAK FLOW         (min)=140.00
                MAXIMUM  STORAGE   USED       (ha.m.)= 1.4785

--------------------------------------------------------------------------------
  ***************************
  ** SIMULATION NUMBER:   7 **
  ***************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 80.31 mm |    Comments: 100yr/6hr
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	2.00	27.30	3.75	11.24	5.50	1.61
.50	1.61	2.25	27.30	4.00	6.42	5.75	1.61
.75	1.61	2.50	73.88	4.25	6.42	6.00	1.61
1.00	1.61	2.75	73.88	4.50	3.21	6.25	1.61
1.25	1.61	3.00	20.88	4.75	3.21		
1.50	9.64	3.25	20.88	5.00	1.61		
1.75	9.64	3.50	11.24	5.25	1.61		

CALIB
STANDHYD (0028) | Area (ha)= 2.31
ID= 1 DT= 5.0 min | Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.29	.02
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	124.10	40.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.00	1.667	9.64	3.250	20.88	4.83	1.61
.167	.00	1.750	9.64	3.333	11.24	4.92	1.61
.250	.00	1.833	27.30	3.417	11.24	5.00	1.61
.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61
.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61
.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61
.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61
.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61
.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61
1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61
1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61
1.250	1.61	2.833	20.88	4.417	3.21	6.00	1.61
1.333	9.64	2.917	20.88	4.500	3.21	6.08	1.61
1.417	9.64	3.000	20.88	4.583	3.21	6.17	1.61
1.500	9.64	3.083	20.88	4.667	3.21	6.25	1.61
1.583	9.64	3.167	20.88	4.750	3.21		

Max.Eff.Inten.	(mm/hr)=	73.88	484.93	
over	(min)	5.00	5.00	
Storage Coeff.	(min)=	3.28 (ii)	4.84 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	5.00	
Unit Hyd. peak	(cms)=	.27	.22	
				TOTALS
PEAK FLOW	(cms)=	.47	.00	.473 (iii)
TIME TO PEAK	(hrs)=	2.75	2.75	2.75
RUNOFF VOLUME	(mm)=	79.31	44.54	78.96
TOTAL RAINFALL	(mm)=	80.31	80.31	80.31
RUNOFF COEFFICIENT	=	.99	.55	.98

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 83.0 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.

CALIB
STANDHYD (0027) | Area (ha)= 2.86
ID= 1 DT= 5.0 min | Total Imp(%)= 61.00 Dir. Conn.(%)= 61.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.74	1.12
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	138.10	40.00
Mannings n	=	.013	.250

				TOTALS
Max.Eff.Inten.	(mm/hr)=	73.88	51.42	
over	(min)	5.00	15.00	
Storage Coeff.	(min)=	3.50 (ii)	14.84 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	.26	.08	
PEAK FLOW	(cms)=	.36	.12	.476 (iii)
TIME TO PEAK	(hrs)=	2.75	2.83	2.75
RUNOFF VOLUME	(mm)=	79.31	44.54	65.75
TOTAL RAINFALL	(mm)=	80.31	80.31	80.31
RUNOFF COEFFICIENT	=	.99	.55	.82

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 83.0 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.

RESERVOIR (0030)
IN= 2---> OUT= 1

DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.2190	.0960

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0027)	2.86	.48	2.75	65.75
OUTFLOW: ID= 1 (0030)	2.86	.19	3.08	65.71

PEAK FLOW REDUCTION [Qout/Qin](%)= 40.13
TIME SHIFT OF PEAK FLOW (min)= 20.00
MAXIMUM STORAGE USED (ha.m.)= .0838

ADD HYD (0029)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0028):	2.31	.473	2.75	78.96
+ ID2= 2 (0030):	2.86	.191	3.08	65.71
ID = 3 (0029):	5.17	.643	2.75	71.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------
| CALIB            |
| STANDHYD  (0006) |   Area    (ha)=  10.80
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      6.59         4.21
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      1.00         1.00
     Length            (m)=    268.30        40.00
     Mannings n           =      .013         .250

     Max.Eff.Inten.(mm/hr)=     73.88        51.42
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      5.21 (ii)   16.55 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=       .21          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=      1.35          .43         1.739 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.92          2.75
     RUNOFF VOLUME    (mm)=     79.31        44.54         65.75
     TOTAL RAINFALL   (mm)=     80.31        80.31         80.31
     RUNOFF COEFFICIENT   =       .99          .55           .82


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0008) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .8130      .3571

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0006)     10.80      1.74      2.75      65.75
     OUTFLOW: ID= 1 (0008)     10.80       .71      3.17      65.74

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.83
                   TIME SHIFT OF PEAK FLOW         (min)= 25.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .3122

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0007) |   Area    (ha)=  15.91
|ID= 1 DT= 5.0 min |   Total Imp(%)=  79.00   Dir. Conn.(%)=  79.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     12.57         3.34
     Dep. Storage     (mm)=      1.00         5.00
     Average Slope     (%)=      1.00         1.00
     Length            (m)=    325.70        40.00
     Mannings n           =      .013         .250

     Max.Eff.Inten.(mm/hr)=     73.88        51.42
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      5.86 (ii)   17.19 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=       .20          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=      2.57          .34         2.874 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.92          2.75
     RUNOFF VOLUME    (mm)=     79.31        44.54         72.01
     TOTAL RAINFALL   (mm)=     80.31        80.31         80.31
     RUNOFF COEFFICIENT   =       .99          .55           .90


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| ADD HYD   (0009) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0008):    10.80     .710     3.17    65.74
        + ID2= 2 (0007):    15.91    2.874     2.75    72.01
          ================================================
          ID = 3 (0009):    26.71    3.481     2.75    69.47

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ADD HYD   (0031) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0029):     5.17     .643     2.75    71.63
        + ID2= 2 (0009):    26.71    3.481     2.75    69.47
          ================================================
          ID = 3 (0031):    31.88    4.124     2.75    69.82

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0010) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .2940     1.1158
                           .0520      .5230   |    .3680     1.3234
                           .1630      .7202   |    .4250     1.4787
                           .2420      .9521   |    .4830     1.6325

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0031)     31.88      4.12      2.75      69.82
     OUTFLOW: ID= 1 (0010)     31.88       .48      5.00      69.73

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.71
                   TIME SHIFT OF PEAK FLOW         (min)=135.00
                   MAXIMUM  STORAGE   USED       (ha.m.)= 1.6324

--------------------------------------------------------------------------------

 FINISH
================================================================================
===============
```

Appendix D6

South-West SWM Pond Calculations

Vaughan Metropolitan Centre
City of Vaughan
SW Corner of Jane St. and Hwy 7

Project #: 08104

Date: April 2012

Storm Volume (6 hrs AES storms)

Storm Event	Rainfall Depth (mm)
25mm	25.00
2-Year	36.00
5-Year	47.80
10-Year	55.70
25-Year	65.60
50-Year	73.00
100-Year	80.30

Building base run-off coefficient = 0.90
Runoff reduction = 15 mm (According to LEED Gold Objective)

Adjustment to Building Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 15mm	C_{15}
25mm	25.00	22.50	7.50	0.30
2-Year	36.00	32.40	17.40	0.48
5-Year	**47.80**	**43.02**	**28.02**	**0.59**
10-Year	55.70	50.13	35.13	0.63
25-Year	65.60	59.04	44.04	0.67
50-Year	73.00	65.70	50.70	0.69
100-Year	80.30	72.27	57.27	0.71

Base run-off coefficient = 0.25
Runoff reduction = 10 mm (Assume 5mm initial abstraction to include for the total proposed 15mm)

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 10mm	C_{10}
25mm	25.00	6.25	0.00	0.00
2-Year	36.00	9.00	0.00	0.00
5-Year	**47.80**	**11.95**	**1.95**	**0.04**
10-Year	55.70	13.93	3.93	0.07
25-Year	65.60	16.40	6.40	0.10
50-Year	73.00	18.25	8.25	0.11
100-Year	80.30	20.08	10.08	0.13

Assumption:

Residential
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Commercial
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Mixed Area
For mixed area 50% is for residential and 50% is for commercial

Open Space and Parkland
C = 0.75 for Parkland (in accordance with the City's design criteria)
C = 0.25 for open space
An average runoff coefficient of 0.50 is used for the land indicated as major parks and open spaces

Area & Imperviousness for Permanent Pool Calculation (based on 5-year Runoff Coefficient)

SW Corner of Jane St. and Hwy 7

		Area (ha)	C	AC
Mized Use (Residential)	Building	5.34	0.59	3.13
	Paved Area	1.78	0.90	1.60
	Landscape	1.89	0.04	0.08
Mized Use (Commercial)	Building	5.34	0.59	3.13
	Paved Area	1.78	0.90	1.60
	Landscape	1.89	0.04	0.08
Residential	Building	8.09	0.59	4.74
	Paved Area	2.70	0.90	2.43
	Landscape	2.87	0.04	0.12
Commercial	Building	1.78	0.59	1.05
	Paved Area	0.59	0.90	0.54
	Landscape	0.63	0.04	0.03
	Open Space / Parkland	8.14	0.50	4.07
	Open Channel	3.95	0.55	2.17
	SWM Pond Block	5.49	0.55	3.02
	Road	21.34	0.90	19.21
	Total	73.62		46.99

← Weighted "C" = **0.64**

Weighted Imperviousness = **0.63**

Vaughan Metropolitan Centre
City of Vaughan

Project #: 08104

Date: April 2012

SWM Pond Permanent Pool/Extended Detention Volume

SW Corner of Jane St. and Hwy 7

Table A.1 – MOE Water Quality Storage Requirements (SWMP 2003)*

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced 80% long-term S.S. removal	Infiltration	25	30	35	40
	Wetlands	80	105	120	140
	Hybrid Wet Pond/Wetland	110	150	175	195
	Wet Pond	140	190	225	250
Normal 70% long-term S.S. removal	Infiltration	20	20	25	30
	Wetlands	60	70	80	90
	Hybrid Wet Pond/Wetland	75	90	105	120
	Wet Pond	90	110	130	150
Basic 60% long-term S.S. removal	Infiltration	20	20	20	20
	Wetlands	60	60	60	60
	Hybrid Wet Pond/Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

* Values in table for Wet Ponds and Wetlands include 40m^3/ha of extended detention storage.

SWM Facility Type = Wet Pond
Level of Protection = 1

Drainage Area = 73.62 ha
Area-Weighted Imperviousness = 63%

Water Quality Requirement =	208.70	m^3/ha	
Permanent Pool Unit Volume Requirement =	168.70	m^3/ha	
Total Permanent Pool Storage Volume Required =	**12,420**	m^3	
Extended Detention Unit Volume Requirement =	40	m^3/ha	
Total Extended Detention Volume Required =	**2,945**	m^3	(compare with Erosion Volume required)

Erosion Control Volume and Release Rate
SW Corner of Jane St. and Hwy 7

SWM Pond

Input:

Area = 73.62 (ha)

R.V = 18.263 (mm)

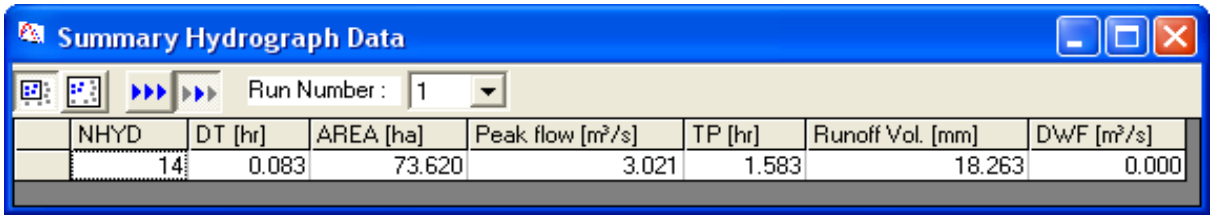
Draw Down Time = 48 (hrs)

Calculations:

Storage = 13,445 (m^3)

Average Outflow = 0.078 (m^3/s)

Peak Outflow = 0.117 (m^3/s) - Estimated at 1.5 times Average Outflow



NHYD	DT [hr]	AREA [ha]	Peak flow [m³/s]	TP [hr]	Runoff Vol. [mm]	DWF [m³/s]
14	0.083	73.620	3.021	1.583	18.263	0.000

Vaughan Metropolitan Centre
City of Vaughan
SW Corner of Jane St. and Hwy 7

Project #: 08104

Date: April 2012

Storm Volume (6 hrs AES storms)

Storm Event	Rainfall Depth (mm)
25mm	25.00
2-Year	36.00
5-Year	47.80
10-Year	55.70
25-Year	65.60
50-Year	73.00
100-Year	80.30

Building base run-off coefficient = 0.90
Runoff reduction = 15 mm (According to LEED Gold Objective)

Adjustment to Building Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 15mm	C_{15}
25mm	25.00	22.50	7.50	0.30
2-Year	36.00	32.40	17.40	0.48
5-Year	47.80	43.02	28.02	0.59
10-Year	55.70	50.13	35.13	0.63
25-Year	65.60	59.04	44.04	0.67
50-Year	73.00	65.70	50.70	0.69
100-Year	**80.30**	**72.27**	**57.27**	**0.71**

Base run-off coefficient = 0.25
Runoff reduction = 10 mm (Assume 5mm initial abstraction to include for the total proposed 15mm)

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 10mm	C_{10}
25mm	25.00	6.25	0.00	0.00
2-Year	36.00	9.00	0.00	0.00
5-Year	47.80	11.95	1.95	0.04
10-Year	55.70	13.93	3.93	0.07
25-Year	65.60	16.40	6.40	0.10
50-Year	73.00	18.25	8.25	0.11
100-Year	**80.30**	**20.08**	**10.08**	**0.13**

Assumption:

Residential
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Commercial
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Mixed Area
For mixed area 50% is for residential and 50% is for commercial

Open Space and Parkland
C = 0.75 for Parkland (in accordance with the City's design criteria)
C = 0.25 for open space
An average runoff coefficient of 0.50 is used for the land indicated as major parks and open spaces

Area & Imperviousness for Permanent Pool Calculation (based on 100-year Runoff Coefficient)

SW Corner of Jane St. and Hwy 7

		Area (ha)	C	AC
Mized Use (Residential)	Building	5.34	0.71	3.81
	Paved Area	1.78	0.90	1.60
	Landscape	1.89	0.13	0.24
Mized Use (Commercial)	Building	5.34	0.71	3.81
	Paved Area	1.78	0.90	1.60
	Landscape	1.89	0.13	0.24
Residential	Building	8.09	0.71	5.77
	Paved Area	2.70	0.90	2.43
	Landscape	2.87	0.13	0.36
Commercial	Building	1.78	0.71	1.27
	Paved Area	0.59	0.90	0.54
	Landscape	0.63	0.13	0.08
	Total	34.70		21.75

← Weighted "C" = **0.63**

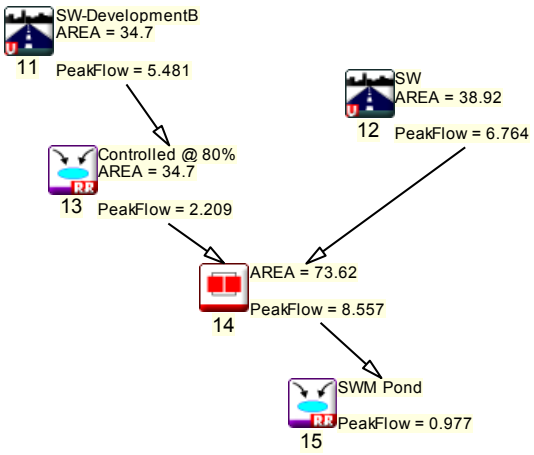
Weighted Imperviousness = **0.61**

	Area (ha)	C	AC
Open Space / Parkland	8.14	0.50	4.07
Open Channel	3.95	0.55	2.17
SWM Pond Block	5.49	0.55	3.02
Road	21.34	0.90	19.21
Total	38.92		28.47

← Weighted "C" = **0.73**

Weighted Imperviousness = **0.76**

South West POND



Summary Hydrograph Data

NHYD	DT [hr]	AREA [ha]	Peak flow [m³/s]	TP [hr]	Runoff Vol. [mm]	DWF [m³/s]
15	0.083	73.620	0.126	5.500	18.232	0.000
15	0.083	73.620	0.327	5.917	27.685	0.000
15	0.083	73.620	0.488	5.750	38.228	0.000
15	0.083	73.620	0.597	5.667	45.424	0.000
15	0.083	73.620	0.744	5.583	54.601	0.000
15	0.083	73.620	0.859	5.500	61.548	0.000
15	0.083	73.620	0.977	5.417	68.454	0.000

```
================================================================================
==============

       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM, Version 2.0
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O   Licensed To: TMIG
        OOO     T      T    H   H    Y    M   M   OOO                 vo2-0145

Developed and Distributed by Greenland International Consulting Inc.
Copyright 1996, 2001 Schaeffer & Associates Ltd.
All rights reserved.


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


  Input   filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat
  Output  filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final submission\100-
YE~1\On-Site Control to 80% Imperv.out
  Summary filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final submission\100-
YE~1\On-Site Control to 80% Imperv.sum


DATE: 4/10/2012                              TIME: 11:55:54 AM

USER:


COMMENTS: _____________________________________________________

--------------------------------------------------------------------------------
---------------
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\25MM4HR.STM
| Ptotal= 25.00 mm |    Comments: Twenty-Five mm Four Hour Chicago Storm
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .17    2.07 |  1.17    5.70 |  2.17    5.19 |  3.17    2.80
                 .33    2.27 |  1.33   10.78 |  2.33    4.47 |  3.33    2.62
                 .50    2.52 |  1.50   50.21 |  2.50    3.95 |  3.50    2.48
                 .67    2.88 |  1.67   13.37 |  2.67    3.56 |  3.67    2.35
                 .83    3.38 |  1.83    8.29 |  2.83    3.25 |  3.83    2.23
                1.00    4.18 |  2.00    6.30 |  3.00    3.01 |  4.00    2.14

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0011) |   Area     (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
```

```
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17        13.53
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     481.00        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08    2.80
               .167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17    2.80
               .250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25    2.62
               .333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33    2.62
               .417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42    2.48
               .500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50    2.48
               .583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58    2.35
               .667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67    2.35
               .750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75    2.23
               .833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83    2.23
               .917    4.17 | 1.917    6.30 | 2.917    3.01 |  3.92    2.14
              1.000    4.18 | 2.000    6.29 | 3.000    3.01 |  4.00    2.14

     Max.Eff.Inten.(mm/hr)=      50.21         4.90
                over (min)       10.00        40.00
     Storage Coeff.  (min)=       8.64 (ii)   37.66 (ii)
     Unit Hyd. Tpeak (min)=      10.00        40.00
     Unit Hyd. peak  (cms)=        .12          .03
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.94          .09          1.955 (iii)
     TIME TO PEAK    (hrs)=       1.58         2.25           1.58
     RUNOFF VOLUME    (mm)=      24.00         5.55          16.80
     TOTAL RAINFALL   (mm)=      25.00        25.00          25.00
     RUNOFF COEFFICIENT   =        .96          .22            .67


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0013) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |  2.5120     1.1572

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0011)    34.70     1.95      1.58      16.80
     OUTFLOW: ID= 1 (0013)    34.70      .54      2.08      16.80

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 27.42
                  TIME SHIFT OF PEAK FLOW         (min)= 30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .2469

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0012) |   Area    (ha)=  38.92
|ID= 1 DT= 5.0 min |   Total Imp(%)=  76.00   Dir. Conn.(%)=  76.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      29.58         9.34
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     509.40        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      50.21         4.90
                over (min)       10.00        40.00
     Storage Coeff.  (min)=       8.94 (ii)   37.97 (ii)
     Unit Hyd. Tpeak (min)=      10.00        40.00
     Unit Hyd. peak  (cms)=        .12          .03
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.68          .06          2.690 (iii)
     TIME TO PEAK    (hrs)=       1.58         2.25           1.58
     RUNOFF VOLUME    (mm)=      24.00         5.55          19.57
     TOTAL RAINFALL   (mm)=      25.00        25.00          25.00
     RUNOFF COEFFICIENT   =        .96          .22            .78


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| ADD HYD   (0014) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0013):    34.70     .536     2.08    16.80
        + ID2= 2 (0012):    38.92    2.690     1.58    19.57
          ================================================
          ID = 3 (0014):    73.62    3.021     1.58    18.26

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0015) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |   .5970     2.5409
                          .1260     1.1416    |   .7450     3.0229
                          .3290     1.6185    |   .8600     3.3869
                          .4890     2.1619    |   .9770     3.7482

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0014)    73.62      3.02      1.58      18.26
     OUTFLOW: ID= 1 (0015)    73.62       .13      5.50      18.23

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.17
                  TIME SHIFT OF PEAK FLOW         (min)=235.00
                  MAXIMUM  STORAGE   USED       (ha.m.)= 1.1412

--------------------------------------------------------------------------------
  ***************************
  ** SIMULATION NUMBER:   2 **
  ***************************


