GO Transit

Whitby Rail Maintenance Facility Stormwater Management Report

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Table of Contents

List of Figures

List of Tables

Appendices

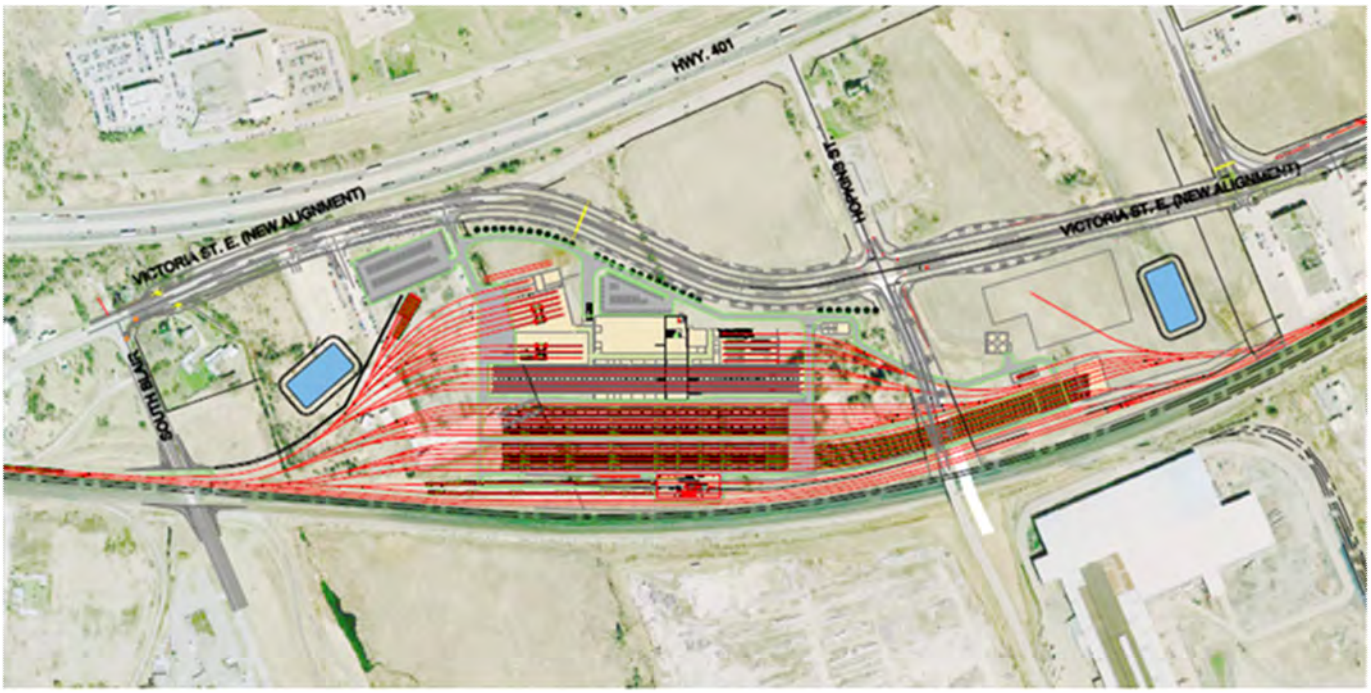
1. Introduction

AECOM Canada Ltd. was retained by GO Transit to complete an Environmental Assessment (EA) and preliminary design for the expansion of rail service from Oshawa to Bowmanville on the Lakeshore East Corridor.

The EA study area extends from Brock Street in Whitby to the Darlington-Clarke Town line (Regional Road 42), near the Highway 401/Highway 35/115 interchange. Previous feasibility studies completed for GO Transit recommended expansion in the CP corridor (rather than the CN corridor to the south), and recommended a new rail maintenance facility west of Thickson Road in the Town of Whitby. A new track is required to connect the existing GO service in the CN corridor to the CP corridor east of Thickson Road.

This report documents the stormwater management plan for the proposed GO Rail Maintenance Facility. The proposed maintenance facility site is bounded by the future realigned Victoria Street to the North, the CN corridor to the south, South Blair Street to the west and Thickson Road to the east (See Figure 1.1). The site drains to both the Pringle Creek and Corbett Creek watersheds. Both watersheds are managed by the Central Lake Ontario Conservation Authority (CLOCA).