--------------------
```

```
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 36.00 mm |    Comments: 2yr/6hr
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	2.00	12.24	3.75	5.04	5.50	.72
.50	.72	2.25	12.24	4.00	2.88	5.75	.72
.75	.72	2.50	33.12	4.25	2.88	6.00	.72
1.00	.72	2.75	33.12	4.50	1.44	6.25	.72
1.25	.72	3.00	9.36	4.75	1.44		
1.50	4.32	3.25	9.36	5.00	.72		
1.75	4.32	3.50	5.04	5.25	.72		

```
--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0011) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17        13.53
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     481.00        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                        ---- TRANSFORMED HYETOGRAPH ----
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.00	1.667	4.32	3.250	9.36	4.83	.72
.167	.00	1.750	4.32	3.333	5.04	4.92	.72
.250	.00	1.833	12.24	3.417	5.04	5.00	.72
.333	.72	1.917	12.24	3.500	5.04	5.08	.72
.417	.72	2.000	12.24	3.583	5.04	5.17	.72
.500	.72	2.083	12.24	3.667	5.04	5.25	.72
.583	.72	2.167	12.24	3.750	5.04	5.33	.72
.667	.72	2.250	12.24	3.833	2.88	5.42	.72
.750	.72	2.333	33.12	3.917	2.88	5.50	.72
.833	.72	2.417	33.12	4.000	2.88	5.58	.72
.917	.72	2.500	33.12	4.083	2.88	5.67	.72
1.000	.72	2.583	33.12	4.167	2.88	5.75	.72
1.083	.72	2.667	33.12	4.250	2.88	5.83	.72
1.167	.72	2.750	33.12	4.333	1.44	5.92	.72
1.250	.72	2.833	9.36	4.417	1.44	6.00	.72
1.333	4.32	2.917	9.36	4.500	1.44	6.08	.72
1.417	4.32	3.000	9.36	4.583	1.44	6.17	.72
1.500	4.32	3.083	9.36	4.667	1.44	6.25	.72
1.583	4.32	3.167	9.36	4.750	1.44		

```
     Max.Eff.Inten.(mm/hr)=      33.12        13.05
               over (min)        10.00        30.00
     Storage Coeff.  (min)=      10.20 (ii)   29.82 (ii)
     Unit Hyd. Tpeak (min)=      10.00        30.00
     Unit Hyd. peak  (cms)=        .11          .04
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.86          .26      2.007 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.17       2.75
     RUNOFF VOLUME    (mm)=      35.00        11.57      25.86
     TOTAL RAINFALL   (mm)=      36.00        36.00      36.00
     RUNOFF COEFFICIENT   =        .97          .32        .72

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0013) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000       .0000   |   2.5120     1.1572

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0011)      34.70      2.01      2.75       25.86
     OUTFLOW: ID= 1 (0013)      34.70       .84      3.33       25.86

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 42.07
                  TIME SHIFT OF PEAK FLOW         (min)= 35.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=  .3895

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0012) |   Area    (ha)=  38.92
|ID= 1 DT= 5.0 min |   Total Imp(%)=  76.00   Dir. Conn.(%)=  76.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      29.58         9.34
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     509.40        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      33.12        13.05
               over (min)        10.00        35.00
     Storage Coeff.  (min)=      10.56 (ii)   30.18 (ii)
     Unit Hyd. Tpeak (min)=      10.00        35.00
     Unit Hyd. peak  (cms)=        .11          .04
                                                    *TOTALS*
     PEAK FLOW       (cms)=       2.58          .18      2.669 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.25       2.75
     RUNOFF VOLUME    (mm)=      35.00        11.57      29.38
     TOTAL RAINFALL   (mm)=      36.00        36.00      36.00
     RUNOFF COEFFICIENT   =        .97          .32        .82

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0014) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0013):    34.70     .844     3.33    25.86
       + ID2= 2 (0012):    38.92    2.669     2.75    29.38
         ================================================
         ID = 3 (0014):    73.62    3.296     2.75    27.72
```

```
     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0015) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .5970     2.5409
                          .1260     1.1416    |    .7450     3.0229
                          .3290     1.6185    |    .8600     3.3869
                          .4890     2.1619    |    .9770     3.7482

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0014)     73.62      3.30      2.75      27.72
     OUTFLOW: ID= 1 (0015)     73.62       .33      5.92      27.68

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.92
                   TIME SHIFT OF PEAK FLOW          (min)=190.00
                   MAXIMUM  STORAGE   USED       (ha.m.)= 1.6135

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   3 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 47.81 mm |    Comments: 5yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   16.25 |  3.75    6.69 |  5.50     .96
                 .50     .96 |  2.25   16.25 |  4.00    3.82 |  5.75     .96
                 .75     .96 |  2.50   43.98 |  4.25    3.82 |  6.00     .96
                1.00     .96 |  2.75   43.98 |  4.50    1.91 |  6.25     .96
                1.25     .96 |  3.00   12.43 |  4.75    1.91 |
                1.50    5.74 |  3.25   12.43 |  5.00     .96 |
                1.75    5.74 |  3.50    6.69 |  5.25     .96 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0011) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17        13.53
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     481.00        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .083     .00 | 1.667    5.74 | 3.250   12.43 |  4.83     .96
                .167     .00 | 1.750    5.74 | 3.333    6.69 |  4.92     .96
                .250     .00 | 1.833   16.25 | 3.417    6.69 |  5.00     .96
                .333     .96 | 1.917   16.25 | 3.500    6.69 |  5.08     .96
                .417     .96 | 2.000   16.25 | 3.583    6.69 |  5.17     .96
                .500     .96 | 2.083   16.25 | 3.667    6.69 |  5.25     .96
                .583     .96 | 2.167   16.25 | 3.750    6.69 |  5.33     .96
                .667     .96 | 2.250   16.25 | 3.833    3.82 |  5.42     .96
                .750     .96 | 2.333   43.98 | 3.917    3.82 |  5.50     .96
                .833     .96 | 2.417   43.98 | 4.000    3.82 |  5.58     .96
                .917     .96 | 2.500   43.98 | 4.083    3.82 |  5.67     .96
               1.000     .96 | 2.583   43.98 | 4.167    3.82 |  5.75     .96
               1.083     .96 | 2.667   43.98 | 4.250    3.82 |  5.83     .96
               1.167     .96 | 2.750   43.98 | 4.333    1.91 |  5.92     .96
               1.250     .96 | 2.833   12.43 | 4.417    1.91 |  6.00     .96
               1.333    5.74 | 2.917   12.43 | 4.500    1.91 |  6.08     .96
               1.417    5.74 | 3.000   12.43 | 4.583    1.91 |  6.17     .96
               1.500    5.74 | 3.083   12.43 | 4.667    1.91 |  6.25     .96
               1.583    5.74 | 3.167   12.43 | 4.750    1.91 |

     Max.Eff.Inten.(mm/hr)=      43.98        21.81
               over (min)        10.00        30.00
     Storage Coeff.  (min)=       9.11 (ii)   25.08 (ii)
     Unit Hyd. Tpeak (min)=      10.00        30.00
     Unit Hyd. peak  (cms)=        .12          .04
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.50          .48      2.804 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.08       2.75
     RUNOFF VOLUME    (mm)=      46.81        19.33      36.09
     TOTAL RAINFALL   (mm)=      47.81        47.81      47.81
     RUNOFF COEFFICIENT   =        .98          .40        .75


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0013) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |   2.5120     1.1572

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0011)     34.70      2.80      2.75      36.09
     OUTFLOW: ID= 1 (0013)     34.70      1.18      3.33      36.09

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 42.12
                   TIME SHIFT OF PEAK FLOW          (min)= 35.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .5449

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0012) |   Area    (ha)=  38.92
|ID= 1 DT= 5.0 min |   Total Imp(%)=  76.00   Dir. Conn.(%)=  76.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      29.58         9.34
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     509.40        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      43.98        21.81
```

```
              over (min)        10.00         30.00
     Storage Coeff.  (min)=      9.42 (ii)    25.40 (ii)
     Unit Hyd. Tpeak (min)=     10.00         30.00
     Unit Hyd. peak  (cms)=       .12           .04
                                                    *TOTALS*
     PEAK FLOW       (cms)=      3.48           .33          3.688 (iii)
     TIME TO PEAK    (hrs)=      2.75          3.08           2.75
     RUNOFF VOLUME    (mm)=     46.81         19.33          40.21
     TOTAL RAINFALL   (mm)=     47.81         47.81          47.81
     RUNOFF COEFFICIENT   =       .98           .40            .84


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0014) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0013):    34.70   1.181     3.33    36.09
        + ID2= 2 (0012):    38.92   3.688     2.75    40.21
          ================================================
          ID = 3 (0014):    73.62   4.566     2.75    38.27

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0015) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .5970     2.5409
                           .1260     1.1416    |    .7450     3.0229
                           .3290     1.6185    |    .8600     3.3869
                           .4890     2.1619    |    .9770     3.7482

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0014)     73.62      4.57      2.75      38.27
     OUTFLOW: ID= 1 (0015)     73.62       .49      5.75      38.23

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.69
                   TIME SHIFT OF PEAK FLOW         (min)=180.00
                   MAXIMUM  STORAGE   USED       (ha.m.)= 2.1584

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   4 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 55.69 mm |    Comments: 10yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   18.94 |  3.75    7.80 |  5.50    1.11
                 .50    1.11 |  2.25   18.94 |  4.00    4.46 |  5.75    1.11
                 .75    1.11 |  2.50   51.24 |  4.25    4.46 |  6.00    1.11
                1.00    1.11 |  2.75   51.24 |  4.50    2.23 |  6.25    1.11
                1.25    1.11 |  3.00   14.48 |  4.75    2.23 |
                1.50    6.68 |  3.25   14.48 |  5.00    1.11 |
                1.75    6.68 |  3.50    7.80 |  5.25    1.11 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0011) |   Area     (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17         13.53
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     481.00         40.00
     Mannings n           =       .013          .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .083     .00 | 1.667    6.68 | 3.250   14.48 |  4.83    1.11
                .167     .00 | 1.750    6.68 | 3.333    7.80 |  4.92    1.11
                .250     .00 | 1.833   18.94 | 3.417    7.80 |  5.00    1.11
                .333    1.11 | 1.917   18.94 | 3.500    7.80 |  5.08    1.11
                .417    1.11 | 2.000   18.94 | 3.583    7.80 |  5.17    1.11
                .500    1.11 | 2.083   18.94 | 3.667    7.80 |  5.25    1.11
                .583    1.11 | 2.167   18.94 | 3.750    7.80 |  5.33    1.11
                .667    1.11 | 2.250   18.94 | 3.833    4.46 |  5.42    1.11
                .750    1.11 | 2.333   51.24 | 3.917    4.46 |  5.50    1.11
                .833    1.11 | 2.417   51.24 | 4.000    4.46 |  5.58    1.11
                .917    1.11 | 2.500   51.24 | 4.083    4.46 |  5.67    1.11
               1.000    1.11 | 2.583   51.24 | 4.167    4.46 |  5.75    1.11
               1.083    1.11 | 2.667   51.24 | 4.250    4.46 |  5.83    1.11
               1.167    1.11 | 2.750   51.24 | 4.333    2.23 |  5.92    1.11
               1.250    1.11 | 2.833   14.48 | 4.417    2.23 |  6.00    1.11
               1.333    6.68 | 2.917   14.48 | 4.500    2.23 |  6.08    1.11
               1.417    6.68 | 3.000   14.48 | 4.583    2.23 |  6.17    1.11
               1.500    6.68 | 3.083   14.48 | 4.667    2.23 |  6.25    1.11
               1.583    6.68 | 3.167   14.48 | 4.750    2.23 |

     Max.Eff.Inten.(mm/hr)=      51.24         29.52
               over (min)        10.00         25.00
     Storage Coeff.  (min)=       8.57 (ii)    22.72 (ii)
     Unit Hyd. Tpeak (min)=      10.00         25.00
     Unit Hyd. peak  (cms)=        .12           .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       2.93           .67          3.434 (iii)
     TIME TO PEAK    (hrs)=       2.75          3.00           2.75
     RUNOFF VOLUME    (mm)=      54.69         25.02          43.12
     TOTAL RAINFALL   (mm)=      55.69         55.69          55.69
     RUNOFF COEFFICIENT   =        .98           .45            .77


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
```

```
| RESERVOIR (0013) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000   |  2.5120     1.1572

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0011)    34.70     3.43      2.75      43.12
     OUTFLOW: ID= 1 (0013)    34.70     1.43      3.25      43.11

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.63
                TIME SHIFT OF PEAK FLOW          (min)= 30.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  .6596

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD  (0012)  |   Area    (ha)=  38.92
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  76.00   Dir. Conn.(%)=  76.00
-------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      29.58         9.34
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     509.40        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      51.24        29.52
                 over (min)      10.00        25.00
     Storage Coeff.  (min)=       8.87 (ii)   23.02 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=        .12          .05
                                                        *TOTALS*
     PEAK FLOW       (cms)=       4.08          .46        4.425 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00         2.75
     RUNOFF VOLUME    (mm)=      54.69        25.02        47.57
     TOTAL RAINFALL   (mm)=      55.69        55.69        55.69
     RUNOFF COEFFICIENT   =        .98          .45          .85


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

-------------------
| ADD HYD   (0014) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------        (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0013):    34.70   1.430     3.25    43.11
        + ID2= 2 (0012):    38.92   4.425     2.75    47.57
          ================================================
          ID = 3 (0014):    73.62   5.491     2.75    45.47

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
-------------------
| RESERVOIR (0015) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000   |   .5970     2.5409
                          .1260     1.1416   |   .7450     3.0229
                          .3290     1.6185   |   .8600     3.3869
                          .4890     2.1619   |   .9770     3.7482

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0014)    73.62     5.49      2.75      45.47
     OUTFLOW: ID= 1 (0015)    73.62      .60      5.67      45.42

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.86
                TIME SHIFT OF PEAK FLOW          (min)=175.00
                MAXIMUM  STORAGE   USED       (ha.m.)= 2.5393

--------------------------------------------------------------------------------
  ***************************
  ** SIMULATION NUMBER:   5 **
  ***************************


-------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 65.59 mm |    Comments: 25yr/6hr
-------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   22.30 |  3.75    9.18 |  5.50    1.31
                 .50    1.31 |  2.25   22.30 |  4.00    5.25 |  5.75    1.31
                 .75    1.31 |  2.50   60.35 |  4.25    5.25 |  6.00    1.31
                1.00    1.31 |  2.75   60.35 |  4.50    2.62 |  6.25    1.31
                1.25    1.31 |  3.00   17.06 |  4.75    2.62 |
                1.50    7.87 |  3.25   17.06 |  5.00    1.31 |
                1.75    7.87 |  3.50    9.18 |  5.25    1.31 |

--------------------------------------------------------------------------------

-------------------
| CALIB             |
| STANDHYD  (0011)  |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
-------------------
                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17        13.53
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     481.00        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .083     .00 | 1.667    7.87 | 3.250   17.06 |  4.83    1.31
                .167     .00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
                .250     .00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
                .333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
                .417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
                .500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
                .583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
                .667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
                .750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
                .833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
                .917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
               1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
```

```
                1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
                1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
                1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
                1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
                1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
                1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
                1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

     Max.Eff.Inten.(mm/hr)=      60.35        38.12
                over (min)       10.00        25.00
     Storage Coeff.  (min)=       8.02 (ii)   20.80 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=        .13          .05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       3.47          .90          4.181 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00           2.75
     RUNOFF VOLUME    (mm)=      64.59        32.60          52.11
     TOTAL RAINFALL   (mm)=      65.59        65.59          65.59
     RUNOFF COEFFICIENT   =        .98          .50            .79


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0013) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |  2.5120     1.1572

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0011)     34.70      4.18      2.75      52.11
     OUTFLOW: ID= 1 (0013)     34.70      1.74      3.25      52.11

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.53
                TIME SHIFT OF PEAK FLOW         (min)= 30.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  .8010

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0012) |   Area    (ha)=  38.92
|ID= 1 DT= 5.0 min |   Total Imp(%)=  76.00   Dir. Conn.(%)=  76.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      29.58         9.34
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     509.40        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      60.35        38.12
                over (min)       10.00        25.00
     Storage Coeff.  (min)=       8.30 (ii)   21.08 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=        .13          .05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       4.83          .62          5.321 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00           2.75
     RUNOFF VOLUME    (mm)=      64.59        32.60          56.91
     TOTAL RAINFALL   (mm)=      65.59        65.59          65.59
     RUNOFF COEFFICIENT   =        .98          .50            .87


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0014) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0013):    34.70    1.737     3.25    52.11
        + ID2= 2 (0012):    38.92    5.321     2.75    56.91
          ================================================
          ID = 3 (0014):    73.62    6.617     2.75    54.65

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0015) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   .5970     2.5409
                           .1260     1.1416   |   .7450     3.0229
                           .3290     1.6185   |   .8600     3.3869
                           .4890     2.1619   |   .9770     3.7482

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0014)     73.62      6.62      2.75      54.65
     OUTFLOW: ID= 1 (0015)     73.62       .74      5.58      54.60

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.25
                TIME SHIFT OF PEAK FLOW         (min)=170.00
                MAXIMUM  STORAGE   USED       (ha.m.)= 3.0208

--------------------------------------------------------------------------------
  ***************************
  ** SIMULATION NUMBER:   6 **
  ***************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 73.00 mm |    Comments: 50yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   24.82 |  3.75   10.22 |  5.50    1.46
                 .50    1.46 |  2.25   24.82 |  4.00    5.84 |  5.75    1.46
                 .75    1.46 |  2.50   67.16 |  4.25    5.84 |  6.00    1.46
                1.00    1.46 |  2.75   67.16 |  4.50    2.92 |  6.25    1.46
                1.25    1.46 |  3.00   18.98 |  4.75    2.92 |
                1.50    8.76 |  3.25   18.98 |  5.00    1.46 |
                1.75    8.76 |  3.50   10.22 |  5.25    1.46 |

--------------------------------------------------------------------------------

--------------------
```

```
| CALIB           |
| STANDHYD  (0011) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17        13.53
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     481.00        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .083     .00 | 1.667    8.76 | 3.250   18.98 |  4.83    1.46
               .167     .00 | 1.750    8.76 | 3.333   10.22 |  4.92    1.46
               .250     .00 | 1.833   24.82 | 3.417   10.22 |  5.00    1.46
               .333    1.46 | 1.917   24.82 | 3.500   10.22 |  5.08    1.46
               .417    1.46 | 2.000   24.82 | 3.583   10.22 |  5.17    1.46
               .500    1.46 | 2.083   24.82 | 3.667   10.22 |  5.25    1.46
               .583    1.46 | 2.167   24.82 | 3.750   10.22 |  5.33    1.46
               .667    1.46 | 2.250   24.82 | 3.833    5.84 |  5.42    1.46
               .750    1.46 | 2.333   67.16 | 3.917    5.84 |  5.50    1.46
               .833    1.46 | 2.417   67.16 | 4.000    5.84 |  5.58    1.46
               .917    1.46 | 2.500   67.16 | 4.083    5.84 |  5.67    1.46
              1.000    1.46 | 2.583   67.16 | 4.167    5.84 |  5.75    1.46
              1.083    1.46 | 2.667   67.16 | 4.250    5.84 |  5.83    1.46
              1.167    1.46 | 2.750   67.16 | 4.333    2.92 |  5.92    1.46
              1.250    1.46 | 2.833   18.98 | 4.417    2.92 |  6.00    1.46
              1.333    8.76 | 2.917   18.98 | 4.500    2.92 |  6.08    1.46
              1.417    8.76 | 3.000   18.98 | 4.583    2.92 |  6.17    1.46
              1.500    8.76 | 3.083   18.98 | 4.667    2.92 |  6.25    1.46
              1.583    8.76 | 3.167   18.98 | 4.750    2.92 |

     Max.Eff.Inten.(mm/hr)=      67.16        44.75
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       7.69 (ii)   19.67 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .13          .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=       3.87         1.13          4.862 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92           2.75
     RUNOFF VOLUME    (mm)=      72.00        38.53          58.94
     TOTAL RAINFALL   (mm)=      73.00        73.00          73.00
     RUNOFF COEFFICIENT   =        .99          .53            .81


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0013) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |  2.5120     1.1572

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0011)     34.70      4.86      2.75       58.94
     OUTFLOW: ID= 1 (0013)     34.70      1.99      3.25       58.94

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.89
                  TIME SHIFT OF PEAK FLOW         (min)= 30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .9158

--------------------------------------------------------------------------------
--------------------
| CALIB           |
| STANDHYD  (0012) |   Area    (ha)=  38.92
|ID= 1 DT= 5.0 min |   Total Imp(%)=  76.00   Dir. Conn.(%)=  76.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      29.58         9.34
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     509.40        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      67.16        44.75
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       7.96 (ii)   19.94 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .13          .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=       5.40          .77          6.075 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92           2.75
     RUNOFF VOLUME    (mm)=      72.00        38.53          63.97
     TOTAL RAINFALL   (mm)=      73.00        73.00          73.00
     RUNOFF COEFFICIENT   =        .99          .53            .88


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| ADD HYD   (0014) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0013):    34.70    1.988     3.25    58.94
        + ID2= 2 (0012):    38.92    6.075     2.75    63.97
          ================================================
          ID = 3 (0014):    73.62    7.575     2.75    61.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0015) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |   .5970     2.5409
                          .1260     1.1416    |   .7450     3.0229
                          .3290     1.6185    |   .8600     3.3869
                          .4890     2.1619    |   .9770     3.7482

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0014)     73.62      7.58      2.75       61.60
     OUTFLOW: ID= 1 (0015)     73.62       .86      5.50       61.55
```

```
                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.35
                  TIME SHIFT OF PEAK FLOW          (min)=165.00
                  MAXIMUM  STORAGE   USED        (ha.m.)= 3.3854

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   7 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 80.31 mm |    Comments: 100yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   27.30 |  3.75   11.24 |  5.50    1.61
                 .50    1.61 |  2.25   27.30 |  4.00    6.42 |  5.75    1.61
                 .75    1.61 |  2.50   73.88 |  4.25    6.42 |  6.00    1.61
                1.00    1.61 |  2.75   73.88 |  4.50    3.21 |  6.25    1.61
                1.25    1.61 |  3.00   20.88 |  4.75    3.21 |
                1.50    9.64 |  3.25   20.88 |  5.00    1.61 |
                1.75    9.64 |  3.50   11.24 |  5.25    1.61 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0011) |   Area     (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17         13.53
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     481.00         40.00
     Mannings n           =       .013          .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .083     .00 | 1.667    9.64 | 3.250   20.88 |  4.83    1.61
                .167     .00 | 1.750    9.64 | 3.333   11.24 |  4.92    1.61
                .250     .00 | 1.833   27.30 | 3.417   11.24 |  5.00    1.61
                .333    1.61 | 1.917   27.30 | 3.500   11.24 |  5.08    1.61
                .417    1.61 | 2.000   27.30 | 3.583   11.24 |  5.17    1.61
                .500    1.61 | 2.083   27.30 | 3.667   11.24 |  5.25    1.61
                .583    1.61 | 2.167   27.30 | 3.750   11.24 |  5.33    1.61
                .667    1.61 | 2.250   27.30 | 3.833    6.42 |  5.42    1.61
                .750    1.61 | 2.333   73.88 | 3.917    6.42 |  5.50    1.61
                .833    1.61 | 2.417   73.88 | 4.000    6.42 |  5.58    1.61
                .917    1.61 | 2.500   73.88 | 4.083    6.42 |  5.67    1.61
               1.000    1.61 | 2.583   73.88 | 4.167    6.42 |  5.75    1.61
               1.083    1.61 | 2.667   73.88 | 4.250    6.42 |  5.83    1.61
               1.167    1.61 | 2.750   73.88 | 4.333    3.21 |  5.92    1.61
               1.250    1.61 | 2.833   20.88 | 4.417    3.21 |  6.00    1.61
               1.333    9.64 | 2.917   20.88 | 4.500    3.21 |  6.08    1.61
               1.417    9.64 | 3.000   20.88 | 4.583    3.21 |  6.17    1.61
               1.500    9.64 | 3.083   20.88 | 4.667    3.21 |  6.25    1.61
               1.583    9.64 | 3.167   20.88 | 4.750    3.21 |

     Max.Eff.Inten.(mm/hr)=      73.88         51.42
           over (min)            5.00         20.00
     Storage Coeff.  (min)=      7.40 (ii)    18.74 (ii)
     Unit Hyd. Tpeak (min)=      5.00         20.00
     Unit Hyd. peak  (cms)=       .17           .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=      4.30          1.33      5.481 (iii)
     TIME TO PEAK    (hrs)=      2.75          2.92       2.75
     RUNOFF VOLUME    (mm)=     79.31         44.54      65.75
     TOTAL RAINFALL   (mm)=     80.31         80.31      80.31
     RUNOFF COEFFICIENT   =       .99           .55        .82

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0013) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)      (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |   2.5120     1.1572

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0011)     34.70      5.48      2.75       65.75
     OUTFLOW: ID= 1 (0013)     34.70      2.21      3.25       65.75

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.30
                  TIME SHIFT OF PEAK FLOW          (min)= 30.00
                  MAXIMUM  STORAGE   USED        (ha.m.)= 1.0181

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0012) |   Area     (ha)=  38.92
|ID= 1 DT= 5.0 min |   Total Imp(%)=  76.00   Dir. Conn.(%)=  76.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      29.58          9.34
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     509.40         40.00
     Mannings n           =       .013          .250

     Max.Eff.Inten.(mm/hr)=      73.88         51.42
           over (min)            10.00         20.00
     Storage Coeff.  (min)=      7.66 (ii)    19.00 (ii)
     Unit Hyd. Tpeak (min)=      10.00         20.00
     Unit Hyd. peak  (cms)=        .13           .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=      5.95           .91      6.764 (iii)
     TIME TO PEAK    (hrs)=      2.75          2.92       2.75
     RUNOFF VOLUME    (mm)=     79.31         44.54      70.97
     TOTAL RAINFALL   (mm)=     80.31         80.31      80.31
     RUNOFF COEFFICIENT   =       .99           .55        .88

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.
```

```
--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0014) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0013):    34.70   2.209     3.25    65.75
        + ID2= 2 (0012):    38.92   6.764     2.75    70.97
          ================================================
          ID = 3 (0014):    73.62   8.557     2.75    68.51

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0015) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .5970     2.5409
                           .1260     1.1416   |    .7450     3.0229
                           .3290     1.6185   |    .8600     3.3869
                           .4890     2.1619   |    .9770     3.7482

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0014)     73.62      8.56      2.75      68.51
     OUTFLOW: ID= 1 (0015)     73.62       .98      5.42      68.45

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.42
                  TIME SHIFT OF PEAK FLOW         (min)=160.00
                  MAXIMUM  STORAGE   USED       (ha.m.)= 3.7481

--------------------------------------------------------------------------------

 FINISH
================================================================================================
==============
```

Appendix D7

North-West SWM Pond Calculations

Vaughan Metropolitan Centre
City of Vaughan
NW Corner of Millway Avenue & Hwy 7

Project #: 08104

Date: April 2012

Storm Volume (6 hrs AES storms)

Storm Event	Rainfall Depth (mm)
25mm	25.00
2-Year	36.00
5-Year	47.80
10-Year	55.70
25-Year	65.60
50-Year	73.00
100-Year	80.30

Building base run-off coefficient = 0.90
Runoff reduction = 15 mm (According to LEED Gold Objective)

Adjustment to Building Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 15mm	C_{15}
25mm	25.00	22.50	7.50	0.30
2-Year	36.00	32.40	17.40	0.48
5-Year	**47.80**	**43.02**	**28.02**	**0.59**
10-Year	55.70	50.13	35.13	0.63
25-Year	65.60	59.04	44.04	0.67
50-Year	73.00	65.70	50.70	0.69
100-Year	80.30	72.27	57.27	0.71

Base run-off coefficient = 0.25
Runoff reduction = 10 mm (Assume 5mm initial abstraction to include for the total proposed 15mm)

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 10mm	C_{10}
25mm	25.00	6.25	0.00	0.00
2-Year	36.00	9.00	0.00	0.00
5-Year	**47.80**	**11.95**	**1.95**	**0.04**
10-Year	55.70	13.93	3.93	0.07
25-Year	65.60	16.40	6.40	0.10
50-Year	73.00	18.25	8.25	0.11
100-Year	80.30	20.08	10.08	0.13

Assumption:

Residential
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Commercial
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Mixed Area
For mixed area 50% is for residential and 50% is for commercial

Open Space and Parkland
C = 0.75 for Parkland (in accordance with the City's design criteria)
C = 0.25 for open space
An average runoff coefficient of 0.50 is used for the land indicated as major parks and open spaces

Area & Imperviousness for Permanent Pool Calculation (based on 5-year Runoff Coefficient)

NW Corner of Millway Avenue & Hwy 7

		Area (ha)	C	AC
Residential	Building	5.59	0.59	3.28
	Paved Area	1.86	0.90	1.68
	Landscape	1.98	0.04	0.08
Commercial	Building	1.04	0.59	0.61
	Paved Area	0.35	0.90	0.31
	Landscape	0.37	0.04	0.01
	Open Space / Parkland	5.68	0.50	2.84
	SWM Pond Block	2.61	0.55	1.44
	Road	10.14	0.90	9.13
	Total	29.61		19.37

← Weighted "C" = **0.65**

Weighted Imperviousness = **0.65**

Vaughan Metropolitan Centre
City of Vaughan

Project #: 08104

Date: April 2012

SWM Pond Permanent Pool/Extended Detention Volume

NW Corner of Millway Avenue & Hwy 7

Table A.1 – MOE Water Quality Storage Requirements (SWMP 2003)*

Protection Level	SWMP Type	Storage Volume (m³/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced 80% long-term S.S. removal	Infiltration	25	30	35	40
	Wetlands	80	105	120	140
	Hybrid Wet Pond/Wetland	110	150	175	195
	Wet Pond	140	190	225	250
Normal 70% long-term S.S. removal	Infiltration	20	20	25	30
	Wetlands	60	70	80	90
	Hybrid Wet Pond/Wetland	75	90	105	120
	Wet Pond	90	110	130	150
Basic 60% long-term S.S. removal	Infiltration	20	20	20	20
	Wetlands	60	60	60	60
	Hybrid Wet Pond/Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

* Values in table for Wet Ponds and Wetlands include 40m^3/ha of extended detention storage.

SWM Facility Type = Wet Pond
Level of Protection = 1

VMC Drainage Area = 29.61 ha
External Drainage Area = 16.77 ha
Total Drainage Area = 46.38 ha

VMC Area-Weighted Imperviousness = 65%
External Imperviousness = 80%
Total Area-Weighted Imperviousness = 70%

Water Quality Requirement = 225.00 m^3/ha
Permanent Pool Unit Volume Requirement = 185.00 m^3/ha
Total Permanent Pool Storage Volume Required = 8,580 m^3
Extended Detention Unit Volume Requirement = 40 m^3/ha
Total Extended Detention Volume Required = 1,855 m^3 (compare with Erosion Volume required)

* Note: Total area contributing into pond is 46.38ha as per the AECOM Black Creek Optimization Study.
The contributing external area is from north of Portage Parkway. A weighted imperviousness was calculated for the overall drainage area to the NW pond.

Erosion Control Volume and Release Rate
NW Corner of Millway Avenue & Hwy 7

SWM Pond

Input:

Area = 46.38 (ha)

R.V = 18.727 (mm)

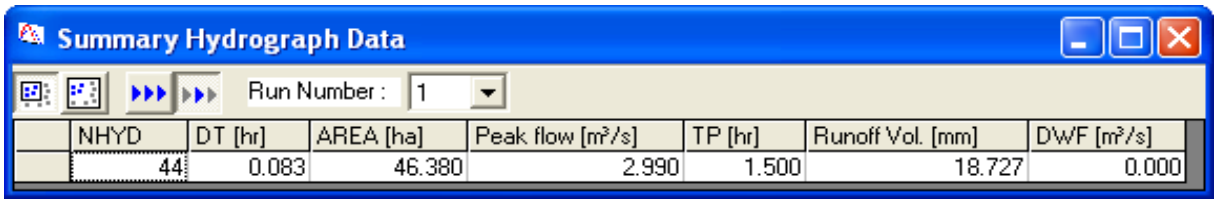
Draw Down Time = 48 (hrs)

Calculations:

Storage = 8,686 (m^3)

Average Outflow = 0.050 (m^3/s)

Peak Outflow = 0.075 (m^3/s) - Estimated at 1.5 times Average Outflow



	NHYD	DT [hr]	AREA [ha]	Peak flow [m³/s]	TP [hr]	Runoff Vol. [mm]	DWF [m³/s]
	44	0.083	46.380	2.990	1.500	18.727	0.000

Vaughan Metropolitan Centre
City of Vaughan
NW Corner of Millway Avenue & Hwy 7

Project #: 08104

Date: April 2012

Storm Volume (6 hrs AES storms)

Storm Event	Rainfall Depth (mm)
25mm	25.00
2-Year	36.00
5-Year	47.80
10-Year	55.70
25-Year	65.60
50-Year	73.00
100-Year	80.30

Building base run-off coefficient = 0.90
Runoff reduction = 15 mm (According to LEED Gold Objective)

Adjustment to Building Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 15mm	C_{15}
25mm	25.00	22.50	7.50	0.30
2-Year	36.00	32.40	17.40	0.48
5-Year	47.80	43.02	28.02	0.59
10-Year	55.70	50.13	35.13	0.63
25-Year	65.60	59.04	44.04	0.67
50-Year	73.00	65.70	50.70	0.69
100-Year	**80.30**	**72.27**	**57.27**	**0.71**

Base run-off coefficient = 0.25
Runoff reduction = 10 mm (Assume 5mm initial abstraction to include for the total proposed 15mm)

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 10mm	C_{10}
25mm	25.00	6.25	0.00	0.00
2-Year	36.00	9.00	0.00	0.00
5-Year	47.80	11.95	1.95	0.04
10-Year	55.70	13.93	3.93	0.07
25-Year	65.60	16.40	6.40	0.10
50-Year	73.00	18.25	8.25	0.11
100-Year	**80.30**	**20.08**	**10.08**	**0.13**

Assumption:

Residential
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Commercial
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Mixed Area
For mixed area 50% is for residential and 50% is for commercial

Open Space and Parkland
C = 0.75 for Parkland (in accordance with the City's design criteria)
C = 0.25 for open space
An average runoff coefficient of 0.50 is used for the land indicated as major parks and open spaces

Area & Imperviousness for Permanent Pool Calculation (based on 100-year Runoff Coefficient)

NW Corner of Millway Avenue & Hwy 7

		Area (ha)	C	AC
Residential	Building	5.59	0.71	3.98
	Paved Area	1.86	0.90	1.68
	Landscape	1.98	0.13	0.25
Commercial	Building	1.04	0.71	0.74
	Paved Area	0.35	0.90	0.31
	Landscape	0.37	0.13	0.05
	Total	11.18		7.01

← Weighted "C" = **0.63**

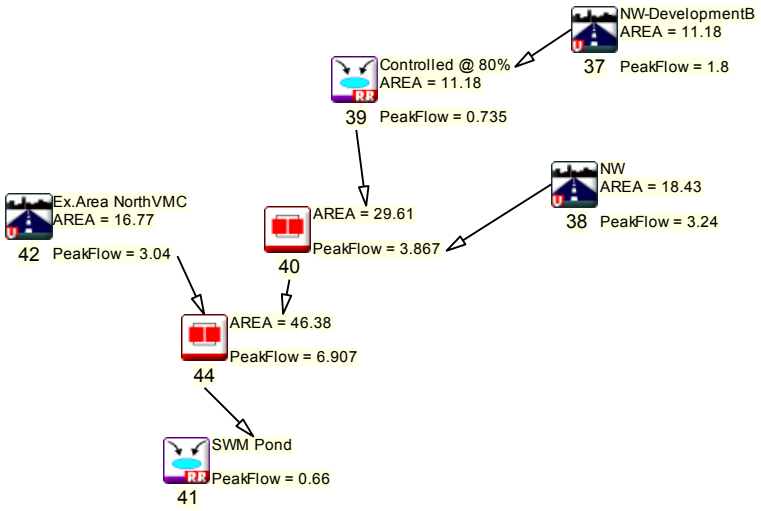
Weighted Imperviousness = **0.61**

Open Space / Parkland	5.68	0.50	2.84
SWM Pond Block	2.61	0.55	1.44
Road	10.14	0.90	9.13
Total	18.43		13.40

← Weighted "C" = **0.73**

Weighted Imperviousness = **0.75**

North West POND



Summary Hydrograph Data

	NHYD	DT [hr]	AREA [ha]	Peak flow [m³/s]	TP [hr]	Runoff Vol. [mm]	DWF [m³/s]
	41	0.083	46.380	0.074	4.750	18.668	0.000
	41	0.083	46.380	0.213	5.083	28.314	0.000
	41	0.083	46.380	0.316	5.000	39.040	0.000
	41	0.083	46.380	0.402	4.917	46.341	0.000
	41	0.083	46.380	0.495	4.833	55.634	0.000
	41	0.083	46.380	0.585	4.833	62.657	0.000
	41	0.083	46.380	0.660	4.833	69.631	0.000

```
================================================================================
==============

       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM, Version 2.0
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O   Licensed To: TMIG
        OOO     T      T    H   H    Y    M   M   OOO                 vo2-0145

Developed and Distributed by Greenland International Consulting Inc.
Copyright 1996, 2001 Schaeffer & Associates Ltd.
All rights reserved.


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


  Input   filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat
  Output  filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final submission\100-
YE~1\On-Site Control to 80% Imperv.out
  Summary filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final submission\100-
YE~1\On-Site Control to 80% Imperv.sum


DATE: 4/4/2012                              TIME: 2:53:09 PM

USER:


COMMENTS: _____________________________________________________

--------------------------------------------------------------------------------
---------------
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\25MM4HR.STM
| Ptotal= 25.00 mm |    Comments: Twenty-Five mm Four Hour Chicago Storm
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .17    2.07 |  1.17    5.70 |  2.17    5.19 |  3.17    2.80
                 .33    2.27 |  1.33   10.78 |  2.33    4.47 |  3.33    2.62
                 .50    2.52 |  1.50   50.21 |  2.50    3.95 |  3.50    2.48
                 .67    2.88 |  1.67   13.37 |  2.67    3.56 |  3.67    2.35
                 .83    3.38 |  1.83    8.29 |  2.83    3.25 |  3.83    2.23
                1.00    4.18 |  2.00    6.30 |  3.00    3.01 |  4.00    2.14

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0042) |   Area     (ha)=  16.77
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  70.00
--------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.42	3.35
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	334.40	40.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	2.07	1.083	5.70	2.083	5.19	3.08	2.80
.167	2.07	1.167	5.70	2.167	5.19	3.17	2.80
.250	2.27	1.250	10.78	2.250	4.47	3.25	2.62
.333	2.27	1.333	10.78	2.333	4.47	3.33	2.62
.417	2.52	1.417	50.21	2.417	3.95	3.42	2.48
.500	2.52	1.500	50.21	2.500	3.95	3.50	2.48
.583	2.88	1.583	13.37	2.583	3.56	3.58	2.35
.667	2.88	1.667	13.37	2.667	3.56	3.67	2.35
.750	3.38	1.750	8.29	2.750	3.25	3.75	2.23
.833	3.38	1.833	8.29	2.833	3.25	3.83	2.23
.917	4.17	1.917	6.30	2.917	3.01	3.92	2.14
1.000	4.18	2.000	6.29	3.000	3.01	4.00	2.14

				TOTALS
Max.Eff.Inten.	(mm/hr)=	50.21	15.08	
over	(min)	5.00	30.00	
Storage Coeff.	(min)=	6.94 (ii)	25.46 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	30.00	
Unit Hyd. peak	(cms)=	.17	.04	
PEAK FLOW	(cms)=	1.32	.07	1.336 (iii)
TIME TO PEAK	(hrs)=	1.50	1.92	1.50
RUNOFF VOLUME	(mm)=	24.00	8.33	19.29
TOTAL RAINFALL	(mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT	=	.96	.33	.77

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 83.0 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.

CALIB	
STANDHYD (0038)	Area (ha)= 18.43
ID= 1 DT= 5.0 min	Total Imp(%)= 75.00 Dir. Conn.(%)= 75.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.82	4.61
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	350.50	40.00
Mannings n	=	.013	.250
Max.Eff.Inten.	(mm/hr)=	50.21	4.90
over	(min)	5.00	40.00
Storage Coeff.	(min)=	7.14 (ii)	36.17 (ii)
Unit Hyd. Tpeak	(min)=	5.00	40.00
Unit Hyd. peak	(cms)=	.17	.03

				TOTALS
PEAK FLOW	(cms)=	1.54	.03	1.545 (iii)
TIME TO PEAK	(hrs)=	1.50	2.25	1.50
RUNOFF VOLUME	(mm)=	24.00	5.55	19.38
TOTAL RAINFALL	(mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT	=	.96	.22	.78

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 83.0 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.

CALIB	
STANDHYD (0037)	Area (ha)= 11.18
ID= 1 DT= 5.0 min	Total Imp(%)= 61.00 Dir. Conn.(%)= 61.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	6.82	4.36
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	273.00	40.00
Mannings n	=	.013	.250
Max.Eff.Inten.	(mm/hr)=	50.21	4.90
over	(min)	5.00	40.00
Storage Coeff.	(min)=	6.15 (ii)	35.17 (ii)
Unit Hyd. Tpeak	(min)=	5.00	40.00
Unit Hyd. peak	(cms)=	.19	.03

				TOTALS
PEAK FLOW	(cms)=	.80	.03	.803 (iii)
TIME TO PEAK	(hrs)=	1.50	2.25	1.50
RUNOFF VOLUME	(mm)=	24.00	5.55	16.80
TOTAL RAINFALL	(mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT	=	.96	.22	.67

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 83.0 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.