Figure 1.1. Study Area



2. Existing Conditions

2.1 Land Use

Land use through the study area was established based on aerial photography and was found to be predominantly agricultural, with some commercial and industrial developments in and adjacent the study area. A Honda dealership was recently constructed on the south side of Victoria Street, just east of the tributary of Pringle Creek at the west limit of the study area. The site appears to have an independent stormwater management system discharging directly to the tributary of Pringle Creek, and was therefore omitted from the study area. Immediately east of the Honda dealership is a recently demolished industrial building. The concrete pad and parking areas associated with the demolished building remain on the site. Finally, a large RONA retail development was recently constructed on the south side of Victoria Street, east of Hopkins Street. This development also has a stormwater management pond to treat runoff from the site, and was excluded from the study area.

From South Blair Street to west of Thickson Road, Victoria Street is parallel and immediately adjacent the south side of Highway 401. It is planned (by others) to shift Victoria Street southward east and west of Hopkins Street, as shown on Figure 1.1.

2.2 Topography & Drainage

The topography through the majority of the study area is relatively flat. There is a height of land east of Hopkins Street that divides the Corbett Creek and Pringle Creek watersheds. The land slopes relatively steeply from this point west to Hopkins Street, crossing under Hopkins Street by means of a culvert approximately 200 m south of Victoria Street and by means of the existing ditch on the north side of the CN tracks. The topography becomes much less steep (< 1%) west of Hopkins Street, but continues to slope in a westerly direction to the tributary of Pringle Creek just east of South Blair Street. The tributary of Pringle Creek flows in a northerly direction, crossing under Victoria Street and joining the main branch of Pringle Creek immediately south of Highway 401. Pringle Creek flows westerly from the confluence before turning south and flowing into Whitby Harbour.

East of the high point (east of Hopkins Street), the land slopes to the east and south, eventually draining to the ditch on the north side of the CN tracks. This ditch flows eastward and empties into West Corbett Creek just west of Thickson Road. West Corbett Creek continues southerly under the CN tracks in a highly modified channel on the west side of Thickson Road.

There is also an area north of Highway 401 that crosses under the highway through a culvert and continues into the site. This external area is described in the Functional Servicing Report for the proposed future Lebovic Industrial Development at the south west corner of the intersection of the existing Victoria Street and Hopkins Street (Sernas, Associates, 1996). It is 18 ha in size, and is almost entirely developed with commercial and industrial land use. It drains into the site west of Hopkins Street, and drains through the site to the tributary of Pringle Creek east of South Blair Street.

2.3 Soils

Information on the soils through the study area was taken from available agricultural soils mapping (Ontario Soil Survey Report No. 23), for Ontario County. The predominant soils through the study area are Darlington loam and Simcoe clay loam, with limited areas of Smithville clay loam. Darlington loam and Simcoe clay loam are both classified as Type C soils using the SCS soil classification system. Smithfield clay loam is classified as a Type CD soil. All three soil types have limited infiltration capacity.

2.4 Hydrologic Model Development

The Central Lake Ontario Conservation Authority (CLOCA) Technical Guidelines for Stormwater Management Submissions were referenced in preparing the hydrologic models for the study area. The CLOCA recommends that flow rates are determined using a hydrologic model approved by the Authority, such as SWMHYMO. The SWMHYMO hydrology model is an event based hydrology model that is widely used throughout Ontario, and is appropriate for this application. The above information on drainage areas, land cover and soils was used to develop a SWMHYMO hydrology model for the area.

The study area was broken up into 4 sub-catchments with the aid of 1 m contour mapping and air photos. The delineated drainage areas are presented in Figure 2.1.

Figure 2.1. Existing Drainage Areas

Each of the four sub-catchments were represented in the SWMHYMO model using the CALIB NAHSHYD command. This command is recommended for modelling rural drainage areas, and requires a Curve Number (CN), Initial Abstraction depth (Ia) and Time to Peak (Tp) as input.

The Curve Number and Initial Abstraction values are based on soil and land cover. The Curve number values were calculated with aid of tables from the MTO Drainage Management Manual and the CLOCA guidelines. Initial abstraction was calculated as 7.5% of soil moisture (as determined from CN), and the resulting values agree closely with the typical values included in the CLOCA guidelines. Time to Peak is based on the catchment area, land cover and the length and slope of the flow path to the catchment outlet. As recommended by the CLOCA guidelines, Tp was calculated using the Airport equation. The calculated values are presented in Table 2.1. In addition, the 18 ha

area north of Highway 401 was included in the hydrology model. The SWMHYMO model parameters used to represent the area in the modelling previously prepared by Sernas (1996) for the Lebovic Industrial site were maintained for the subject analysis.