RESERVOIR (0039)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.8410	.3698

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0037)	11.18	.80	1.50	16.80
OUTFLOW: ID= 1 (0039)	11.18	.18	1.92	16.79

PEAK FLOW REDUCTION [Qout/Qin](%)= 22.35
TIME SHIFT OF PEAK FLOW (min)= 25.00
MAXIMUM STORAGE USED (ha.m.)= .0790

ADD HYD (0040)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0038):	18.43	1.545	1.50	19.38
+ ID2= 2 (0039):	11.18	.180	1.92	16.79

```
          ================================================
          ID = 3 (0040):    29.61   1.654     1.50    18.40

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0044) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0042):    16.77   1.336     1.50    19.29
        + ID2= 2 (0040):    29.61   1.654     1.50    18.40
          ================================================
          ID = 3 (0044):    46.38   2.990     1.50    18.73

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0041) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .4050     1.7000
                          .0750      .7700    |    .5050     2.0500
                          .2240     1.1000    |    .5840     2.2500
                          .3320     1.5000    |    .6640     2.5000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0044)     46.38      2.99      1.50      18.73
     OUTFLOW: ID= 1 (0041)     46.38       .07      4.75      18.67

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.49
                    TIME SHIFT OF PEAK FLOW         (min)=195.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  .7649

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 36.00 mm |    Comments: 2yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   12.24 |  3.75    5.04 |  5.50     .72
                 .50     .72 |  2.25   12.24 |  4.00    2.88 |  5.75     .72
                 .75     .72 |  2.50   33.12 |  4.25    2.88 |  6.00     .72
                1.00     .72 |  2.75   33.12 |  4.50    1.44 |  6.25     .72
                1.25     .72 |  3.00    9.36 |  4.75    1.44 |
                1.50    4.32 |  3.25    9.36 |  5.00     .72 |
                1.75    4.32 |  3.50    5.04 |  5.25     .72 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0042) |   Area    (ha)=  16.77
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  70.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.42         3.35
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     334.40        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .083     .00 | 1.667    4.32 | 3.250    9.36 |  4.83     .72
               .167     .00 | 1.750    4.32 | 3.333    5.04 |  4.92     .72
               .250     .00 | 1.833   12.24 | 3.417    5.04 |  5.00     .72
               .333     .72 | 1.917   12.24 | 3.500    5.04 |  5.08     .72
               .417     .72 | 2.000   12.24 | 3.583    5.04 |  5.17     .72
               .500     .72 | 2.083   12.24 | 3.667    5.04 |  5.25     .72
               .583     .72 | 2.167   12.24 | 3.750    5.04 |  5.33     .72
               .667     .72 | 2.250   12.24 | 3.833    2.88 |  5.42     .72
               .750     .72 | 2.333   33.12 | 3.917    2.88 |  5.50     .72
               .833     .72 | 2.417   33.12 | 4.000    2.88 |  5.58     .72
               .917     .72 | 2.500   33.12 | 4.083    2.88 |  5.67     .72
              1.000     .72 | 2.583   33.12 | 4.167    2.88 |  5.75     .72
              1.083     .72 | 2.667   33.12 | 4.250    2.88 |  5.83     .72
              1.167     .72 | 2.750   33.12 | 4.333    1.44 |  5.92     .72
              1.250     .72 | 2.833    9.36 | 4.417    1.44 |  6.00     .72
              1.333    4.32 | 2.917    9.36 | 4.500    1.44 |  6.08     .72
              1.417    4.32 | 3.000    9.36 | 4.583    1.44 |  6.17     .72
              1.500    4.32 | 3.083    9.36 | 4.667    1.44 |  6.25     .72
              1.583    4.32 | 3.167    9.36 | 4.750    1.44 |

     Max.Eff.Inten.(mm/hr)=      33.12        28.09
               over (min)        10.00        25.00
     Storage Coeff.  (min)=       8.20 (ii)   22.64 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=        .13          .05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.05          .16      1.172 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00       2.75
     RUNOFF VOLUME    (mm)=      35.00        15.84      29.25
     TOTAL RAINFALL   (mm)=      36.00        36.00      36.00
     RUNOFF COEFFICIENT   =        .97          .44        .81


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0038) |   Area    (ha)=  18.43
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  75.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.82         4.61
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     350.50        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      33.12        13.05
               over (min)        10.00        30.00
```

```
     Storage Coeff.  (min)=       8.44 (ii)   28.05 (ii)
     Unit Hyd. Tpeak (min)=      10.00        30.00
     Unit Hyd. peak  (cms)=        .12          .04
                                                 *TOTALS*
     PEAK FLOW       (cms)=       1.24          .09          1.290 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.08           2.75
     RUNOFF VOLUME    (mm)=      35.00        11.57          29.14
     TOTAL RAINFALL   (mm)=      36.00        36.00          36.00
     RUNOFF COEFFICIENT   =        .97          .32            .81


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0037) |   Area    (ha)=  11.18
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.82         4.36
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     273.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      33.12        13.05
               over (min)        5.00        30.00
     Storage Coeff.  (min)=       7.26 (ii)   26.88 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .17          .04
                                                 *TOTALS*
     PEAK FLOW       (cms)=        .62          .09           .673 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.08           2.75
     RUNOFF VOLUME    (mm)=      35.00        11.57          25.86
     TOTAL RAINFALL   (mm)=      36.00        36.00          36.00
     RUNOFF COEFFICIENT   =        .97          .32            .72


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0039) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .8410      .3698

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0037)     11.18       .67      2.75      25.86
     OUTFLOW: ID= 1 (0039)     11.18       .28      3.17      25.85

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.51
                  TIME SHIFT OF PEAK FLOW         (min)= 25.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .1228

--------------------------------------------------------------------------------
```

```
--------------------
| ADD HYD   (0040) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0038):    18.43   1.290     2.75    29.14
       + ID2= 2 (0039):    11.18    .279     3.17    25.85
         ================================================
         ID = 3 (0040):    29.61   1.531     2.75    27.90

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0044) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0042):    16.77   1.172     2.75    29.25
       + ID2= 2 (0040):    29.61   1.531     2.75    27.90
         ================================================
         ID = 3 (0044):    46.38   2.703     2.75    28.39

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0041) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .4050     1.7000
                           .0750      .7700    |    .5050     2.0500
                           .2240     1.1000    |    .5840     2.2500
                           .3320     1.5000    |    .6640     2.5000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0044)    46.38     2.70      2.75      28.39
     OUTFLOW: ID= 1 (0041)    46.38      .21      5.08      28.31

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  7.87
                  TIME SHIFT OF PEAK FLOW         (min)=140.00
                  MAXIMUM  STORAGE   USED       (ha.m.)= 1.0754

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   3 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 47.81 mm |    Comments: 5yr/6hr
--------------------
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .25     .00 |  2.00   16.25 |  3.75    6.69 |  5.50     .96
                .50     .96 |  2.25   16.25 |  4.00    3.82 |  5.75     .96
                .75     .96 |  2.50   43.98 |  4.25    3.82 |  6.00     .96
               1.00     .96 |  2.75   43.98 |  4.50    1.91 |  6.25     .96
               1.25     .96 |  3.00   12.43 |  4.75    1.91 |
               1.50    5.74 |  3.25   12.43 |  5.00     .96 |
               1.75    5.74 |  3.50    6.69 |  5.25     .96 |
```

```
--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0042) |   Area    (ha)=  16.77
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  70.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.42         3.35
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     334.40        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .083     .00 | 1.667    5.74 | 3.250   12.43 |  4.83     .96
               .167     .00 | 1.750    5.74 | 3.333    6.69 |  4.92     .96
               .250     .00 | 1.833   16.25 | 3.417    6.69 |  5.00     .96
               .333     .96 | 1.917   16.25 | 3.500    6.69 |  5.08     .96
               .417     .96 | 2.000   16.25 | 3.583    6.69 |  5.17     .96
               .500     .96 | 2.083   16.25 | 3.667    6.69 |  5.25     .96
               .583     .96 | 2.167   16.25 | 3.750    6.69 |  5.33     .96
               .667     .96 | 2.250   16.25 | 3.833    3.82 |  5.42     .96
               .750     .96 | 2.333   43.98 | 3.917    3.82 |  5.50     .96
               .833     .96 | 2.417   43.98 | 4.000    3.82 |  5.58     .96
               .917     .96 | 2.500   43.98 | 4.083    3.82 |  5.67     .96
              1.000     .96 | 2.583   43.98 | 4.167    3.82 |  5.75     .96
              1.083     .96 | 2.667   43.98 | 4.250    3.82 |  5.83     .96
              1.167     .96 | 2.750   43.98 | 4.333    1.91 |  5.92     .96
              1.250     .96 | 2.833   12.43 | 4.417    1.91 |  6.00     .96
              1.333    5.74 | 2.917   12.43 | 4.500    1.91 |  6.08     .96
              1.417    5.74 | 3.000   12.43 | 4.583    1.91 |  6.17     .96
              1.500    5.74 | 3.083   12.43 | 4.667    1.91 |  6.25     .96
              1.583    5.74 | 3.167   12.43 | 4.750    1.91 |

     Max.Eff.Inten.(mm/hr)=      43.98        43.59
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      7.32 (ii)   19.43 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=       .17          .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=      1.42          .27          1.659 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.92          2.75
     RUNOFF VOLUME    (mm)=     46.81        24.99         40.26
     TOTAL RAINFALL   (mm)=     47.81        47.81         47.81
     RUNOFF COEFFICIENT   =       .98          .52           .84


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0038) |   Area    (ha)=  18.43
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  75.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.82         4.61
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     350.50        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      43.98        21.81
               over (min)        10.00        25.00
     Storage Coeff.  (min)=       7.53 (ii)   23.51 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=        .13          .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.66          .17          1.784 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00          2.75
     RUNOFF VOLUME    (mm)=      46.81        19.33         39.94
     TOTAL RAINFALL   (mm)=      47.81        47.81         47.81
     RUNOFF COEFFICIENT   =        .98          .40           .84


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0037) |   Area    (ha)=  11.18
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.82         4.36
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     273.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      43.98        21.81
               over (min)        5.00         25.00
     Storage Coeff.  (min)=      6.48 (ii)    22.46 (ii)
     Unit Hyd. Tpeak (min)=      5.00         25.00
     Unit Hyd. peak  (cms)=       .18          .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       .83          .17           .951 (iii)
     TIME TO PEAK    (hrs)=      2.75         3.00          2.75
     RUNOFF VOLUME    (mm)=     46.81        19.33         36.09
     TOTAL RAINFALL   (mm)=     47.81        47.81         47.81
     RUNOFF COEFFICIENT   =       .98          .40           .75


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0039) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .8410      .3698

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0037)     11.18       .95      2.75      36.09
```

```
     OUTFLOW: ID= 1 (0039)     11.18       .39      3.17      36.08

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.38
                   TIME SHIFT OF PEAK FLOW         (min)= 25.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .1730

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0040) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)     (cms)    (hrs)      (mm)
          ID1= 1 (0038):    18.43   1.784     2.75     39.94
        + ID2= 2 (0039):    11.18    .393     3.17     36.08
          ================================================
          ID = 3 (0040):    29.61   2.120     2.75     38.48

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0044) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------        (ha)     (cms)    (hrs)      (mm)
          ID1= 1 (0042):    16.77   1.659     2.75     40.26
        + ID2= 2 (0040):    29.61   2.120     2.75     38.48
          ================================================
          ID = 3 (0044):    46.38   3.779     2.75     39.13

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0041) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .4050     1.7000
                           .0750      .7700   |    .5050     2.0500
                           .2240     1.1000   |    .5840     2.2500
                           .3320     1.5000   |    .6640     2.5000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0044)     46.38      3.78      2.75      39.13
     OUTFLOW: ID= 1 (0041)     46.38       .32      5.00      39.04

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.37
                   TIME SHIFT OF PEAK FLOW         (min)=135.00
                   MAXIMUM  STORAGE   USED       (ha.m.)= 1.4426

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   4 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 55.69 mm |    Comments: 10yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   18.94 |  3.75    7.80 |  5.50    1.11
                 .50    1.11 |  2.25   18.94 |  4.00    4.46 |  5.75    1.11
                 .75    1.11 |  2.50   51.24 |  4.25    4.46 |  6.00    1.11
                1.00    1.11 |  2.75   51.24 |  4.50    2.23 |  6.25    1.11
                1.25    1.11 |  3.00   14.48 |  4.75    2.23 |
                1.50    6.68 |  3.25   14.48 |  5.00    1.11 |
                1.75    6.68 |  3.50    7.80 |  5.25    1.11 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0042) |   Area     (ha)=  16.77
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  70.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.42         3.35
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     334.40        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .083     .00 | 1.667    6.68 | 3.250   14.48 |  4.83    1.11
                .167     .00 | 1.750    6.68 | 3.333    7.80 |  4.92    1.11
                .250     .00 | 1.833   18.94 | 3.417    7.80 |  5.00    1.11
                .333    1.11 | 1.917   18.94 | 3.500    7.80 |  5.08    1.11
                .417    1.11 | 2.000   18.94 | 3.583    7.80 |  5.17    1.11
                .500    1.11 | 2.083   18.94 | 3.667    7.80 |  5.25    1.11
                .583    1.11 | 2.167   18.94 | 3.750    7.80 |  5.33    1.11
                .667    1.11 | 2.250   18.94 | 3.833    4.46 |  5.42    1.11
                .750    1.11 | 2.333   51.24 | 3.917    4.46 |  5.50    1.11
                .833    1.11 | 2.417   51.24 | 4.000    4.46 |  5.58    1.11
                .917    1.11 | 2.500   51.24 | 4.083    4.46 |  5.67    1.11
               1.000    1.11 | 2.583   51.24 | 4.167    4.46 |  5.75    1.11
               1.083    1.11 | 2.667   51.24 | 4.250    4.46 |  5.83    1.11
               1.167    1.11 | 2.750   51.24 | 4.333    2.23 |  5.92    1.11
               1.250    1.11 | 2.833   14.48 | 4.417    2.23 |  6.00    1.11
               1.333    6.68 | 2.917   14.48 | 4.500    2.23 |  6.08    1.11
               1.417    6.68 | 3.000   14.48 | 4.583    2.23 |  6.17    1.11
               1.500    6.68 | 3.083   14.48 | 4.667    2.23 |  6.25    1.11
               1.583    6.68 | 3.167   14.48 | 4.750    2.23 |

     Max.Eff.Inten.(mm/hr)=      51.24        54.40
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      6.89 (ii)   17.97 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=       .18          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=      1.66          .35     1.976 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.92      2.75
     RUNOFF VOLUME    (mm)=     54.69        31.49     47.73
     TOTAL RAINFALL   (mm)=     55.69        55.69     55.69
     RUNOFF COEFFICIENT   =       .98          .57       .86


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
```

```
--------------------
| CALIB            |
| STANDHYD  (0038) |   Area    (ha)=  18.43
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  75.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.82         4.61
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     350.50        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      51.24        29.52
               over (min)        5.00        25.00
     Storage Coeff.  (min)=       7.08 (ii)   21.24 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .17          .05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.95          .23          2.128 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00           2.75
     RUNOFF VOLUME    (mm)=      54.69        25.02          47.27
     TOTAL RAINFALL   (mm)=      55.69        55.69          55.69
     RUNOFF COEFFICIENT   =        .98          .45            .85


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0037) |   Area    (ha)=  11.18
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.82         4.36
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     273.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      51.24        29.52
               over (min)        5.00        25.00
     Storage Coeff.  (min)=       6.10 (ii)   20.25 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .19          .05
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .97          .22          1.140 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00           2.75
     RUNOFF VOLUME    (mm)=      54.69        25.02          43.12
     TOTAL RAINFALL   (mm)=      55.69        55.69          55.69
     RUNOFF COEFFICIENT   =        .98          .45            .77


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0039) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)      (ha.m.)   |   (cms)     (ha.m.)
                           .0000       .0000   |    .8410      .3698

                                    AREA     QPEAK     TPEAK       R.V.
                                    (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0037)     11.18       1.14      2.75       43.12
     OUTFLOW: ID= 1 (0039)     11.18        .47      3.17       43.11

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.38
                    TIME SHIFT OF PEAK FLOW          (min)= 25.00
                    MAXIMUM  STORAGE   USED        (ha.m.)=  .2075

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0040) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0038):    18.43   2.128     2.75     47.27
        + ID2= 2 (0039):    11.18    .472     3.17     43.11
          ================================================
          ID = 3 (0040):    29.61   2.530     2.75     45.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0044) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0042):    16.77   1.976     2.75     47.73
        + ID2= 2 (0040):    29.61   2.530     2.75     45.70
          ================================================
          ID = 3 (0044):    46.38   4.506     2.75     46.43

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0041) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)      (ha.m.)   |   (cms)     (ha.m.)
                           .0000       .0000   |    .4050     1.7000
                           .0750       .7700   |    .5050     2.0500
                           .2240      1.1000   |    .5840     2.2500
                           .3320      1.5000   |    .6640     2.5000

                                    AREA     QPEAK     TPEAK       R.V.
                                    (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0044)     46.38       4.51      2.75       46.43
     OUTFLOW: ID= 1 (0041)     46.38        .40      4.92       46.34

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  8.93
                    TIME SHIFT OF PEAK FLOW          (min)=130.00
                    MAXIMUM  STORAGE   USED        (ha.m.)= 1.6926

--------------------------------------------------------------------------------
  ***************************
  ** SIMULATION NUMBER:   5 **
  ***************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
```

```
|                  |             08104 - Vaughan Corporate Centre - Master Ser
|                  |             \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 65.59 mm |    Comments: 25yr/6hr
-------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	2.00	22.30	3.75	9.18	5.50	1.31
.50	1.31	2.25	22.30	4.00	5.25	5.75	1.31
.75	1.31	2.50	60.35	4.25	5.25	6.00	1.31
1.00	1.31	2.75	60.35	4.50	2.62	6.25	1.31
1.25	1.31	3.00	17.06	4.75	2.62		
1.50	7.87	3.25	17.06	5.00	1.31		
1.75	7.87	3.50	9.18	5.25	1.31		

```
--------------------
| CALIB            |
| STANDHYD  (0042) |   Area    (ha)=  16.77
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  70.00
--------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.42	3.35
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	334.40	40.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.00	1.667	7.87	3.250	17.06	4.83	1.31
.167	.00	1.750	7.87	3.333	9.18	4.92	1.31
.250	.00	1.833	22.30	3.417	9.18	5.00	1.31
.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Max.Eff.Inten.	(mm/hr)=	60.35	68.28	
over	(min)	5.00	20.00	
Storage Coeff.	(min)=	6.45 (ii)	16.57 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	.18	.06	
				TOTALS
PEAK FLOW	(cms)=	1.96	.46	2.381 (iii)
TIME TO PEAK	(hrs)=	2.75	2.92	2.75
RUNOFF VOLUME	(mm)=	64.59	39.98	57.21
TOTAL RAINFALL	(mm)=	65.59	65.59	65.59
RUNOFF COEFFICIENT	=	.98	.61	.87

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 83.0 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.

```
--------------------
| CALIB            |
| STANDHYD  (0038) |   Area    (ha)=  18.43
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  75.00
--------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	13.82	4.61
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	350.50	40.00
Mannings n	=	.013	.250

Max.Eff.Inten.	(mm/hr)=	60.35	38.12	
over	(min)	5.00	20.00	
Storage Coeff.	(min)=	6.64 (ii)	19.42 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	.18	.06	
				TOTALS
PEAK FLOW	(cms)=	2.30	.32	2.585 (iii)
TIME TO PEAK	(hrs)=	2.75	2.92	2.75
RUNOFF VOLUME	(mm)=	64.59	32.60	56.59
TOTAL RAINFALL	(mm)=	65.59	65.59	65.59
RUNOFF COEFFICIENT	=	.98	.50	.86

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 83.0 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.

```
--------------------
| CALIB            |
| STANDHYD  (0037) |   Area    (ha)=  11.18
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	6.82	4.36
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	273.00	40.00
Mannings n	=	.013	.250

Max.Eff.Inten.	(mm/hr)=	60.35	38.12	
over	(min)	5.00	20.00	
Storage Coeff.	(min)=	5.71 (ii)	18.49 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	.20	.06	
				TOTALS
PEAK FLOW	(cms)=	1.14	.31	1.414 (iii)
TIME TO PEAK	(hrs)=	2.75	2.92	2.75
RUNOFF VOLUME	(mm)=	64.59	32.60	52.11
TOTAL RAINFALL	(mm)=	65.59	65.59	65.59
RUNOFF COEFFICIENT	=	.98	.50	.79

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 83.0 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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0039) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .8410      .3698

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0037)     11.18      1.41      2.75      52.11
     OUTFLOW: ID= 1 (0039)     11.18       .58      3.17      52.10

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.90
                TIME SHIFT OF PEAK FLOW         (min)= 25.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  .2546

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0040) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0038):    18.43   2.585     2.75    56.59
        + ID2= 2 (0039):    11.18    .579     3.17    52.10
          ================================================
          ID = 3 (0040):    29.61   3.079     2.75    54.90

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0044) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0042):    16.77   2.381     2.75    57.21
        + ID2= 2 (0040):    29.61   3.079     2.75    54.90
          ================================================
          ID = 3 (0044):    46.38   5.460     2.75    55.73

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0041) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .4050     1.7000
                           .0750      .7700   |    .5050     2.0500
                           .2240     1.1000   |    .5840     2.2500
                           .3320     1.5000   |    .6640     2.5000

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0044)     46.38      5.46      2.75      55.73
     OUTFLOW: ID= 1 (0041)     46.38       .49      4.83      55.63

                PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.06
                TIME SHIFT OF PEAK FLOW         (min)=125.00
                MAXIMUM  STORAGE   USED       (ha.m.)= 2.0148

--------------------------------------------------------------------------------

  ****************************
  ** SIMULATION NUMBER:   6 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 73.00 mm |    Comments: 50yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   24.82 |  3.75   10.22 |  5.50    1.46
                 .50    1.46 |  2.25   24.82 |  4.00    5.84 |  5.75    1.46
                 .75    1.46 |  2.50   67.16 |  4.25    5.84 |  6.00    1.46
                1.00    1.46 |  2.75   67.16 |  4.50    2.92 |  6.25    1.46
                1.25    1.46 |  3.00   18.98 |  4.75    2.92 |
                1.50    8.76 |  3.25   18.98 |  5.00    1.46 |
                1.75    8.76 |  3.50   10.22 |  5.25    1.46 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0042) |   Area     (ha)=  16.77
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  70.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.42         3.35
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     334.40        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .083     .00 | 1.667    8.76 | 3.250   18.98 |  4.83    1.46
                .167     .00 | 1.750    8.76 | 3.333   10.22 |  4.92    1.46
                .250     .00 | 1.833   24.82 | 3.417   10.22 |  5.00    1.46
                .333    1.46 | 1.917   24.82 | 3.500   10.22 |  5.08    1.46
                .417    1.46 | 2.000   24.82 | 3.583   10.22 |  5.17    1.46
                .500    1.46 | 2.083   24.82 | 3.667   10.22 |  5.25    1.46
                .583    1.46 | 2.167   24.82 | 3.750   10.22 |  5.33    1.46
                .667    1.46 | 2.250   24.82 | 3.833    5.84 |  5.42    1.46
                .750    1.46 | 2.333   67.16 | 3.917    5.84 |  5.50    1.46
                .833    1.46 | 2.417   67.16 | 4.000    5.84 |  5.58    1.46
                .917    1.46 | 2.500   67.16 | 4.083    5.84 |  5.67    1.46
               1.000    1.46 | 2.583   67.16 | 4.167    5.84 |  5.75    1.46
               1.083    1.46 | 2.667   67.16 | 4.250    5.84 |  5.83    1.46
               1.167    1.46 | 2.750   67.16 | 4.333    2.92 |  5.92    1.46
               1.250    1.46 | 2.833   18.98 | 4.417    2.92 |  6.00    1.46
               1.333    8.76 | 2.917   18.98 | 4.500    2.92 |  6.08    1.46
               1.417    8.76 | 3.000   18.98 | 4.583    2.92 |  6.17    1.46
               1.500    8.76 | 3.083   18.98 | 4.667    2.92 |  6.25    1.46
               1.583    8.76 | 3.167   18.98 | 4.750    2.92 |

     Max.Eff.Inten.(mm/hr)=      67.16        80.50
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      6.18 (ii)   15.66 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=       .19          .07
                                                        *TOTALS*
```

```
     PEAK FLOW       (cms)=       2.18          .55          2.689 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83           2.75
     RUNOFF VOLUME    (mm)=      72.00        46.51          64.35
     TOTAL RAINFALL   (mm)=      73.00        73.00          73.00
     RUNOFF COEFFICIENT   =        .99          .64            .88


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD  (0038) |   Area    (ha)=  18.43
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  75.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.82         4.61
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     350.50        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      67.16        44.75
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.36 (ii)   18.34 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .19          .06
                                                        *TOTALS*
     PEAK FLOW       (cms)=       2.56          .39          2.913 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92           2.75
     RUNOFF VOLUME    (mm)=      72.00        38.53          63.63
     TOTAL RAINFALL   (mm)=      73.00        73.00          73.00
     RUNOFF COEFFICIENT   =        .99          .53            .87


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD  (0037) |   Area    (ha)=  11.18
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.82         4.36
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     273.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      67.16        44.75
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       5.47 (ii)   17.46 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .20          .06
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.27          .38          1.607 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92           2.75
     RUNOFF VOLUME    (mm)=      72.00        38.53          58.94
     TOTAL RAINFALL   (mm)=      73.00        73.00          73.00
     RUNOFF COEFFICIENT   =        .99          .53            .81


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0039) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .8410      .3698

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0037)      11.18      1.61      2.75       58.94
     OUTFLOW: ID= 1 (0039)      11.18       .66      3.17       58.93

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.86
                TIME SHIFT OF PEAK FLOW          (min)= 25.00
                MAXIMUM  STORAGE   USED        (ha.m.)=  .2889

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0040) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0038):    18.43    2.913     2.75    63.63
        + ID2= 2 (0039):    11.18     .657     3.17    58.93
          ================================================
          ID = 3 (0040):    29.61   3.473     2.75    61.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0044) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0042):    16.77    2.689     2.75    64.35
        + ID2= 2 (0040):    29.61    3.473     2.75    61.86
          ================================================
          ID = 3 (0044):    46.38    6.162     2.75    62.76

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0041) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .4050     1.7000
                           .0750      .7700    |    .5050     2.0500
                           .2240     1.1000    |    .5840     2.2500
                           .3320     1.5000    |    .6640     2.5000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0044)      46.38      6.16      2.75       62.76
```

```
     OUTFLOW: ID= 1 (0041)     46.38       .58      4.83      62.66

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.49
                   TIME SHIFT OF PEAK FLOW         (min)=125.00
                   MAXIMUM  STORAGE   USED       (ha.m.)= 2.2532

--------------------------------------------------------------------------------
  ***************************
  ** SIMULATION NUMBER:   7 **
  ***************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 80.31 mm |    Comments: 100yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   27.30 |  3.75   11.24 |  5.50    1.61
                 .50    1.61 |  2.25   27.30 |  4.00    6.42 |  5.75    1.61
                 .75    1.61 |  2.50   73.88 |  4.25    6.42 |  6.00    1.61
                1.00    1.61 |  2.75   73.88 |  4.50    3.21 |  6.25    1.61
                1.25    1.61 |  3.00   20.88 |  4.75    3.21 |
                1.50    9.64 |  3.25   20.88 |  5.00    1.61 |
                1.75    9.64 |  3.50   11.24 |  5.25    1.61 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0042) |   Area    (ha)=  16.77
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  70.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.42         3.35
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     334.40        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .083     .00 | 1.667    9.64 | 3.250   20.88 |  4.83    1.61
                .167     .00 | 1.750    9.64 | 3.333   11.24 |  4.92    1.61
                .250     .00 | 1.833   27.30 | 3.417   11.24 |  5.00    1.61
                .333    1.61 | 1.917   27.30 | 3.500   11.24 |  5.08    1.61
                .417    1.61 | 2.000   27.30 | 3.583   11.24 |  5.17    1.61
                .500    1.61 | 2.083   27.30 | 3.667   11.24 |  5.25    1.61
                .583    1.61 | 2.167   27.30 | 3.750   11.24 |  5.33    1.61
                .667    1.61 | 2.250   27.30 | 3.833    6.42 |  5.42    1.61
                .750    1.61 | 2.333   73.88 | 3.917    6.42 |  5.50    1.61
                .833    1.61 | 2.417   73.88 | 4.000    6.42 |  5.58    1.61
                .917    1.61 | 2.500   73.88 | 4.083    6.42 |  5.67    1.61
               1.000    1.61 | 2.583   73.88 | 4.167    6.42 |  5.75    1.61
               1.083    1.61 | 2.667   73.88 | 4.250    6.42 |  5.83    1.61
               1.167    1.61 | 2.750   73.88 | 4.333    3.21 |  5.92    1.61
               1.250    1.61 | 2.833   20.88 | 4.417    3.21 |  6.00    1.61
               1.333    9.64 | 2.917   20.88 | 4.500    3.21 |  6.08    1.61
               1.417    9.64 | 3.000   20.88 | 4.583    3.21 |  6.17    1.61
               1.500    9.64 | 3.083   20.88 | 4.667    3.21 |  6.25    1.61
               1.583    9.64 | 3.167   20.88 | 4.750    3.21 |

     Max.Eff.Inten.(mm/hr)=      73.88        90.99
               over (min)        5.00        15.00
     Storage Coeff.  (min)=      5.95 (ii)   14.97 (ii)
     Unit Hyd. Tpeak (min)=      5.00        15.00
     Unit Hyd. peak  (cms)=       .19          .08
                                                        *TOTALS*
     PEAK FLOW       (cms)=      2.40          .65         3.040 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.83          2.75
     RUNOFF VOLUME    (mm)=     79.31        53.07         71.44
     TOTAL RAINFALL   (mm)=     80.31        80.31         80.31
     RUNOFF COEFFICIENT   =       .99          .66           .89

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0038) |   Area    (ha)=  18.43
|ID= 1 DT= 5.0 min |   Total Imp(%)=  75.00   Dir. Conn.(%)=  75.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.82         4.61
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     350.50        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      73.88        51.42
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      6.12 (ii)   17.46 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=       .19          .06
                                                        *TOTALS*
     PEAK FLOW       (cms)=      2.82          .46         3.240 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.92          2.75
     RUNOFF VOLUME    (mm)=     79.31        44.54         70.62
     TOTAL RAINFALL   (mm)=     80.31        80.31         80.31
     RUNOFF COEFFICIENT   =       .99          .55           .88

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0037) |   Area    (ha)=  11.18
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.82         4.36
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     273.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      73.88        51.42
               over (min)        5.00        20.00
```

```
     Storage Coeff.  (min)=       5.27 (ii)   16.61 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .21          .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.40          .44          1.800 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92           2.75
     RUNOFF VOLUME    (mm)=      79.31        44.54          65.75
     TOTAL RAINFALL   (mm)=      80.31        80.31          80.31
     RUNOFF COEFFICIENT   =        .99          .55            .82


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0039) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .8410      .3698

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0037)     11.18      1.80      2.75      65.75
     OUTFLOW: ID= 1 (0039)     11.18       .73      3.17      65.74

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.82
                   TIME SHIFT OF PEAK FLOW         (min)= 25.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .3232

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0040) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0038):    18.43   3.240     2.75    70.62
        + ID2= 2 (0039):    11.18    .735     3.17    65.74
          ================================================
          ID = 3 (0040):    29.61   3.867     2.75    68.78

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0044) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0042):    16.77   3.040     2.75    71.44
        + ID2= 2 (0040):    29.61   3.867     2.75    68.78
          ================================================
          ID = 3 (0044):    46.38   6.907     2.75    69.74

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0041) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .4050     1.7000
                          .0750      .7700   |    .5050     2.0500
                          .2240     1.1000   |    .5840     2.2500
                          .3320     1.5000   |    .6640     2.5000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0044)     46.38      6.91      2.75      69.74
     OUTFLOW: ID= 1 (0041)     46.38       .66      4.83      69.63

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  9.56
                   TIME SHIFT OF PEAK FLOW         (min)=125.00
                   MAXIMUM  STORAGE   USED       (ha.m.)= 2.4897

--------------------------------------------------------------------------------

 FINISH
================================================================================
==============
```

Appendix D8

Storage Summary

Vaughan Metropolitan Centre
City of Vaughan

Project #: 08104

Date: April 2012

6 hours AES Storm

SE Corner of Jane St. & Hwy 7 (31.88ha)

Preferred Scenario: Controlled Flow - 2-year post-development release rates controlled at 80% Imperviousness from development block + LID (15mm)

Event	Target Release Rate (m^3/s)	Required Storage (m^3)
Permanent Pool	-	5,675
Erosion	0.052	5,230
2-year	0.163	7,202
5-year	0.242	9,521
10-year	0.294	11,158
25-year	0.368	13,234
50-year	0.425	14,787
100-year	0.483	16,325

← Total Storage = Permanent Pool Storage + Active Storage
= 22,000 m^3

SW Corner of Jane St. & Hwy 7 (73.62ha)

Preferred Scenario: Controlled Flow - 2-year post-development release rates controlled at 80% Imperviousness from development block + LID (15mm)

Event	Target Release Rate (m^3/s)	Required Storage (m^3)
Permanent Pool	-	12,420
Erosion	0.126	11,416
2-year	0.329	16,185
5-year	0.489	21,619
10-year	0.597	25,409
25-year	0.745	30,229
50-year	0.860	33,869
100-year	0.977	37,482

← Total Storage = Permanent Pool Storage + Active Storage
= 49,902 m^3

NW Corner of Millway Avenue & Hwy 7 (48.38ha)

Preferred Scenario: Controlled Flow - 2-year post-development release rates controlled at 80% Imperviousness from development block + LID (15mm)

Event	Target Release Rate (m^3/s)	Required Storage (m^3)
Permanent Pool	-	8,580
Erosion	0.075	7,700
2-year	0.224	11,000
5-year	0.332	15,000
10-year	0.405	17,000
25-year	0.505	20,500
50-year	0.584	22,500
100-year	0.664	25,000

← Total Storage = Permanent Pool Storage + Active Storage
= 33,580 m^3

Appendix D9

Proposed Hydrologic Modeling for SWM SW Pond (Considering L.I.D. Measures Within R.O.W.)

Vaughan Metropolitan Centre
City of Vaughan

Project #: 08104
Date: April 2012

Volume Provided within LID measures

Assumptions and Methodology:

The purpose of this modeling is to analyze the positive impact of applying LID measures along proposed ROW.
For the purpose of this report the initial runoff coefficient from Roads/ROW is conservatively assumed to be C=0.90
The following analysis will justify a reduction of initial runoff coefficient. As an example this analysis will identify runoff reduction for the road/ROW areas contributing into the proposed interchange pond, SWM Pond SW.
Total area contributing into the SWM pond is 73.62ha, of which 34.70ha to have on-site controls, and the remainder of the area of 38.92ha discharging uncontrolled into SWM pond.

Total Area to SWM Pond	**73.62**	ha
on-site controls	34.07	ha
uncontrolled		
open space / parks	18.21	ha
Roads/ROW	21.34	ha

As per the current Secondary plan and the proposed road layout a total road length where the LID measures can be applied is measured to be 5700m. Therefore if linear underground LID are proposed on both sides of ROW, the maximum available length to be used for LID is 11,400m.
The proposed LID are envisioned as infiltration trenches/linear bioretention trenches, where the filter media will provide quality, erosion and water attenuation within the porous media.

It is assumed that the LID measures will have the following conceptual geometry:

Width:	1.00	m
Height:	1.20	m
Porosity:	0.40	
Overall max length	11,400.00	m

Therefore the volume provided within the voids will be:

Provided Volume:	5,472.00	m^3

Runoff volume from 25mm storm event is:

Rainfall Depth:	25.00	mm
Runoff Coefficient:	0.90	
Area Road:	21.34	ha

Accumulated Runoff Volume from 25mm storm :	4,801.50	m^3

Form above analysis can be seen that the 25mm storm event runoff volume is less than the provided volumes within voids of media.

Therefore an assumption can be made that the 25mm storm event can be stored within media voids and a runoff coefficient reduction of 25 mm can be applied to road area.

The detailed runoff coefficient reduction calculation can be found in the following Appendix B.

A separate VO2 modeling is generated to analyze the impact of reduced runoff coefficient applied for road areas into the required pond volumes. The output file from VO2 modeling can be found in Appendix B.

The following table summarizes findings of the analysis regarding Volume Required within SWM Pond SW

	Option 1	**Option 2**		**Option 3**	
	No LID within ROW	LID applied 100% along both sides of ROW		LID applied 50% along both sides of ROW	
Event	Required Volumes	Required Volumes	% reduction	Required Volumes	% reduction
25mm storm	11,412.00	9,714.00	15%	10,563.00	7%
2 year	16,135.00	14,000.00	13%	15,054.00	7%
5 year	21,584.00	19,083.00	12%	20,319.00	6%
10 year	25,393.00	22,684.00	11%	24,031.00	5%
25 year	30,208.00	27,268.00	10%	28,734.00	5%
50 year	33,584.00	30,779.00	8%	32,274.00	4%
100 year	37,481.00	34,284.00	9%	35,833.00	4%

As ca be seen from above table, utilizing LID measures within ROW will reduce the required volumes in SWM Pond SW.
If LID are applied 100% within the ROW / Roads than a reduction of approximately 9% in the required volumes can be expected.
If LID are applied 50% within the ROW / Roads than a reduction of approximately 4% in the required volumes can be expected.

A conceptual analysis is performed to translate this volume reduction into pond block area reduction:

As per current pond design the pond geometry can be summarized:

	Pond Block Area	3.80 ha
	Top of Active storage Area	2.62 ha
	Top of permanent Pool Area	1.70 ha
	Active Storage Depth	2.2 m
	Volume Provided	**4.75 ham**
Conclusions:		
	Volume after 9 % reduction	4.32 ham
	Calculated base of the pond after volume reduction	1.55 ha
	% Reduction on Pond block area by applying 100% LID	**9%**
	Volume after 4 % reduction	4.56 ham
	Calculated base of the pond after volume reduction	1.63 ha
	% Reduction on Pond block area by applying 50% LID	**4%**

Vaughan Metropolitan Centre
City of Vaughan

Project #: 08104
Date: April 2012

100 year Imperviousness Calculation for areas contributing into SW Pond (100% LID Measures within ROW / Roads)

Storm Volume (6 hrs AES storms)

Storm Event	Rainfall Depth (mm)
25mm	25.00
2-Year	36.00
5-Year	47.80
10-Year	55.70
25-Year	65.60
50-Year	73.00
100-Year	80.30

Building base run-off coefficient = 0.90
Runoff reduction = 15 mm (According to LEED Gold Objective)

Adjustment to Building Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 15mm	C_{15}	% reduction
25mm	25.00	22.50	7.50	0.30	67%
2-Year	36.00	32.40	17.40	0.48	46%
5-Year	47.80	43.02	28.02	0.59	35%
10-Year	55.70	50.13	35.13	0.63	30%
25-Year	65.60	59.04	44.04	0.67	25%
50-Year	73.00	65.70	50.70	0.69	23%
100-Year	**80.30**	**72.27**	**57.27**	**0.71**	**21%**

Landscape area Base run-off coefficient = 0.25
Runoff reduction = 10 mm (Assume 5mm initial abstraction to include for the total proposed 15mm)

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 10mm	C_{10}	% reduction
25mm	25.00	6.25	0.00	0.00	100%
2-Year	36.00	9.00	0.00	0.00	100%
5-Year	47.80	11.95	1.95	0.04	84%
10-Year	55.70	13.93	3.93	0.07	72%
25-Year	65.60	16.40	6.40	0.10	61%
50-Year	73.00	18.25	8.25	0.11	55%
100-Year	**80.30**	**20.08**	**10.08**	**0.13**	**50%**

Roads base run-off coefficient = 0.90
Runoff reduction = 25 mm (According to Preliminary Analysis)

Adjustment to Road Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 25mm	C_{25}	% reduction
25mm	25.00	22.50	0.00	0.00	100%
2-Year	36.00	32.40	7.40	0.21	77%
5-Year	47.80	43.02	18.02	0.38	58%
10-Year	55.70	50.13	25.13	0.45	50%
25-Year	65.60	59.04	34.04	0.52	42%
50-Year	73.00	65.70	40.70	0.56	38%
100-Year	**80.30**	**72.27**	**47.27**	**0.59**	**35%**

Assumption:

Residential
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Commercial
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Mixed Area
For mixed area 50% is for residential and 50% is for commercial

Open Space and Parkland
C = 0.75 for Parkland (in accordance with the City's design criteria)
C = 0.25 for open space
An average runoff coefficient of 0.50 is used for the land indicated as major parks and open spaces

Area & Imperviousness for Permanent Pool Calculation (based on 100-year Runoff Coefficient)

SW Corner of Jane St. and Hwy 7

Area controlled through on-site controls (100year post to 2 year post at 80% imperviousness)

		Area (ha)	C	AC
Mized Use (Residential)	Building	5.34	0.71	3.81
	Paved Area	1.78	0.90	1.60
	Landscape	1.89	0.13	0.24
Mized Use (Commercial)	Building	5.34	0.71	3.81
	Paved Area	1.78	0.90	1.60
	Landscape	1.89	0.13	0.24
Residential	Building	8.09	0.71	5.77
	Paved Area	2.70	0.90	2.43
	Landscape	2.87	0.13	0.36
Commercial	Building	1.78	0.71	1.27
	Paved Area	0.59	0.90	0.54
	Landscape	0.63	0.13	0.08
	Total	34.70		21.75

← Weighted "C" = **0.63**

Weighted Imperviousness = **0.61**

Uncontrolled Area

	Area (ha)	C	AC
Open Space / Parkland	8.14	0.50	4.07
Open Channel	3.95	0.55	2.17
SWM Pond Block	5.49	0.55	3.02
Total	17.58		9.26

← Weighted "C" = **0.53**

Weighted Imperviousness = **0.47**

Area controlled through LID

Road	21.34	0.59	12.56
Total	21.34		12.56

← Weighted "C" = **0.59**

Weighted Imperviousness = **0.56**

Total area to SWM SW Pond **73.62**

Vaughan Metropolitan Centre
City of Vaughan

Project #: 08104
Date: April 2012

100 year Imperviousness Calculation for areas contributing into SW Pond (50% LID Measures within ROW / Roads)

Storm Volume (6 hrs AES storms)

Storm Event	Rainfall Depth (mm)
25mm	25.00
2-Year	36.00
5-Year	47.80
10-Year	55.70
25-Year	65.60
50-Year	73.00
100-Year	80.30

Building base run-off coefficient = 0.90
Runoff reduction = 15 mm (According to LEED Gold Objective)

Adjustment to Building Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 15mm	C_{15}	% reduction
25mm	25.00	22.50	7.50	0.30	67%
2-Year	36.00	32.40	17.40	0.48	46%
5-Year	47.80	43.02	28.02	0.59	35%
10-Year	55.70	50.13	35.13	0.63	30%
25-Year	65.60	59.04	44.04	0.67	25%
50-Year	73.00	65.70	50.70	0.69	23%
100-Year	**80.30**	**72.27**	**57.27**	**0.71**	**21%**

Landscape area Base run-off coefficient = 0.25
Runoff reduction = 10 mm (Assume 5mm initial abstraction to include for the total proposed 15mm)

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 10mm	C_{10}	% reduction
25mm	25.00	6.25	0.00	0.00	100%
2-Year	36.00	9.00	0.00	0.00	100%
5-Year	47.80	11.95	1.95	0.04	84%
10-Year	55.70	13.93	3.93	0.07	72%
25-Year	65.60	16.40	6.40	0.10	61%
50-Year	73.00	18.25	8.25	0.11	55%
100-Year	**80.30**	**20.08**	**10.08**	**0.13**	**50%**

Roads base run-off coefficient = 0.90
Runoff reduction = 25 mm (According to Preliminary Analysis)

Adjustment to Building Runoff Coefficient to Account for On-site Measures

Storm Event	Rainfall Depth (mm)	Base Runoff (mm)	Runoff Reduced by 25mm	C_{25}	% reduction
25mm	25.00	22.50	0.00	0.00	100%
2-Year	36.00	32.40	7.40	0.21	77%
5-Year	47.80	43.02	18.02	0.38	58%
10-Year	55.70	50.13	25.13	0.45	50%
25-Year	65.60	59.04	34.04	0.52	42%
50-Year	73.00	65.70	40.70	0.56	38%
100-Year	**80.30**	**72.27**	**47.27**	**0.59**	**35%**

Assumption:

Residential
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Commercial
C = 0.75
I = 79%
For the 79% of impervious area it is assumed that 75% of it is building and 25% of it is paved area

Mixed Area
For mixed area 50% is for residential and 50% is for commercial

Open Space and Parkland
C = 0.75 for Parkland (in accordance with the City's design criteria)
C = 0.25 for open space
An average runoff coefficient of 0.50 is used for the land indicated as major parks and open spaces

Area & Imperviousness for Permanent Pool Calculation (based on 100-year Runoff Coefficient)

SW Corner of Jane St. and Hwy 7

Area controlled through on-site controls (100year post to 2 year post at 80% imperviousness)

		Area (ha)	C	AC
Mized Use (Residential)	Building	5.34	0.71	3.81
	Paved Area	1.78	0.90	1.60
	Landscape	1.89	0.13	0.24
Mized Use (Commercial)	Building	5.34	0.71	3.81
	Paved Area	1.78	0.90	1.60
	Landscape	1.89	0.13	0.24
Residential	Building	8.09	0.71	5.77
	Paved Area	2.70	0.90	2.43
	Landscape	2.87	0.13	0.36
Commercial	Building	1.78	0.71	1.27
	Paved Area	0.59	0.90	0.54
	Landscape	0.63	0.13	0.08
	Total	34.70		21.75

← Weighted "C" = **0.63**

Weighted Imperviousness = **0.61**

Uncontrolled Area

	Area (ha)	C	AC
Open Space / Parkland	8.14	0.50	4.07
Open Channel	3.95	0.55	2.17
SWM Pond Block	5.49	0.55	3.02
Road	10.67	0.90	9.60
Total	28.25		18.87

← Weighted "C" = **0.67**

Weighted Imperviousness = **0.67**

Area controlled through LID (assuming that LID will be applied to 50% of Road area)

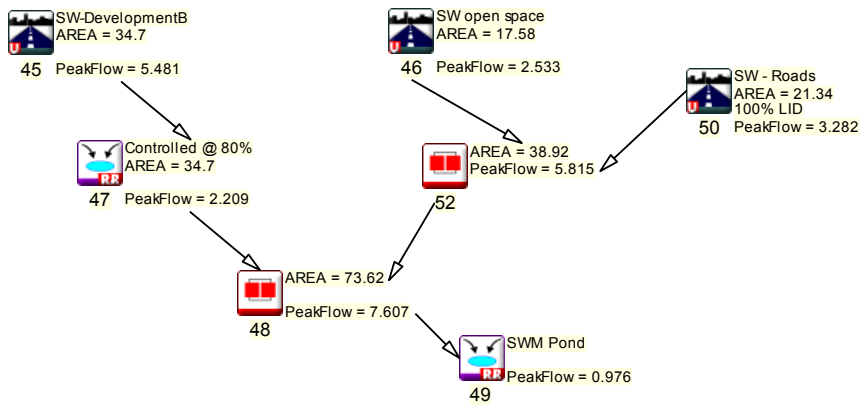
Road	10.67	0.59	6.28
Total	10.67		6.28

← Weighted "C" = **0.59**

Weighted Imperviousness = **0.56**

Total area to SWM SW Pond **73.62**

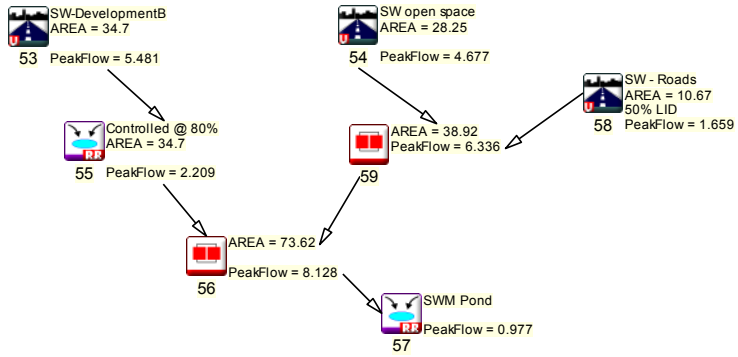
South West POND (100% LID on ROW)



Summary Hydrograph Data

NHYD	DT [hr]	AREA [ha]	Peak flow [m³/s]	TP [hr]	Runoff Vol. [mm]	DWF [m³/s]
49	0.083	73.620	0.126	5.500	15.890	0.000
49	0.083	73.620	0.328	5.917	24.713	0.000
49	0.083	73.620	0.488	5.750	34.745	0.000
49	0.083	73.620	0.596	5.667	41.666	0.000
49	0.083	73.620	0.744	5.583	50.552	0.000
49	0.083	73.620	0.859	5.500	57.312	0.000
49	0.083	73.620	0.976	5.417	64.055	0.000

South West POND (50% LID on ROW)



Summary Hydrograph Data

NHYD	DT [hr]	AREA [ha]	Peak flow [m³/s]	TP [hr]	Runoff Vol. [mm]	DWF [m³/s]
57	0.083	73.620	0.126	5.500	17.062	0.000
57	0.083	73.620	0.328	5.917	26.203	0.000
57	0.083	73.620	0.488	5.750	36.494	0.000
57	0.083	73.620	0.597	5.667	43.554	0.000
57	0.083	73.620	0.745	5.583	52.587	0.000
57	0.083	73.620	0.860	5.500	59.442	0.000
57	0.083	73.620	0.977	5.417	66.267	0.000