Table 2.1. SWMHYMO Input Parameters – Existing Conditions

Area ID	Drainage Area (ha)	Catchment length (m)	Slope (%)	Tp (hr)	CN	Ia (mm)
A1	8.01	462	0.6	0.72	76.0	6.0
A2	4.99	312	2.6	0.38	78.6	5.2
A3	2.06	195	3.6	0.27	76.0	6.0
A4	28.87	819	0.9	0.46	79.0	5.0

The ROUTE CHANNEL command in SWMHYMO was used to account for the attenuation of flows as they travel from the areas east of Hopkins Street and form the area north of Highway 401 to the tributary of Pringle Creek. The ROUTE channel command was based on a representative channel cross section and the length and slope of the flow paths from the catchments to the system outlet at the tributary of Pringle Creek.

The CLOCA Stormwater Management Guidelines recommend that the design storm events used in hydrologic modelling be based on the distributions used for any watershed modelling exercises, and that the 1 hour AES and 24 hour SCS distributions also be used in the analyses.

The Pringle Creek Master Drainage Plan Update (Dillon, April 1999) was obtained from CLOCA. The 12 hour Chicago storm distribution was selected for the watershed model, using the rainfall intensities from the long term Toronto Bloor Street gauge. These storms were re-created for the subject modelling exercise, and the 1 hour AES and the 24 hour SCS design storms were taken from the tables included in Appendix C of the CLOCA guidelines

2.5 Hydrology Model Output

The output from the hydrology model for the 2 year through 100 year storm events are summarized in Table 2.2. The SWMHYMO modelling found that the 12 hour Chicago storms generate higher peak flow rates than the other two rainfall distributions. Note that the peak flow rates summarized in Table 2.2 do not include the flows from the 18 ha external area north of Highway 401. It is assumed that the flows from this area will be diverted around the proposed maintenance yard and will discharge directly to Pringle Creek. The pre-development peak flow rates therefore only reflect the areas impacted by and draining through the proposed maintenance yard property. The detailed SWMHYMO output files are provided in Appendix A.

Table 2.2. SWMHYMO Model Output – Pringle Creek Drainage Area

Rainfall Distribution	2 year flow (m^3/s)	5 year flow (m^3/s)	10 year flow (m^3/s)	25 year flow (m^3/s)	50 year flow (m^3/s)	100 year flow (m^3/s)
12 hr Chicago	0.91	1.56	2.06	2.73	3.22	3.75
1 hr AES	0.44	0.87	1.22	1.71	2.12	2.54
24 hr SCS	0.43	0.67	0.84	1.07	1.25	1.44

Table 2.3. SWMHYMO Model Output – Corbett Creek Drainage Area

Rainfall Distribution	2 year flow (m^3/s)	5 year flow (m^3/s)	10 year flow (m^3/s)	25 year flow (m^3/s)	50 year flow (m^3/s)	100 year flow (m^3/s)
12 hr Chicago	0.14	0.24	0.32	0.42	0.49	0.58
1 hr AES	0.05	0.11	0.16	0.23	0.28	0.34
24 hr SCS	0.07	0.12	0.15	0.19	0.23	0.26

3. Proposed Conditions

The site is proposed to be developed for a rail maintenance facility to allow GO Transit to handle rail equipment maintenance for the future expanded rail network. There is an existing rail maintenance facility in Etobicoke. The location of this site enables GO Transit to develop a balanced approach to rail equipment maintenance. In addition, GO Transit will be in a better position to manage the regulated inspections and maintenance on the entire train fleet once these two facilities are in operation.

This facility will cover approximately 30 ha of land, and will enable GO Transit to rebuild its engines and coaches, paint its equipment, wash its equipment on a regular basis, undertake regulated inspections and light maintenance and repair, and repair and replace train wheels. The facility will have stores for supplies and office space for the management of this facility. Trains will be fuelled here and approximately 18, 12-car train sets will be able to be stored here and put onto electrical land lines and turned off when not in use. From this rail yard, trains will be started and sent into revenue service. This will enable train operators or crews to start and end their day from the crew center in this facility.

The rail maintenance facility site will be re-graded to enable the train yard to be built below the entrance points in a dished fashion. This is necessary as an additional safety measure to prevent cars from rolling away from the yard.

The Whitby Rail Maintenance Facility (WRMF) will be designed to Leadership in Energy and Environmental Design (LEED) standards by utilizing environmentally friendly building practices during design and construction. Specific LEED measures for stormwater management and rainwater harvesting have not yet been established. The hydrologic modelling completed for proposed conditions has conservatively not included any runoff reduction practices typical of LEED developments (green roofs, permeable paving, etc).

3.1 Stormwater Management Criteria

Stormwater management criteria for the proposed maintenance yard were taken from the Central Lake Ontario Conservation Authority (CLOCA) Technical Guidelines for Stormwater Management Submissions and the Pringle Creek Master Drainage Plan Update (Dillon, 1996). The applicable criteria are listed in Table 3.1.

Table 3.1. Stormwater Management Criteria

Watershed	Water Quality	Water quantity	Water balance	Stream erosion
Pringle Creek	Enhanced (Level 1, 80% TSS Removal)	Quantity control (2-100 year)	Required for all sites with remedial measure to match pre & post development recharge	Extended detention storage of 25 mm storm (4 hr Chicago) for 24 hrs
Corbett Creek	Enhanced (Level 1, 80% TSS Removal)	Quantity control (2-100 & Regional Storm)	Required for all sites with remedial measure to match pre & post development recharge	Extended detention storage of 25 mm storm for 24-48 hrs

3.2 Hydrology

The hydrology model developed for the existing conditions analysis was modified to represent the proposed development of the rail maintenance facility and surrounding future development.

The proposed rail maintenance facility is shown in Figure 3.1. The facility is generally bounded by the CN tracks to the south and the future realigned Victoria Street to the north. The central yard area will be hard surfaced (buildings and pavement), but traditional granular ballast will be used for the track areas east and west of the maintenance bays.

The hydrology model was also modified to represent the future re-aligned Victoria Street, and future development of the lands south of Highway 401 and west of Hopkins Street for commercial/industrial use. Three separate drainage areas were delineated to represent the rail maintenance facility, the future commercial/industrial lands and the future realigned Victoria Street. These catchment areas are shown on Figure 3.1.

Stormwater management for the proposed development of the lands south of Highway 401 and west of Hopkins Street was documented in the Functional Servicing Report for the Lebovic Industrial Development(Sernas, Associates, 1996). The report recommended 250 m^3/ha of on-site storage to reduce peak flow rates, with quality and erosion control provided in an off-site pond. The on-site storage of 250 m^3/ha was maintained for the subject analyses. Hydrology model parameters for the proposed industrial site and Victoria Street right-of-way were maintained from the previous modelling by Sernas (1996). These parameters were reviewed and found to be reasonable.

The key hydrology model input parameters are included in Table 3.2.

Table 3.2. SWMHYMO Input Parameters – Proposed Conditions

Area ID	Description	Drainage Area (ha)	Percent Impervious	Impervious Area Ia (mm)	Pervious Area CN	Pervious Area Ia (mm)
P1	Future Industrial	4.51	90	1	76	6
P2	Victoria Street	2.49	60	1	76	6
P3	Maintenance Facility	25.2	32	1	76	6

Note that the hydrology model does not include the areas draining eastward to Corbett Creek. Recall that for safety reasons, the tracks must be graded to create a ‘dish’ in the middle of the yard. This requires that the track area east of Hopkins Street must be re-graded to flow westward into the yard. The diversion in drainage area between Corbett Creek and Pringle Creek will be balanced by re-grading the area south of the future re-aligned Victoria Street and east of Hopkins Street to flow eastward to Corbett Creek. This area will include a yard store and other ancillary uses. A stormwater management pond is not necessary for this area. The limited impervious surface areas can be managed using low impact development practices.

The proposed conditions hydrology model was simulated using the same design storms used for the existing conditions modelling. The results are summarized in Table 3.3 for the 12 hour Chicago storms. It is evident that without stormwater quantity controls, the proposed development will result in significant increases in peak flow rates. A stormwater management pond is necessary to control the quantity and quality of runoff from the site before it is discharged to the tributary of Pringle Creek.