```
================================================================================================
===============

       V    V   I    SSSSS  U   U    A    L
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM, Version 2.0
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M  M  O   O   Licensed To: TMIG
        OOO     T      T    H   H    Y    M   M  OOO                 vo2-0145

Developed and Distributed by Greenland International Consulting Inc.
Copyright 1996, 2001 Schaeffer & Associates Ltd.
All rights reserved.

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


  Input   filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat
  Output  filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final submission\100-year
to 2-year (with LID)\Pond SW lid options.out
  Summary filename: G:\Projects\2008\08104-~1\Design\SWM\2012 02 final submission\100-year
to 2-year (with LID)\Pond SW lid options.sum


DATE: 4/10/2012                              TIME: 11:49:57 AM

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------------------------
---------------
  ****************************
  ** SIMULATION NUMBER:   1 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\25MM4HR.STM
| Ptotal= 25.00 mm |    Comments: Twenty-Five mm Four Hour Chicago Storm
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .17    2.07 |  1.17    5.70 |  2.17    5.19 |  3.17    2.80
                 .33    2.27 |  1.33   10.78 |  2.33    4.47 |  3.33    2.62
                 .50    2.52 |  1.50   50.21 |  2.50    3.95 |  3.50    2.48
                 .67    2.88 |  1.67   13.37 |  2.67    3.56 |  3.67    2.35
                 .83    3.38 |  1.83    8.29 |  2.83    3.25 |  3.83    2.23
                1.00    4.18 |  2.00    6.30 |  3.00    3.01 |  4.00    2.14

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0050) |   Area    (ha)=  21.34
|ID= 1 DT= 5.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  56.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.95         9.39
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     377.20        40.00
     Mannings n             =      .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .083    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08    2.80
               .167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17    2.80
               .250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25    2.62
               .333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33    2.62
               .417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42    2.48
               .500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50    2.48
               .583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58    2.35
               .667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67    2.35
               .750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75    2.23
               .833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83    2.23
               .917    4.17 | 1.917    6.30 | 2.917    3.01 |  3.92    2.14
              1.000    4.18 | 2.000    6.29 | 3.000    3.01 |  4.00    2.14

     Max.Eff.Inten.(mm/hr)=      50.21         4.90
               over (min)        5.00        40.00
     Storage Coeff.  (min)=      7.46 (ii)   36.49 (ii)
     Unit Hyd. Tpeak (min)=      5.00        40.00
     Unit Hyd. peak  (cms)=       .17          .03
                                                        *TOTALS*
     PEAK FLOW       (cms)=      1.31          .06       1.317 (iii)
     TIME TO PEAK    (hrs)=      1.50         2.25         1.50
     RUNOFF VOLUME    (mm)=     24.00         5.55        15.88
     TOTAL RAINFALL   (mm)=     25.00        25.00        25.00
     RUNOFF COEFFICIENT   =       .96          .22          .64


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0046) |   Area    (ha)=  17.58
|ID= 1 DT= 5.0 min |   Total Imp(%)=  47.00   Dir. Conn.(%)=  47.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.26         9.32
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     342.30        40.00
     Mannings n             =      .013         .250

     Max.Eff.Inten.(mm/hr)=      50.21         4.90
               over (min)        5.00        40.00
     Storage Coeff.  (min)=      7.04 (ii)   36.07 (ii)
     Unit Hyd. Tpeak (min)=      5.00        40.00
     Unit Hyd. peak  (cms)=       .17          .03
                                                        *TOTALS*
```

```
     PEAK FLOW       (cms)=        .93          .06          .932 (iii)
     TIME TO PEAK    (hrs)=       1.50         2.25          1.50
     RUNOFF VOLUME    (mm)=      24.00         5.55         14.22
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .96          .22           .57


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0052) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0050):    21.34   1.317     1.50    15.88
       + ID2= 2 (0046):    17.58    .932     1.50    14.22
         ================================================
         ID = 3 (0052):    38.92   2.250     1.50    15.13

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0045) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17         13.53
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     481.00         40.00
     Mannings n           =       .013          .250

     Max.Eff.Inten.(mm/hr)=      50.21          4.90
               over (min)        10.00         40.00
     Storage Coeff.  (min)=       8.64 (ii)    37.66 (ii)
     Unit Hyd. Tpeak (min)=      10.00         40.00
     Unit Hyd. peak  (cms)=        .12           .03
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.94           .09          1.955 (iii)
     TIME TO PEAK    (hrs)=       1.58          2.25           1.58
     RUNOFF VOLUME    (mm)=      24.00          5.55          16.80
     TOTAL RAINFALL   (mm)=      25.00         25.00          25.00
     RUNOFF COEFFICIENT   =        .96           .22           .67


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0047) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         .0000      .0000    |   2.5120     1.1572

                              AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0045)     34.70      1.95      1.58      16.80
     OUTFLOW: ID= 1 (0047)     34.70       .54      2.08      16.80

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 27.42
                  TIME SHIFT OF PEAK FLOW         (min)= 30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .2469

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0048) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0052):    38.92   2.250     1.50    15.13
       + ID2= 2 (0047):    34.70    .536     2.08    16.80
         ================================================
         ID = 3 (0048):    73.62   2.475     1.50    15.92

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0049) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .5970     2.2700
                          .1260      .9730    |    .7450     2.7289
                          .3290     1.4013    |    .8600     3.0794
                          .4890     1.9110    |    .9770     3.4299

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0048)     73.62      2.48      1.50      15.92
     OUTFLOW: ID= 1 (0049)     73.62       .13      5.50      15.89

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  5.08
                  TIME SHIFT OF PEAK FLOW         (min)=240.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .9714

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0053) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17         13.53
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     481.00         40.00
     Mannings n           =       .013          .250

     Max.Eff.Inten.(mm/hr)=      50.21          4.90
               over (min)        10.00         40.00
     Storage Coeff.  (min)=       8.64 (ii)    37.66 (ii)
     Unit Hyd. Tpeak (min)=      10.00         40.00
     Unit Hyd. peak  (cms)=        .12           .03
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.94           .09          1.955 (iii)
     TIME TO PEAK    (hrs)=       1.58          2.25           1.58
     RUNOFF VOLUME    (mm)=      24.00          5.55          16.80
     TOTAL RAINFALL   (mm)=      25.00         25.00          25.00
     RUNOFF COEFFICIENT   =        .96           .22           .67
```

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0055) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000   |   2.5120     1.1572

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0053)     34.70      1.95      1.58      16.80
     OUTFLOW: ID= 1 (0055)     34.70       .54      2.08      16.80

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 27.42
                   TIME SHIFT OF PEAK FLOW         (min)= 30.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .2469

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0054) |   Area    (ha)=  28.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  67.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.93         9.32
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     434.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      50.21         4.90
               over (min)        10.00        40.00
     Storage Coeff.  (min)=       8.12 (ii)   37.15 (ii)
     Unit Hyd. Tpeak (min)=      10.00        40.00
     Unit Hyd. peak  (cms)=        .13          .03
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.77          .06         1.777 (iii)
     TIME TO PEAK    (hrs)=       1.58         2.25          1.58
     RUNOFF VOLUME    (mm)=      24.00         5.55         17.91
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .96          .22           .72


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0058) |   Area    (ha)=  10.67
|ID= 1 DT= 5.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  56.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.98         4.69
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     266.70        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      50.21         4.90
               over (min)        10.00        40.00
     Storage Coeff.  (min)=       6.06 (ii)   35.09 (ii)
     Unit Hyd. Tpeak (min)=       5.00        40.00
     Unit Hyd. peak  (cms)=        .19          .03
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .70          .03          .707 (iii)
     TIME TO PEAK    (hrs)=       1.50         2.25          1.50
     RUNOFF VOLUME    (mm)=      24.00         5.55         15.88
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =        .96          .22           .64


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0059) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0054):    28.25   1.777     1.58    17.91
        + ID2= 2 (0058):    10.67    .707     1.50    15.88
          ================================================
          ID = 3 (0059):    38.92   2.405     1.50    17.35

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0056) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0055):    34.70    .536     2.08    16.80
        + ID2= 2 (0059):    38.92   2.405     1.50    17.35
          ================================================
          ID = 3 (0056):    73.62   2.630     1.50    17.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0057) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------       (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000   |    .5970     2.4033
                          .1260     1.0577   |    .7450     2.8737
                          .3290     1.5066   |    .8600     3.2276
                          .4890     2.0346   |    .9770     3.5835

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0056)     73.62      2.63      1.50      17.09
     OUTFLOW: ID= 1 (0057)     73.62       .13      5.50      17.06

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  4.78
                   TIME SHIFT OF PEAK FLOW         (min)=240.00
                   MAXIMUM  STORAGE   USED       (ha.m.)= 1.0563

--------------------------------------------------------------------------------
```

```
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 36.00 mm |    Comments: 2yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   12.24 |  3.75    5.04 |  5.50     .72
                 .50     .72 |  2.25   12.24 |  4.00    2.88 |  5.75     .72
                 .75     .72 |  2.50   33.12 |  4.25    2.88 |  6.00     .72
                1.00     .72 |  2.75   33.12 |  4.50    1.44 |  6.25     .72
                1.25     .72 |  3.00    9.36 |  4.75    1.44 |
                1.50    4.32 |  3.25    9.36 |  5.00     .72 |
                1.75    4.32 |  3.50    5.04 |  5.25     .72 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0050) |   Area    (ha)=  21.34
|ID= 1 DT= 5.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  56.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.95         9.39
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     377.20        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .083     .00 | 1.667    4.32 | 3.250    9.36 |  4.83     .72
                .167     .00 | 1.750    4.32 | 3.333    5.04 |  4.92     .72
                .250     .00 | 1.833   12.24 | 3.417    5.04 |  5.00     .72
                .333     .72 | 1.917   12.24 | 3.500    5.04 |  5.08     .72
                .417     .72 | 2.000   12.24 | 3.583    5.04 |  5.17     .72
                .500     .72 | 2.083   12.24 | 3.667    5.04 |  5.25     .72
                .583     .72 | 2.167   12.24 | 3.750    5.04 |  5.33     .72
                .667     .72 | 2.250   12.24 | 3.833    2.88 |  5.42     .72
                .750     .72 | 2.333   33.12 | 3.917    2.88 |  5.50     .72
                .833     .72 | 2.417   33.12 | 4.000    2.88 |  5.58     .72
                .917     .72 | 2.500   33.12 | 4.083    2.88 |  5.67     .72
               1.000     .72 | 2.583   33.12 | 4.167    2.88 |  5.75     .72
               1.083     .72 | 2.667   33.12 | 4.250    2.88 |  5.83     .72
               1.167     .72 | 2.750   33.12 | 4.333    1.44 |  5.92     .72
               1.250     .72 | 2.833    9.36 | 4.417    1.44 |  6.00     .72
               1.333    4.32 | 2.917    9.36 | 4.500    1.44 |  6.08     .72
               1.417    4.32 | 3.000    9.36 | 4.583    1.44 |  6.17     .72
               1.500    4.32 | 3.083    9.36 | 4.667    1.44 |  6.25     .72
               1.583    4.32 | 3.167    9.36 | 4.750    1.44 |

     Max.Eff.Inten.(mm/hr)=      33.12        13.05
               over (min)        10.00        30.00
     Storage Coeff.  (min)=       8.82 (ii)   28.43 (ii)
     Unit Hyd. Tpeak (min)=      10.00        30.00
     Unit Hyd. peak  (cms)=        .12          .04
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.07          .18          1.173 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.08           2.75
     RUNOFF VOLUME    (mm)=      35.00        11.57          24.69
     TOTAL RAINFALL   (mm)=      36.00        36.00          36.00
     RUNOFF COEFFICIENT   =        .97          .32            .69


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0046) |   Area    (ha)=  17.58
|ID= 1 DT= 5.0 min |   Total Imp(%)=  47.00   Dir. Conn.(%)=  47.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.26         9.32
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     342.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      33.12        13.05
               over (min)        10.00        30.00
     Storage Coeff.  (min)=       8.32 (ii)   27.94 (ii)
     Unit Hyd. Tpeak (min)=      10.00        30.00
     Unit Hyd. peak  (cms)=        .13          .04
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .74          .18           .848 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.08           2.75
     RUNOFF VOLUME    (mm)=      35.00        11.57          22.58
     TOTAL RAINFALL   (mm)=      36.00        36.00          36.00
     RUNOFF COEFFICIENT   =        .97          .32            .63


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0052) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0050):    21.34   1.173     2.75    24.69
        + ID2= 2 (0046):    17.58    .848     2.75    22.58
          ================================================
          ID = 3 (0052):    38.92   2.021     2.75    23.74

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0045) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17        13.53
     Dep. Storage     (mm)=       1.00         5.00
```

```
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     481.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      33.12        13.05
               over (min)        10.00        30.00
     Storage Coeff.  (min)=      10.20 (ii)   29.82 (ii)
     Unit Hyd. Tpeak (min)=      10.00        30.00
     Unit Hyd. peak  (cms)=        .11          .04
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.86          .26          2.007 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.17           2.75
     RUNOFF VOLUME    (mm)=      35.00        11.57          25.86
     TOTAL RAINFALL   (mm)=      36.00        36.00          36.00
     RUNOFF COEFFICIENT   =        .97          .32            .72


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0047) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |  2.5120     1.1572

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0045)     34.70      2.01      2.75      25.86
     OUTFLOW: ID= 1 (0047)     34.70       .84      3.33      25.86

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 42.07
                   TIME SHIFT OF PEAK FLOW         (min)= 35.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .3895

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0048) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0052):    38.92   2.021     2.75    23.74
        + ID2= 2 (0047):    34.70    .844     3.33    25.86
          ================================================
          ID = 3 (0048):    73.62   2.648     2.75    24.74

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0049) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   .5970     2.2700
                           .1260      .9730   |   .7450     2.7289
                           .3290     1.4013   |   .8600     3.0794
                           .4890     1.9110   |   .9770     3.4299

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0048)     73.62      2.65      2.75      24.74
     OUTFLOW: ID= 1 (0049)     73.62       .33      5.92      24.71

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.40
                   TIME SHIFT OF PEAK FLOW         (min)=190.00
                   MAXIMUM  STORAGE   USED       (ha.m.)= 1.4000

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0053) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17         13.53
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     481.00         40.00
     Mannings n           =       .013          .250

     Max.Eff.Inten.(mm/hr)=      33.12         13.05
               over (min)        10.00         30.00
     Storage Coeff.  (min)=      10.20 (ii)    29.82 (ii)
     Unit Hyd. Tpeak (min)=      10.00         30.00
     Unit Hyd. peak  (cms)=        .11           .04
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.86          .26          2.007 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.17           2.75
     RUNOFF VOLUME    (mm)=      35.00        11.57          25.86
     TOTAL RAINFALL   (mm)=      36.00        36.00          36.00
     RUNOFF COEFFICIENT   =        .97          .32            .72


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0055) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |  2.5120     1.1572

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0053)     34.70      2.01      2.75      25.86
     OUTFLOW: ID= 1 (0055)     34.70       .84      3.33      25.86

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 42.07
                   TIME SHIFT OF PEAK FLOW         (min)= 35.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .3895

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0054) |   Area    (ha)=  28.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  67.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.93          9.32
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     434.00         40.00
     Mannings n           =       .013          .250
```

```
     Max.Eff.Inten.(mm/hr)=      33.12        13.05
               over (min)        10.00        30.00
     Storage Coeff.  (min)=       9.59 (ii)   29.21 (ii)
     Unit Hyd. Tpeak (min)=      10.00        30.00
     Unit Hyd. peak  (cms)=        .11          .04
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.67          .18     1.777 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.17      2.75
     RUNOFF VOLUME    (mm)=      35.00        11.57     27.27
     TOTAL RAINFALL   (mm)=      36.00        36.00     36.00
     RUNOFF COEFFICIENT   =        .97          .32       .76


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0058) |   Area    (ha)=  10.67
|ID= 1 DT= 5.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  56.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.98         4.69
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     266.70        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      33.12        13.05
               over (min)         5.00        30.00
     Storage Coeff.  (min)=       7.16 (ii)   26.78 (ii)
     Unit Hyd. Tpeak (min)=       5.00        30.00
     Unit Hyd. peak  (cms)=        .17          .04
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .54          .09        .600 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.08       2.75
     RUNOFF VOLUME    (mm)=      35.00        11.57      24.69
     TOTAL RAINFALL   (mm)=      36.00        36.00      36.00
     RUNOFF COEFFICIENT   =        .97          .32        .69


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0059) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0054):    28.25   1.777     2.75    27.27
        + ID2= 2 (0058):    10.67    .600     2.75    24.69
          ================================================
          ID = 3 (0059):    38.92   2.377     2.75    26.56

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
```

```
--------------------
| ADD HYD   (0056) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0055):    34.70    .844     3.33    25.86
        + ID2= 2 (0059):    38.92   2.377     2.75    26.56
          ================================================
          ID = 3 (0056):    73.62   3.005     2.75    26.23

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0057) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .5970     2.4033
                          .1260     1.0577    |    .7450     2.8737
                          .3290     1.5066    |    .8600     3.2276
                          .4890     2.0346    |    .9770     3.5835

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0056)     73.62     3.00      2.75      26.23
     OUTFLOW: ID= 1 (0057)     73.62      .33      5.92      26.20

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 10.93
                TIME SHIFT OF PEAK FLOW         (min)=190.00
                MAXIMUM  STORAGE   USED       (ha.m.)= 1.5054

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   3 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 47.81 mm |    Comments: 5yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   16.25 |  3.75    6.69 |  5.50     .96
                 .50     .96 |  2.25   16.25 |  4.00    3.82 |  5.75     .96
                 .75     .96 |  2.50   43.98 |  4.25    3.82 |  6.00     .96
                1.00     .96 |  2.75   43.98 |  4.50    1.91 |  6.25     .96
                1.25     .96 |  3.00   12.43 |  4.75    1.91 |
                1.50    5.74 |  3.25   12.43 |  5.00     .96 |
                1.75    5.74 |  3.50    6.69 |  5.25     .96 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0050) |   Area    (ha)=  21.34
|ID= 1 DT= 5.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  56.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.95         9.39
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     377.20        40.00
     Mannings n           =       .013         .250
```