Figure 3.1. Proposed Drainage Areas

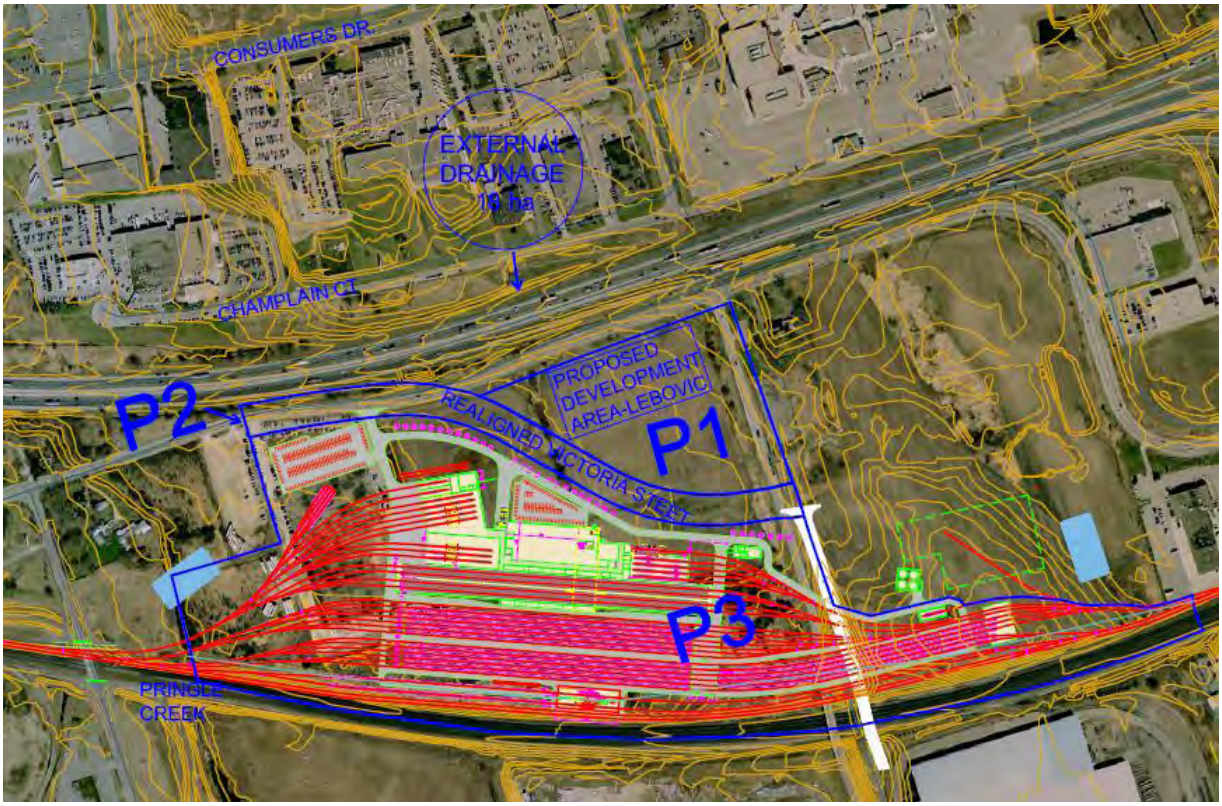


Table 3.3. Post Development Peak Flow Rates (12 Hour Chicago Storm)

Scenario	2 year flow (m^3/s)	5 year flow (m^3/s)	10 year flow (m^3/s)	25 year flow (m^3/s)	50 year flow (m^3/s)	100 year flow (m^3/s)
Existing Conditions	0.91	1.56	2.06	2.73	3.22	3.75
Proposed Conditions (Uncontrolled)	1.96	1.56	2.08	2.72	3.21	3.74

3.3 Stormwater Management Pond Design

3.3.1 Water Quality

Pringle Creek requires Enhanced water quality protection (80 % TSS Removal). Water quality control is achieved through a stormwater management wet pond with an appropriately sized permanent pool. The MOE Stormwater Management Planning and Design Manual provides unit storage requirements for water quality control based on imperviousness The total area draining through the site, including the Victoria Street right-of-way and the future industrial development west of Hopkins Street, is 32.2 ha with an average imperviousness of 42%. To achieve Enhanced water quality protection, a permanent pool volume of 32.2 ha x (165 m^3/ha - 40 m^3/ha) = 4025 m^3.

3.3.2 Extended Detention

To prevent excessive streambank erosion in Pringle Creek, it is necessary to store the runoff from a 25 mm storm event and slowly release it over a period of at least 24 hours. The proposed conditions SWMHYMO model was simulated with a 4 hour, 25 mm storm, and calculated a total runoff volume of 4035 m^3. This volume will be stored in the pond within the first 1 m above the permanent pool and slowly released over a period of at least 24 hours.

3.3.3 Peak Flow Attenuation

The SWMHYMO model was used to calculate the storage volume required in the pond (including the extended detention storage) to control post-development peak flow rates to pre-development levels for the 2 year through 100 year storm events. All three storm distributions (1 hour AES, 12 hour Chicago, 24 hour SCS) were simulated, and it was determined that the 12 hour Chicago storm generated the largest storage volumes.

The model output for the 12 hour Chicago storm is presented in Table 3.4. A total active storage volume of 8,550 m^3 is required to control post development peak flow rates to pre-development levels for up to the 100 year storm event.