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.00	1.667	5.74	3.250	12.43	4.83	.96
.167	.00	1.750	5.74	3.333	6.69	4.92	.96
.250	.00	1.833	16.25	3.417	6.69	5.00	.96
.333	.96	1.917	16.25	3.500	6.69	5.08	.96
.417	.96	2.000	16.25	3.583	6.69	5.17	.96
.500	.96	2.083	16.25	3.667	6.69	5.25	.96
.583	.96	2.167	16.25	3.750	6.69	5.33	.96
.667	.96	2.250	16.25	3.833	3.82	5.42	.96
.750	.96	2.333	43.98	3.917	3.82	5.50	.96
.833	.96	2.417	43.98	4.000	3.82	5.58	.96
.917	.96	2.500	43.98	4.083	3.82	5.67	.96
1.000	.96	2.583	43.98	4.167	3.82	5.75	.96
1.083	.96	2.667	43.98	4.250	3.82	5.83	.96
1.167	.96	2.750	43.98	4.333	1.91	5.92	.96
1.250	.96	2.833	12.43	4.417	1.91	6.00	.96
1.333	5.74	2.917	12.43	4.500	1.91	6.08	.96
1.417	5.74	3.000	12.43	4.583	1.91	6.17	.96
1.500	5.74	3.083	12.43	4.667	1.91	6.25	.96
1.583	5.74	3.167	12.43	4.750	1.91		

Max.Eff.Inten.	(mm/hr)=	43.98	21.81	
over	(min)	10.00	25.00	
Storage Coeff.	(min)=	7.87 (ii)	23.85 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	25.00	
Unit Hyd. peak	(cms)=	.13	.05	
				TOTALS
PEAK FLOW	(cms)=	1.43	.35	1.684 (iii)
TIME TO PEAK	(hrs)=	2.75	3.00	2.75
RUNOFF VOLUME	(mm)=	46.81	19.33	34.72
TOTAL RAINFALL	(mm)=	47.81	47.81	47.81
RUNOFF COEFFICIENT	=	.98	.40	.73

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 83.0 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.

CALIB				
STANDHYD (0046)	Area	(ha)=	17.58	
ID= 1 DT= 5.0 min	Total Imp	(%)=	47.00	Dir. Conn.(%)= 47.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	8.26	9.32
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	342.30	40.00
Mannings n	=	.013	.250

Max.Eff.Inten.	(mm/hr)=	43.98	21.81	
over	(min)	5.00	25.00	
Storage Coeff.	(min)=	7.42 (ii)	23.40 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	25.00	
Unit Hyd. peak	(cms)=	.17	.05	
				TOTALS
PEAK FLOW	(cms)=	1.00	.35	1.254 (iii)
TIME TO PEAK	(hrs)=	2.75	3.00	2.75
RUNOFF VOLUME	(mm)=	46.81	19.33	32.24
TOTAL RAINFALL	(mm)=	47.81	47.81	47.81
RUNOFF COEFFICIENT	=	.98	.40	.67

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 83.0 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.

ADD HYD (0052)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0050):	21.34	1.684	2.75	34.72
	+ ID2= 2 (0046):	17.58	1.254	2.75	32.24
	ID = 3 (0052):	38.92	2.938	2.75	33.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
STANDHYD (0045)	Area	(ha)=	34.70	
ID= 1 DT= 5.0 min	Total Imp	(%)=	61.00	Dir. Conn.(%)= 61.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	21.17	13.53
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	481.00	40.00
Mannings n	=	.013	.250

Max.Eff.Inten.	(mm/hr)=	43.98	21.81	
over	(min)	10.00	30.00	
Storage Coeff.	(min)=	9.11 (ii)	25.08 (ii)	
Unit Hyd. Tpeak	(min)=	10.00	30.00	
Unit Hyd. peak	(cms)=	.12	.04	
				TOTALS
PEAK FLOW	(cms)=	2.50	.48	2.804 (iii)
TIME TO PEAK	(hrs)=	2.75	3.08	2.75
RUNOFF VOLUME	(mm)=	46.81	19.33	36.09
TOTAL RAINFALL	(mm)=	47.81	47.81	47.81
RUNOFF COEFFICIENT	=	.98	.40	.75

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 83.0 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.

RESERVOIR (0047)						
IN= 2---> OUT= 1						
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)		OUTFLOW (cms)	STORAGE (ha.m.)	
	.0000	.0000		2.5120	1.1572	

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0045)	34.70	2.80	2.75	36.09
OUTFLOW: ID= 1 (0047)	34.70	1.18	3.33	36.09

```
                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 42.12
                  TIME SHIFT OF PEAK FLOW         (min)= 35.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .5449

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0048) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0052):    38.92   2.938     2.75    33.60
       + ID2= 2 (0047):    34.70   1.181     3.33    36.09
         ==================================================
         ID = 3 (0048):    73.62   3.816     2.75    34.77

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| RESERVOIR (0049) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .5970     2.2700
                          .1260      .9730    |    .7450     2.7289
                          .3290     1.4013    |    .8600     3.0794
                          .4890     1.9110    |    .9770     3.4299

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0048)    73.62      3.82      2.75      34.77
     OUTFLOW: ID= 1 (0049)    73.62       .49      5.75      34.75

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.79
                  TIME SHIFT OF PEAK FLOW         (min)=180.00
                  MAXIMUM  STORAGE   USED       (ha.m.)= 1.9083

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0053) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17         13.53
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     481.00         40.00
     Mannings n           =       .013          .250

     Max.Eff.Inten.(mm/hr)=      43.98         21.81
               over (min)        10.00         30.00
     Storage Coeff.  (min)=       9.11 (ii)    25.08 (ii)
     Unit Hyd. Tpeak (min)=      10.00         30.00
     Unit Hyd. peak  (cms)=        .12           .04

                                                *TOTALS*
     PEAK FLOW        (cms)=       2.50           .48          2.804 (iii)
     TIME TO PEAK     (hrs)=       2.75          3.08           2.75
     RUNOFF VOLUME     (mm)=      46.81         19.33          36.09
     TOTAL RAINFALL    (mm)=      47.81         47.81          47.81
     RUNOFF COEFFICIENT   =        .98           .40            .75


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| RESERVOIR (0055) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |   2.5120     1.1572

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0053)    34.70      2.80      2.75      36.09
     OUTFLOW: ID= 1 (0055)    34.70      1.18      3.33      36.09

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 42.12
                  TIME SHIFT OF PEAK FLOW         (min)= 35.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  .5449

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0054) |   Area    (ha)=  28.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  67.00
--------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.93          9.32
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     434.00         40.00
     Mannings n           =       .013          .250

     Max.Eff.Inten.(mm/hr)=      43.98         21.81
               over (min)        10.00         25.00
     Storage Coeff.  (min)=       8.56 (ii)    24.54 (ii)
     Unit Hyd. Tpeak (min)=      10.00         25.00
     Unit Hyd. peak  (cms)=        .12           .05

                                                *TOTALS*
     PEAK FLOW        (cms)=       2.25           .34          2.497 (iii)
     TIME TO PEAK     (hrs)=       2.75          3.00           2.75
     RUNOFF VOLUME     (mm)=      46.81         19.33          37.74
     TOTAL RAINFALL    (mm)=      47.81         47.81          47.81
     RUNOFF COEFFICIENT   =        .98           .40            .79


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0058) |   Area    (ha)=  10.67
|ID= 1 DT= 5.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  56.00
--------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.98          4.69
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     266.70         40.00
     Mannings n           =       .013          .250

     Max.Eff.Inten.(mm/hr)=      43.98         21.81
               over (min)         5.00         25.00
```

```
     Storage Coeff.  (min)=       6.39 (ii)   22.37 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .18          .05
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .73          .18          .858 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00          2.75
     RUNOFF VOLUME    (mm)=      46.81        19.33         34.72
     TOTAL RAINFALL   (mm)=      47.81        47.81         47.81
     RUNOFF COEFFICIENT   =        .98          .40           .73


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0059) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0054):    28.25   2.497     2.75    37.74
        + ID2= 2 (0058):    10.67    .858     2.75    34.72
          ================================================
          ID = 3 (0059):    38.92   3.355     2.75    36.91

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0056) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0055):    34.70   1.181     3.33    36.09
        + ID2= 2 (0059):    38.92   3.355     2.75    36.91
          ================================================
          ID = 3 (0056):    73.62   4.233     2.75    36.52

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0057) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .5970     2.4033
                           .1260     1.0577   |    .7450     2.8737
                           .3290     1.5066   |    .8600     3.2276
                           .4890     2.0346   |    .9770     3.5835

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0056)      73.62      4.23      2.75      36.52
     OUTFLOW: ID= 1 (0057)      73.62       .49      5.75      36.49

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.53
                    TIME SHIFT OF PEAK FLOW         (min)=180.00
                    MAXIMUM  STORAGE   USED       (ha.m.)= 2.0319

--------------------------------------------------------------------------------
  ***************************
  ** SIMULATION NUMBER:   4 **
  ***************************

--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 55.69 mm |    Comments: 10yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   18.94 |  3.75    7.80 |  5.50    1.11
                 .50    1.11 |  2.25   18.94 |  4.00    4.46 |  5.75    1.11
                 .75    1.11 |  2.50   51.24 |  4.25    4.46 |  6.00    1.11
                1.00    1.11 |  2.75   51.24 |  4.50    2.23 |  6.25    1.11
                1.25    1.11 |  3.00   14.48 |  4.75    2.23 |
                1.50    6.68 |  3.25   14.48 |  5.00    1.11 |
                1.75    6.68 |  3.50    7.80 |  5.25    1.11 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0050) |   Area     (ha)=  21.34
|ID= 1 DT= 5.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  56.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.95          9.39
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     377.20         40.00
     Mannings n           =       .013          .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .083     .00 | 1.667    6.68 | 3.250   14.48 |  4.83    1.11
                .167     .00 | 1.750    6.68 | 3.333    7.80 |  4.92    1.11
                .250     .00 | 1.833   18.94 | 3.417    7.80 |  5.00    1.11
                .333    1.11 | 1.917   18.94 | 3.500    7.80 |  5.08    1.11
                .417    1.11 | 2.000   18.94 | 3.583    7.80 |  5.17    1.11
                .500    1.11 | 2.083   18.94 | 3.667    7.80 |  5.25    1.11
                .583    1.11 | 2.167   18.94 | 3.750    7.80 |  5.33    1.11
                .667    1.11 | 2.250   18.94 | 3.833    4.46 |  5.42    1.11
                .750    1.11 | 2.333   51.24 | 3.917    4.46 |  5.50    1.11
                .833    1.11 | 2.417   51.24 | 4.000    4.46 |  5.58    1.11
                .917    1.11 | 2.500   51.24 | 4.083    4.46 |  5.67    1.11
               1.000    1.11 | 2.583   51.24 | 4.167    4.46 |  5.75    1.11
               1.083    1.11 | 2.667   51.24 | 4.250    4.46 |  5.83    1.11
               1.167    1.11 | 2.750   51.24 | 4.333    2.23 |  5.92    1.11
               1.250    1.11 | 2.833   14.48 | 4.417    2.23 |  6.00    1.11
               1.333    6.68 | 2.917   14.48 | 4.500    2.23 |  6.08    1.11
               1.417    6.68 | 3.000   14.48 | 4.583    2.23 |  6.17    1.11
               1.500    6.68 | 3.083   14.48 | 4.667    2.23 |  6.25    1.11
               1.583    6.68 | 3.167   14.48 | 4.750    2.23 |

     Max.Eff.Inten.(mm/hr)=      51.24        29.52
               over (min)         5.00        25.00
     Storage Coeff.  (min)=       7.40 (ii)   21.56 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .17          .05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.68          .47          2.044 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00           2.75
     RUNOFF VOLUME    (mm)=      54.69        25.02          41.63
```

```
     TOTAL RAINFALL   (mm)=      55.69        55.69          55.69
     RUNOFF COEFFICIENT   =        .98          .45            .75


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0046) |   Area    (ha)=  17.58
|ID= 1 DT= 5.0 min |   Total Imp(%)=  47.00   Dir. Conn.(%)=  47.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.26         9.32
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     342.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      51.24        29.52
               over (min)        5.00        25.00
     Storage Coeff.  (min)=       6.98 (ii)   21.14 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .17          .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.17          .47          1.529 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00           2.75
     RUNOFF VOLUME    (mm)=      54.69        25.02          38.96
     TOTAL RAINFALL   (mm)=      55.69        55.69          55.69
     RUNOFF COEFFICIENT   =        .98          .45            .70


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------


--------------------
| ADD HYD   (0052) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
         ID1= 1 (0050):    21.34    2.044     2.75    41.63
       + ID2= 2 (0046):    17.58    1.529     2.75    38.96
         ====================================================
         ID = 3 (0052):    38.92    3.573     2.75    40.43

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0045) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17        13.53
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     481.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      51.24        29.52
               over (min)        10.00        25.00
     Storage Coeff.  (min)=       8.57 (ii)   22.72 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=        .12          .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       2.93          .67          3.434 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00           2.75
     RUNOFF VOLUME    (mm)=      54.69        25.02          43.12
     TOTAL RAINFALL   (mm)=      55.69        55.69          55.69
     RUNOFF COEFFICIENT   =        .98          .45            .77


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0047) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000       .0000   |   2.5120     1.1572

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0045)     34.70      3.43      2.75      43.12
     OUTFLOW: ID= 1 (0047)     34.70      1.43      3.25      43.11

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.63
                TIME SHIFT OF PEAK FLOW         (min)= 30.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  .6596

--------------------------------------------------------------------------------


--------------------
| ADD HYD   (0048) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)     (cms)    (hrs)     (mm)
         ID1= 1 (0052):    38.92    3.573     2.75    40.43
       + ID2= 2 (0047):    34.70    1.430     3.25    43.11
         ====================================================
         ID = 3 (0048):    73.62    4.638     2.75    41.69

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0049) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000       .0000   |    .5970     2.2700
                           .1260       .9730   |    .7450     2.7289
                           .3290      1.4013   |    .8600     3.0794
                           .4890      1.9110   |    .9770     3.4299

                                 AREA     QPEAK     TPEAK       R.V.
                                 (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0048)     73.62      4.64      2.75      41.69
     OUTFLOW: ID= 1 (0049)     73.62       .60      5.67      41.67

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.86
```

```
                  TIME SHIFT OF PEAK FLOW          (min)=175.00
                  MAXIMUM  STORAGE   USED        (ha.m.)= 2.2684

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0053) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17        13.53
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     481.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      51.24        29.52
               over (min)        10.00        25.00
     Storage Coeff.  (min)=       8.57 (ii)   22.72 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=        .12          .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       2.93          .67          3.434 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00           2.75
     RUNOFF VOLUME    (mm)=      54.69        25.02          43.12
     TOTAL RAINFALL   (mm)=      55.69        55.69          55.69
     RUNOFF COEFFICIENT   =        .98          .45            .77


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0055) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   2.5120     1.1572

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0053)     34.70      3.43      2.75      43.12
     OUTFLOW: ID= 1 (0055)     34.70      1.43      3.25      43.11

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.63
                  TIME SHIFT OF PEAK FLOW          (min)= 30.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=  .6596

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0054) |   Area    (ha)=  28.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  67.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.93         9.32
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     434.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      51.24        29.52
               over (min)        10.00        25.00
     Storage Coeff.  (min)=       8.05 (ii)   22.21 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=        .13          .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       2.63          .46          2.985 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00           2.75
     RUNOFF VOLUME    (mm)=      54.69        25.02          44.90
     TOTAL RAINFALL   (mm)=      55.69        55.69          55.69
     RUNOFF COEFFICIENT   =        .98          .45            .81


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0058) |   Area    (ha)=  10.67
|ID= 1 DT= 5.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  56.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.98         4.69
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     266.70        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      51.24        29.52
               over (min)         5.00        25.00
     Storage Coeff.  (min)=       6.01 (ii)   20.17 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .19          .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .85          .24          1.034 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00           2.75
     RUNOFF VOLUME    (mm)=      54.69        25.02          41.63
     TOTAL RAINFALL   (mm)=      55.69        55.69          55.69
     RUNOFF COEFFICIENT   =        .98          .45            .75


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0059) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0054):    28.25   2.985     2.75    44.90
        + ID2= 2 (0058):    10.67   1.034     2.75    41.63
          ================================================
          ID = 3 (0059):    38.92   4.019     2.75    44.00

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0056) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
```

```
--------------------          (ha)     (cms)     (hrs)      (mm)
          ID1= 1 (0055):    34.70    1.430      3.25     43.11
        + ID2= 2 (0059):    38.92    4.019      2.75     44.00
          ================================================
          ID = 3 (0056):    73.62    5.085      2.75     43.58

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0057) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .5970     2.4033
                           .1260     1.0577    |    .7450     2.8737
                           .3290     1.5066    |    .8600     3.2276
                           .4890     2.0346    |    .9770     3.5835

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0056)      73.62      5.08      2.75      43.58
     OUTFLOW: ID= 1 (0057)      73.62       .60      5.67      43.55

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 11.74
                   TIME SHIFT OF PEAK FLOW          (min)=175.00
                   MAXIMUM  STORAGE   USED       (ha.m.)= 2.4031

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   5 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 65.59 mm |    Comments: 25yr/6hr
--------------------
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .25     .00 |  2.00   22.30 |  3.75    9.18 |  5.50    1.31
                 .50    1.31 |  2.25   22.30 |  4.00    5.25 |  5.75    1.31
                 .75    1.31 |  2.50   60.35 |  4.25    5.25 |  6.00    1.31
                1.00    1.31 |  2.75   60.35 |  4.50    2.62 |  6.25    1.31
                1.25    1.31 |  3.00   17.06 |  4.75    2.62 |
                1.50    7.87 |  3.25   17.06 |  5.00    1.31 |
                1.75    7.87 |  3.50    9.18 |  5.25    1.31 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0050) |   Area     (ha)=  21.34
|ID= 1 DT= 5.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  56.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.95         9.39
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     377.20        40.00
     Mannings n           =       .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

```
                    ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                .083     .00 | 1.667    7.87 | 3.250   17.06 |  4.83    1.31
                .167     .00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
                .250     .00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
                .333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
                .417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
                .500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
                .583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
                .667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
                .750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
                .833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
                .917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
               1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
               1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
               1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
               1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
               1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
               1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
               1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
               1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

     Max.Eff.Inten.(mm/hr)=      60.35        38.12
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      6.93 (ii)   19.71 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=       .17          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=      1.99          .66       2.561 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.92        2.75
     RUNOFF VOLUME    (mm)=     64.59        32.60       50.51
     TOTAL RAINFALL   (mm)=     65.59        65.59       65.59
     RUNOFF COEFFICIENT   =       .98          .50         .77