Table 3.4. Post Development Controlled Peak Flow Rates (12 Hour Chicago Storms)

Storm Event	Pre-Development Flow Rate (m^3/s)	Peak Flow Rate to Pond (m^3/s)	Controlled Discharge from Pond (m^3/s)	Maximum Storage Used (m^3)
25 mm	-	0.71	0.05	4035
2 year	0.91	1.96	0.91	4441
5 year	1.56	3.30	1.56	5302
10 year	2.06	4.15	2.08	6072
25 year	2.73	5.20	2.72	6955
50 year	3.22	6.00	3.21	7632
100 year	3.75	7.07	3.74	8547

3.3.4 Pond Configuration

A preliminary grading plan for the maintenance yard has not been completed, and it is therefore not possible to prepare an accurate preliminary design plan for the pond. However, several conservative assumptions have been used to estimate the potential area required for a pond that can provide the storage volumes calculated above.

Assuming a maximum extended detention storage zone depth of 1 m, a maximum total active storage zone depth of 2 m, and a maximum permanent pool depth of 2 m, an area of at least 0.75 ha is required for the stormwater management pond. The pond must be located near Pringle Creek and at a sufficiently low elevation to drain the proposed maintenance yard and outlet to the creek.

The current concept plan for the proposed maintenance yard does not include a sufficient area for a stormwater management pond. The only suitable area available for a stormwater management pond is a small site located on the east side of Pringle Creek, between the tracks and a recent commercial development to the north (See Figure 3.2). Unfortunately, this area is less than 0.4 ha in size and can only provide approximately 50 % of the required storage.

Figure 3.2. Potential SWM Pond Location

There are several options available to provide the remainder of the required storage volume.

- **Reduce storm runoff from the site:** The permanent pool and active storage volumes required in the pond could be reduced if runoff from the proposed maintenance yard were reduced. There are a number of emerging techniques, referred to as Low Impact Development (LID) practices, which could be implemented on the site. These include green roofs on the buildings, permeable pavement on parking lots and laneways, bioretention swales, infiltration trenches, and storing runoff in cisterns for re-use in irrigation and greywater systems. Implementation of some or all of these techniques could reduce the volumes required in the pond, and may also achieve additional LEED credits.

- **Underground storage:** While more expensive than traditional open stormwater management ponds, the additional storage volumes could be provided in oversized pipes or tanks installed below the tracks and/or parking areas on the west half of the site. There are several manufacturers of concrete and plastic modular underground storage units that can be designed to support heavy vehicles.

- **Expand the stormwater management pond to the north:** The current concept plans for the maintenance yard and stormwater management pond have avoided the commercial development on the south side of Victoria Street, east of Pringle Creek (Durham Honda Powerhouse, 609 Victoria Street East). This site was developed within the last few years, and the owners are unlikely to want to re-locate. However, if the property could be acquired, it would be large enough and ideally located for the required stormwater management pond.

- **Shift the maintenance yard to the east:** At the time of this report, there have been some discussions regarding closing Hopkins Street south of the future realigned Victoria Street, and providing an alternative access from South Blair Street to the industrial developments south of the CN corridor. If this were to occur, there would be more flexibility to shift the track entrance and exit to the proposed maintenance yard further to the east. This would free up additional land for a larger stormwater management pond that could provide the required storage volumes.

These and other alternatives to provide adequate stormwater quantity and quality control for the site will be explored during the next stage of design.

3.4 Water Balance

The CLOCA stormwater management guidelines require existing average annual groundwater recharge rates be maintained following development. The proposed development includes several buildings, parking lots and paved internal access routes. If not mitigated, these areas will prevent infiltration and groundwater recharge.

Potential measures to mitigate impacts on groundwater recharge include the following:

- Use of permeable pavement in parking lots and laneways
- Bio-retention swales to treat and infiltrate runoff
- Cisterns to collect water from building rooftops for irrigation of landscaped areas.

Other potential measures to reduce post-development runoff volumes include rainwater harvesting for re-use in greywater systems (flushing toilets and/or washing train cars) and green roofs.

As described in Section 3.3.4, these measures could also reduce the size of the stormwater management pond and assist in achieving several different LEED credits.

The water balance measures for the site will be determined during the next stage of design.

4. Summary

AECOM Canada Ltd. was retained by GO Transit to complete an Environmental Assessment (EA) and preliminary design for the expansion of rail service from Oshawa to Bowmanville on the Lakeshore East Corridor. Previous feasibility studies completed for GO Transit recommended expansion in the CP corridor (rather than the CN corridor to the south), and recommended a new rail maintenance facility west of Thickson Road in the Town of Whitby. This report has been prepared to determine the stormwater management requirements for the proposed rail maintenance facility.

The majority of the proposed maintenance yard will drain to Pringle Creek to the east. It will be necessary to provide Enhanced water quality protection, detain the runoff from a 25 mm storm for at least 24 hours, and control post-development peak flow rates to pre-development levels for the 2 year through 100 year storm events.

A wet detention pond is proposed to achieve the applicable stormwater management criteria. It must have a permanent pool volume of at least 4,025 m^3, an extended detention volume of at least 4,035 m^3, and a total active storage volume of at least 8,550 m^3. While concept grading plans have not yet been prepared for the maintenance yard and pond, it is estimated that an area of at least 0.75 ha is required for the stormwater management pond.

The current conceptual maintenance yard design does not include sufficient room for the require pond. The only open area available for a stormwater management pond would provide approximately half of the required storage volumes. It may be possible to reduce the required storage volumes through application of Low Impact Development practices in the maintenance yard, provide the additional storage underground, purchase additional property for the stormwater management pond, or shift the yard to the east to create additional room for the pond.

Opportunities to reduce and provide the required stormwater management storage volumes will be explored further during the next stage of design.

Appendix A

SWMHYMO Output

Existing Conditions
12 Hour Chicago Storms

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      StormWater Management HYdrologic Model           999    999  =========

 **************************************************************************
 ************************** SWMHYMO-99 Ver/4.02 ***************************
 *******  A single event and continuous hydrologic simulation model  *******
 *******     based on the principles of HYMO and its successors      *******
 *******                 OTTHYMO-83 and OTTHYMO-89.                  *******
 **************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.          *******
 *******                   Ottawa,  Ontario: (613) 727-5199         *******
 *******                   Gatineau, Quebec: (819) 243-6858         *******
 *******                   E-Mail: swmhymo@jfsa.Com                 *******
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*#  Modeller    : [  E. Liu      ]
*#  Company     : UMA Engineering Ltd.
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*#****TORONTO BLOOR ST DATA --12 HOURS 10 YEAR CHICAGO STORM ******************
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.08	1.916	3.08	4.939	6.08	4.483	9.08	2.498
.17	1.943	3.17	5.261	6.17	4.371	9.17	2.472
.25	1.971	3.25	5.643	6.25	4.266	9.25	2.447
.33	2.000	3.33	6.105	6.33	4.167	9.33	2.423
.42	2.030	3.42	6.679	6.42	4.074	9.42	2.399
.50	2.061	3.50	7.414	6.50	3.986	9.50	2.376
.58	2.093	3.58	8.400	6.58	3.902	9.58	2.354
.67	2.127	3.67	9.811	6.67	3.823	9.67	2.332
.75	2.162	3.75	12.051	6.75	3.748	9.75	2.310
.83	2.199	3.83	16.360	6.83	3.677	9.83	2.289
.92	2.237	3.92	30.652	6.92	3.609	9.92	2.269
1.00	2.277	4.00	107.213	7.00	3.544	10.00	2.249
1.08	2.319	4.08	37.801	7.08	3.482	10.08	2.229
1.17	2.363	4.17	23.535	7.17	3.423	10.17	2.210
1.25	2.409	4.25	17.934	7.25	3.366	10.25	2.191
1.33	2.457	4.33	14.814	7.33	3.311	10.33	2.173
1.42	2.509	4.42	12.784	7.42	3.259	10.42	2.155
1.50	2.562	4.50	11.339	7.50	3.209	10.50	2.138
1.58	2.619	4.58	10.249	7.58	3.161	10.58	2.120
1.67	2.680	4.67	9.392	7.67	3.114	10.67	2.100
1.75	2.744	4.75	8.696	7.75	3.070	10.75	2.104
1.83	2.812	4.83	8.119	7.83	2.985	10.83	2.087
1.92	2.884	4.92	7.631	7.92	2.945	10.92	2.071
2.00	2.962	5.00	7.211	8.00	2.906	11.00	2.055
2.08	3.045	5.08	6.846	8.08	2.868	11.08	2.039
2.17	3.135	5.17	6.524	8.17	2.832	11.17	2.024
2.25	3.231	5.25	6.239	8.25	2.797	11.25	2.009
2.33	3.335	5.33	5.983	8.33	2.763	11.33	1.994
2.42	3.449	5.42	5.753	8.42	2.730	11.42	1.980
2.50	3.573	5.50	5.544	8.50	2.698	11.50	1.966
2.58	3.709	5.58	5.353	8.58	2.667	11.58	1.952
2.67	3.859	5.67	5.179	8.67	2.637	11.67	1.938
2.75	4.026	5.75	5.018	8.75	2.607	11.75	1.925
2.83	4.213	5.83	4.869	8.83	2.579	11.83	1.912
2.92	4.423	5.92	4.731	8.92	2.551	11.92	1.899
3.00	4.663	6.00	4.603	9.00	2.524	12.00	1.886

```
--------------------------------------------------------------------------------