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0046) |   Area     (ha)=  17.58
|ID= 1 DT= 5.0 min |   Total Imp(%)=  47.00   Dir. Conn.(%)=  47.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.26         9.32
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     342.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      60.35        38.12
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      6.54 (ii)   19.32 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=       .18          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=      1.38          .66       1.951 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.92        2.75
     RUNOFF VOLUME    (mm)=     64.59        32.60       47.63
     TOTAL RAINFALL   (mm)=     65.59        65.59       65.59
     RUNOFF COEFFICIENT   =       .98          .50         .73
```

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0052) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0050):    21.34   2.561     2.75    50.51
        + ID2= 2 (0046):    17.58   1.951     2.75    47.63
          ================================================
          ID = 3 (0052):    38.92   4.512     2.75    49.21

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0045) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17         13.53
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     481.00         40.00
     Mannings n           =       .013          .250

     Max.Eff.Inten.(mm/hr)=      60.35         38.12
               over (min)        10.00         25.00
     Storage Coeff.  (min)=       8.02 (ii)    20.80 (ii)
     Unit Hyd. Tpeak (min)=      10.00         25.00
     Unit Hyd. peak  (cms)=        .13           .05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       3.47           .90          4.181 (iii)
     TIME TO PEAK    (hrs)=       2.75          3.00           2.75
     RUNOFF VOLUME    (mm)=      64.59         32.60          52.11
     TOTAL RAINFALL   (mm)=      65.59         65.59          65.59
     RUNOFF COEFFICIENT   =        .98           .50            .79


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0047) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   2.5120     1.1572

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0045)    34.70     4.18      2.75      52.11
     OUTFLOW: ID= 1 (0047)    34.70     1.74      3.25      52.11

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.53
                  TIME SHIFT OF PEAK FLOW         (min)= 30.00

                  MAXIMUM  STORAGE   USED       (ha.m.)=  .8010

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0048) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0052):    38.92   4.512     2.75    49.21
        + ID2= 2 (0047):    34.70   1.737     3.25    52.11
          ================================================
          ID = 3 (0048):    73.62   5.808     2.75    50.58

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0049) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .5970     2.2700
                           .1260      .9730   |    .7450     2.7289
                           .3290     1.4013   |    .8600     3.0794
                           .4890     1.9110   |    .9770     3.4299

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0048)    73.62     5.81      2.75      50.58
     OUTFLOW: ID= 1 (0049)    73.62      .74      5.58      50.55

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.81
                  TIME SHIFT OF PEAK FLOW         (min)=170.00
                  MAXIMUM  STORAGE   USED       (ha.m.)= 2.7268

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0053) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17         13.53
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     481.00         40.00
     Mannings n           =       .013          .250

     Max.Eff.Inten.(mm/hr)=      60.35         38.12
               over (min)        10.00         25.00
     Storage Coeff.  (min)=       8.02 (ii)    20.80 (ii)
     Unit Hyd. Tpeak (min)=      10.00         25.00
     Unit Hyd. peak  (cms)=        .13           .05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       3.47           .90          4.181 (iii)
     TIME TO PEAK    (hrs)=       2.75          3.00           2.75
     RUNOFF VOLUME    (mm)=      64.59         32.60          52.11
     TOTAL RAINFALL   (mm)=      65.59         65.59          65.59
     RUNOFF COEFFICIENT   =        .98           .50            .79


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.
```

```
--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0055) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   2.5120     1.1572

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0053)     34.70      4.18      2.75      52.11
     OUTFLOW: ID= 1 (0055)     34.70      1.74      3.25      52.11

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 41.53
                   TIME SHIFT OF PEAK FLOW         (min)= 30.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  .8010

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0054) |   Area    (ha)=  28.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  67.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.93         9.32
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     434.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      60.35        38.12
               over (min)        10.00        25.00
     Storage Coeff.  (min)=       7.54 (ii)   20.32 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=        .13          .05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       3.11          .63         3.612 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00          2.75
     RUNOFF VOLUME    (mm)=      64.59        32.60         54.03
     TOTAL RAINFALL   (mm)=      65.59        65.59         65.59
     RUNOFF COEFFICIENT   =        .98          .50           .82


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0058) |   Area    (ha)=  10.67
|ID= 1 DT= 5.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  56.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.98         4.69
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     266.70        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      60.35        38.12
               over (min)         5.00        20.00
     Storage Coeff.  (min)=       5.63 (ii)   18.41 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .20          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.00          .34         1.295 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92          2.75
     RUNOFF VOLUME    (mm)=      64.59        32.60         50.51
     TOTAL RAINFALL   (mm)=      65.59        65.59         65.59
     RUNOFF COEFFICIENT   =        .98          .50           .77


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0059) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0054):    28.25    3.612     2.75    54.03
        + ID2= 2 (0058):    10.67    1.295     2.75    50.51
          ================================================
          ID = 3 (0059):    38.92    4.907     2.75    53.07

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0056) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0055):    34.70    1.737     3.25    52.11
        + ID2= 2 (0059):    38.92    4.907     2.75    53.07
          ================================================
          ID = 3 (0056):    73.62    6.203     2.75    52.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0057) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   .5970     2.4033
                           .1260     1.0577   |   .7450     2.8737
                           .3290     1.5066   |   .8600     3.2276
                           .4890     2.0346   |   .9770     3.5835

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0056)     73.62      6.20      2.75      52.62
     OUTFLOW: ID= 1 (0057)     73.62       .74      5.58      52.59

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.01
                   TIME SHIFT OF PEAK FLOW         (min)=170.00
                   MAXIMUM  STORAGE   USED       (ha.m.)= 2.8734

--------------------------------------------------------------------------------
  **************************
  ** SIMULATION NUMBER:   6 **
  **************************


--------------------
```

```
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 73.00 mm |    Comments: 50yr/6hr
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	.00	2.00	24.82	3.75	10.22	5.50	1.46
.50	1.46	2.25	24.82	4.00	5.84	5.75	1.46
.75	1.46	2.50	67.16	4.25	5.84	6.00	1.46
1.00	1.46	2.75	67.16	4.50	2.92	6.25	1.46
1.25	1.46	3.00	18.98	4.75	2.92		
1.50	8.76	3.25	18.98	5.00	1.46		
1.75	8.76	3.50	10.22	5.25	1.46		

```
--------------------
| CALIB            |
| STANDHYD  (0050) |   Area    (ha)=  21.34
|ID= 1 DT= 5.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  56.00
--------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	11.95	9.39
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	377.20	40.00
Mannings n	=	.013	.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	.00	1.667	8.76	3.250	18.98	4.83	1.46
.167	.00	1.750	8.76	3.333	10.22	4.92	1.46
.250	.00	1.833	24.82	3.417	10.22	5.00	1.46
.333	1.46	1.917	24.82	3.500	10.22	5.08	1.46
.417	1.46	2.000	24.82	3.583	10.22	5.17	1.46
.500	1.46	2.083	24.82	3.667	10.22	5.25	1.46
.583	1.46	2.167	24.82	3.750	10.22	5.33	1.46
.667	1.46	2.250	24.82	3.833	5.84	5.42	1.46
.750	1.46	2.333	67.16	3.917	5.84	5.50	1.46
.833	1.46	2.417	67.16	4.000	5.84	5.58	1.46
.917	1.46	2.500	67.16	4.083	5.84	5.67	1.46
1.000	1.46	2.583	67.16	4.167	5.84	5.75	1.46
1.083	1.46	2.667	67.16	4.250	5.84	5.83	1.46
1.167	1.46	2.750	67.16	4.333	2.92	5.92	1.46
1.250	1.46	2.833	18.98	4.417	2.92	6.00	1.46
1.333	8.76	2.917	18.98	4.500	2.92	6.08	1.46
1.417	8.76	3.000	18.98	4.583	2.92	6.17	1.46
1.500	8.76	3.083	18.98	4.667	2.92	6.25	1.46
1.583	8.76	3.167	18.98	4.750	2.92		

Max.Eff.Inten.	(mm/hr)=	67.16	44.75	
over	(min)	5.00	20.00	
Storage Coeff.	(min)=	6.64 (ii)	18.63 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	.18	.06	
				TOTALS
PEAK FLOW	(cms)=	2.21	.80	2.920 (iii)
TIME TO PEAK	(hrs)=	2.75	2.92	2.75
RUNOFF VOLUME	(mm)=	72.00	38.53	57.27
TOTAL RAINFALL	(mm)=	73.00	73.00	73.00
RUNOFF COEFFICIENT	=	.99	.53	.78

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 83.0 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.

```
--------------------
| CALIB            |
| STANDHYD  (0046) |   Area    (ha)=  17.58
|ID= 1 DT= 5.0 min |   Total Imp(%)=  47.00   Dir. Conn.(%)=  47.00
--------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	8.26	9.32
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	342.30	40.00
Mannings n	=	.013	.250

Max.Eff.Inten.	(mm/hr)=	67.16	44.75	
over	(min)	5.00	20.00	
Storage Coeff.	(min)=	6.27 (ii)	18.25 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	.19	.06	
				TOTALS
PEAK FLOW	(cms)=	1.53	.80	2.241 (iii)
TIME TO PEAK	(hrs)=	2.75	2.92	2.75
RUNOFF VOLUME	(mm)=	72.00	38.53	54.26
TOTAL RAINFALL	(mm)=	73.00	73.00	73.00
RUNOFF COEFFICIENT	=	.99	.53	.74

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 83.0 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.

```
--------------------
| ADD HYD   (0052) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
         ID1= 1 (0050):    21.34   2.920     2.75    57.27
       + ID2= 2 (0046):    17.58   2.241     2.75    54.26
         ================================================
         ID = 3 (0052):    38.92   5.161     2.75    55.91

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------
| CALIB            |
| STANDHYD  (0045) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	21.17	13.53
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	1.00
Length	(m)=	481.00	40.00
Mannings n	=	.013	.250

Max.Eff.Inten.	(mm/hr)=	67.16	44.75
over	(min)	10.00	20.00

```
     Storage Coeff.  (min)=       7.69 (ii)   19.67 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=        .13          .06
                                                  *TOTALS*
     PEAK FLOW       (cms)=       3.87         1.13          4.862 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92           2.75
     RUNOFF VOLUME    (mm)=      72.00        38.53          58.94
     TOTAL RAINFALL   (mm)=      73.00        73.00          73.00
     RUNOFF COEFFICIENT   =        .99          .53            .81


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0047) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   2.5120     1.1572

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0045)     34.70      4.86      2.75      58.94
     OUTFLOW: ID= 1 (0047)     34.70      1.99      3.25      58.94

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.89
                TIME SHIFT OF PEAK FLOW         (min)= 30.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  .9158

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0048) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0052):    38.92   5.161     2.75    55.91
        + ID2= 2 (0047):    34.70   1.988     3.25    58.94
          ==========================================================
          ID = 3 (0048):    73.62   6.661     2.75    57.34

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0049) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .5970     2.2700
                           .1260      .9730   |    .7450     2.7289
                           .3290     1.4013   |    .8600     3.0794
                           .4890     1.9110   |    .9770     3.4299

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0048)     73.62      6.66      2.75      57.34
     OUTFLOW: ID= 1 (0049)     73.62       .86      5.50      57.31

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.90
                TIME SHIFT OF PEAK FLOW         (min)=165.00
                MAXIMUM  STORAGE   USED       (ha.m.)= 3.0779
```

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0053) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17         13.53
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     481.00         40.00
     Mannings n           =       .013          .250

     Max.Eff.Inten.(mm/hr)=      67.16         44.75
                 over (min)      10.00         20.00
     Storage Coeff.  (min)=       7.69 (ii)   19.67 (ii)
     Unit Hyd. Tpeak (min)=      10.00         20.00
     Unit Hyd. peak  (cms)=        .13           .06
                                                  *TOTALS*
     PEAK FLOW       (cms)=       3.87         1.13          4.862 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92           2.75
     RUNOFF VOLUME    (mm)=      72.00        38.53          58.94
     TOTAL RAINFALL   (mm)=      73.00        73.00          73.00
     RUNOFF COEFFICIENT   =        .99          .53            .81


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0055) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   2.5120     1.1572

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0053)     34.70      4.86      2.75      58.94
     OUTFLOW: ID= 1 (0055)     34.70      1.99      3.25      58.94

                PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.89
                TIME SHIFT OF PEAK FLOW         (min)= 30.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  .9158

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0054) |   Area    (ha)=  28.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  67.00
--------------------
                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.93          9.32
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          1.00
     Length            (m)=     434.00         40.00
     Mannings n           =       .013          .250

     Max.Eff.Inten.(mm/hr)=      67.16         44.75
                 over (min)       5.00         20.00
     Storage Coeff.  (min)=       7.23 (ii)   19.21 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=        .17           .06
```

```
                                                    *TOTALS*
     PEAK FLOW       (cms)=       3.50          .78          4.187 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92           2.75
     RUNOFF VOLUME    (mm)=      72.00        38.53          60.95
     TOTAL RAINFALL   (mm)=      73.00        73.00          73.00
     RUNOFF COEFFICIENT   =        .99          .53            .83


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0058) |   Area    (ha)=  10.67
|ID= 1 DT= 5.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  56.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.98         4.69
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     266.70        40.00
     Mannings n             =     .013         .250

     Max.Eff.Inten.(mm/hr)=      67.16        44.75
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       5.40 (ii)   17.38 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .21          .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.11          .41          1.477 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92           2.75
     RUNOFF VOLUME    (mm)=      72.00        38.53          57.27
     TOTAL RAINFALL   (mm)=      73.00        73.00          73.00
     RUNOFF COEFFICIENT   =        .99          .53            .78


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0059) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0054):    28.25   4.187     2.75    60.95
        + ID2= 2 (0058):    10.67   1.477     2.75    57.27
          ================================================
          ID = 3 (0059):    38.92   5.663     2.75    59.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0056) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0055):    34.70   1.988     3.25    58.94
        + ID2= 2 (0059):    38.92   5.663     2.75    59.94
          ================================================
          ID = 3 (0056):    73.62   7.164     2.75    59.47

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0057) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          .0000      .0000    |    .5970     2.4033
                          .1260     1.0577    |    .7450     2.8737
                          .3290     1.5066    |    .8600     3.2276
                          .4890     2.0346    |    .9770     3.5835

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0056)     73.62      7.16      2.75      59.47
     OUTFLOW: ID= 1 (0057)     73.62       .86      5.50      59.44

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.00
                  TIME SHIFT OF PEAK FLOW          (min)=165.00
                  MAXIMUM  STORAGE   USED       (ha.m.)= 3.2274

--------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   7 **
  ****************************


--------------------
|    READ STORM    |    Filename: G:\Projects\2008\
|                  |              08104 - Vaughan Corporate Centre - Master Ser
|                  |              \Design\SWM\VO2 model\STORM\6 and 12 hour AES
| Ptotal= 80.31 mm |    Comments: 100yr/6hr
--------------------
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
               .25     .00 |  2.00   27.30 |  3.75   11.24 |  5.50    1.61
               .50    1.61 |  2.25   27.30 |  4.00    6.42 |  5.75    1.61
               .75    1.61 |  2.50   73.88 |  4.25    6.42 |  6.00    1.61
              1.00    1.61 |  2.75   73.88 |  4.50    3.21 |  6.25    1.61
              1.25    1.61 |  3.00   20.88 |  4.75    3.21 |
              1.50    9.64 |  3.25   20.88 |  5.00    1.61 |
              1.75    9.64 |  3.50   11.24 |  5.25    1.61 |

--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD  (0050) |   Area    (ha)=  21.34
|ID= 1 DT= 5.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  56.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.95         9.39
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     377.20        40.00
     Mannings n             =     .013         .250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
```

```
                .083     .00 | 1.667    9.64 | 3.250   20.88 |  4.83    1.61
                .167     .00 | 1.750    9.64 | 3.333   11.24 |  4.92    1.61
                .250     .00 | 1.833   27.30 | 3.417   11.24 |  5.00    1.61
                .333    1.61 | 1.917   27.30 | 3.500   11.24 |  5.08    1.61
                .417    1.61 | 2.000   27.30 | 3.583   11.24 |  5.17    1.61
                .500    1.61 | 2.083   27.30 | 3.667   11.24 |  5.25    1.61
                .583    1.61 | 2.167   27.30 | 3.750   11.24 |  5.33    1.61
                .667    1.61 | 2.250   27.30 | 3.833    6.42 |  5.42    1.61
                .750    1.61 | 2.333   73.88 | 3.917    6.42 |  5.50    1.61
                .833    1.61 | 2.417   73.88 | 4.000    6.42 |  5.58    1.61
                .917    1.61 | 2.500   73.88 | 4.083    6.42 |  5.67    1.61
               1.000    1.61 | 2.583   73.88 | 4.167    6.42 |  5.75    1.61
               1.083    1.61 | 2.667   73.88 | 4.250    6.42 |  5.83    1.61
               1.167    1.61 | 2.750   73.88 | 4.333    3.21 |  5.92    1.61
               1.250    1.61 | 2.833   20.88 | 4.417    3.21 |  6.00    1.61
               1.333    9.64 | 2.917   20.88 | 4.500    3.21 |  6.08    1.61
               1.417    9.64 | 3.000   20.88 | 4.583    3.21 |  6.17    1.61
               1.500    9.64 | 3.083   20.88 | 4.667    3.21 |  6.25    1.61
               1.583    9.64 | 3.167   20.88 | 4.750    3.21 |

     Max.Eff.Inten.(mm/hr)=      73.88        51.42
               over (min)         5.00        20.00
     Storage Coeff.  (min)=       6.40 (ii)   17.73 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .18          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.44          .94      3.282 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92       2.75
     RUNOFF VOLUME    (mm)=      79.31        44.54      64.01
     TOTAL RAINFALL   (mm)=      80.31        80.31      80.31
     RUNOFF COEFFICIENT   =        .99          .55        .80


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0046) |   Area    (ha)=  17.58
|ID= 1 DT= 5.0 min |   Total Imp(%)=  47.00   Dir. Conn.(%)=  47.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.26         9.32
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     342.30        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      73.88        51.42
               over (min)         5.00        20.00
     Storage Coeff.  (min)=       6.03 (ii)   17.37 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .19          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.69          .94      2.533 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92       2.75
     RUNOFF VOLUME    (mm)=      79.31        44.54      60.88
     TOTAL RAINFALL   (mm)=      80.31        80.31      80.31
     RUNOFF COEFFICIENT   =        .99          .55        .76


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| ADD HYD   (0052) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0050):    21.34   3.282     2.75    64.01
        + ID2= 2 (0046):    17.58   2.533     2.75    60.88
          ================================================
          ID = 3 (0052):    38.92   5.815     2.75    62.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0045) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17        13.53
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     481.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      73.88        51.42
               over (min)         5.00        20.00
     Storage Coeff.  (min)=       7.40 (ii)   18.74 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .17          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       4.30         1.33      5.481 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92       2.75
     RUNOFF VOLUME    (mm)=      79.31        44.54      65.75
     TOTAL RAINFALL   (mm)=      80.31        80.31      80.31
     RUNOFF COEFFICIENT   =        .99          .55        .82


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0047) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |   2.5120     1.1572

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0045)       34.70      5.48      2.75      65.75
     OUTFLOW: ID= 1 (0047)       34.70      2.21      3.25      65.75

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.30
                  TIME SHIFT OF PEAK FLOW          (min)= 30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)= 1.0181

--------------------------------------------------------------------------------
```

```
--------------------
| ADD HYD   (0048) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
          ID1= 1 (0052):    38.92    5.815     2.75    62.60
         + ID2= 2 (0047):    34.70    2.209     3.25    65.75
           ================================================
           ID = 3 (0048):    73.62    7.607     2.75    64.08

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0049) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |    .5970     2.2700
                           .1260      .9730    |    .7450     2.7289
                           .3290     1.4013    |    .8600     3.0794
                           .4890     1.9110    |    .9770     3.4299

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0048)     73.62      7.61      2.75      64.08
     OUTFLOW: ID= 1 (0049)     73.62       .98      5.42      64.06

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.84
                   TIME SHIFT OF PEAK FLOW         (min)=160.00
                   MAXIMUM  STORAGE   USED       (ha.m.)= 3.4284

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0053) |   Area    (ha)=  34.70
|ID= 1 DT= 5.0 min |   Total Imp(%)=  61.00   Dir. Conn.(%)=  61.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      21.17        13.53
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     481.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      73.88        51.42
                 over (min)       5.00        20.00
     Storage Coeff.  (min)=       7.40 (ii)   18.74 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .17          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       4.30         1.33      5.481 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92       2.75
     RUNOFF VOLUME    (mm)=      79.31        44.54      65.75
     TOTAL RAINFALL   (mm)=      80.31        80.31      80.31
     RUNOFF COEFFICIENT   =        .99          .55        .82


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0055) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000    |   2.5120     1.1572

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0053)     34.70      5.48      2.75      65.75
     OUTFLOW: ID= 1 (0055)     34.70      2.21      3.25      65.75

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.30
                   TIME SHIFT OF PEAK FLOW         (min)= 30.00
                   MAXIMUM  STORAGE   USED       (ha.m.)= 1.0181

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0054) |   Area    (ha)=  28.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  67.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      18.93         9.32
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     434.00        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      73.88        51.42
                 over (min)       5.00        20.00
     Storage Coeff.  (min)=       6.96 (ii)   18.29 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .17          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       3.85          .92      4.677 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92       2.75
     RUNOFF VOLUME    (mm)=      79.31        44.54      67.84
     TOTAL RAINFALL   (mm)=      80.31        80.31      80.31
     RUNOFF COEFFICIENT   =        .99          .55        .84


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0058) |   Area    (ha)=  10.67
|ID= 1 DT= 5.0 min |   Total Imp(%)=  56.00   Dir. Conn.(%)=  56.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.98         4.69
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         1.00
     Length            (m)=     266.70        40.00
     Mannings n           =       .013         .250

     Max.Eff.Inten.(mm/hr)=      73.88        51.42
                 over (min)       5.00        20.00
     Storage Coeff.  (min)=       5.19 (ii)   16.53 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .21          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.22          .48      1.659 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.92       2.75
```

```
     RUNOFF VOLUME     (mm)=      79.31        44.54          64.01
     TOTAL RAINFALL    (mm)=      80.31        80.31          80.31
     RUNOFF COEFFICIENT   =        .99          .55            .80


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  83.0    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.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0059) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0054):    28.25   4.677     2.75    67.84
       + ID2= 2 (0058):    10.67   1.659     2.75    64.01
         ================================================
         ID = 3 (0059):    38.92   6.336     2.75    66.79

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------

--------------------
| ADD HYD   (0056) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0055):    34.70   2.209     3.25    65.75
       + ID2= 2 (0059):    38.92   6.336     2.75    66.79
         ================================================
         ID = 3 (0056):    73.62   8.128     2.75    66.30

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0057) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                           .0000      .0000   |    .5970     2.4033
                           .1260     1.0577   |    .7450     2.8737
                           .3290     1.5066   |    .8600     3.2276
                           .4890     2.0346   |    .9770     3.5835

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0056)     73.62      8.13      2.75      66.30
     OUTFLOW: ID= 1 (0057)     73.62       .98      5.42      66.27

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.02
                   TIME SHIFT OF PEAK FLOW         (min)=160.00
                   MAXIMUM  STORAGE   USED       (ha.m.)= 3.5833

--------------------------------------------------------------------------------

 FINISH
================================================================================================
==============
```