001:0003----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    8.00   Curve Number   (CN)=76.00
| 01:  100  DT= 5.00 |   Ia      (mm)=   6.020   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .720

     Unit Hyd Qpeak  (cms)=     .424
```

```
     PEAK FLOW       (cms)=     .139 (i)
     TIME TO PEAK    (hrs)=    4.917
     RUNOFF VOLUME    (mm)=   23.522
     TOTAL RAINFALL   (mm)=   62.782
     RUNOFF COEFFICIENT   =     .375

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

-------------------------------------------------------------------------------
001:0004---------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.99   Curve Number   (CN)=78.59
| 02:  200  DT= 5.00 |   Ia      (mm)=   5.190   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .380

     Unit Hyd Qpeak  (cms)=     .502

     PEAK FLOW       (cms)=     .145 (i)
     TIME TO PEAK    (hrs)=    4.417
     RUNOFF VOLUME    (mm)=   26.160
     TOTAL RAINFALL   (mm)=   62.782
     RUNOFF COEFFICIENT   =     .417

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

-------------------------------------------------------------------------------
001:0005---------------------------------------------------------------------
--------------------
| ROUTE CHANNEL    |     Routing time step (min) =  5.00
|  IN> 02:  200    |     Number of SEGMENTS =  3
| OUT< 10:001000   |     Slopes (%), CHANNEL= .9000  FLOODPLAIN= .9000
--------------------                LENGTH =  820.50    (m)

              <------ DATA FOR SECTION (   3.0) ------>
              Distance      Elevation       Manning
                   .00         81.00         .0500
                  7.27         81.00     .0500 / .0350  Main Channel
                  9.21         80.00         .0350      Main Channel
                 13.60         80.00         .0350      Main Channel
                 14.93         81.00     .0350 / .0500  Main Channel
                 21.45         82.00         .0500

   <---------------------------- TRAVEL TIME TABLE ---------------------------->
    DEPTH    ELEV   X-VOLUME  S-VOLUME  FLOW RATE  VELOCITY  TRAV.TIME   D x V
      (m)     (m)   (cu.m.)   (cu.m.)      (cms)     (m/s)     (min)   (m2/s)
     .050   80.050  .183E+03  .621E+00       .081      .362     37.78     .018
     .100   80.100  .374E+03  .253E+01       .258      .566     24.17     .057
     .150   80.150  .570E+03  .579E+01       .508      .731     18.71     .110
     .200   80.200  .774E+03  .105E+02       .824      .873     15.66     .175
     .250   80.250  .984E+03  .167E+02      1.200     1.000     13.67     .250
     .300   80.300  .120E+04  .244E+02      1.634     1.116     12.26     .335
     .350   80.350  .142E+04  .338E+02      2.123     1.222     11.19     .428
     .400   80.400  .166E+04  .448E+02      2.666     1.321     10.35     .528
     .450   80.450  .189E+04  .577E+02      3.262     1.414      9.67     .636
     .500   80.500  .214E+04  .723E+02      3.910     1.502      9.11     .751
     .550   80.550  .239E+04  .889E+02      4.611     1.585      8.63     .872
     .600   80.600  .264E+04  .107E+03      5.363     1.664      8.22     .999
     .650   80.650  .291E+04  .128E+03      6.167     1.740      7.86    1.131
     .700   80.700  .318E+04  .151E+03      7.023     1.813      7.54    1.269
     .750   80.750  .346E+04  .175E+03      7.931     1.883      7.26    1.412
     .800   80.800  .374E+04  .203E+03      8.891     1.951      7.01    1.560
     .850   80.850  .403E+04  .232E+03      9.903     2.016      6.78    1.713
     .900   80.900  .433E+04  .264E+03     10.968     2.079      6.58    1.871
     .950   80.950  .463E+04  .298E+03     12.086     2.141      6.39    2.034

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

                                      <---- hydrograph ---->   <-pipe / channel->
                                 AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                 (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2:  200          4.99     .145    4.42 26.160      .068      .417
   OUTFLOW: ID=10:001000         4.99     .097    4.92 26.160      .054      .373


-------------------------------------------------------------------------------
001:0006---------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    2.06   Curve Number   (CN)=76.00
| 03:  300  DT= 5.00 |   Ia      (mm)=   6.020   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .270

     Unit Hyd Qpeak  (cms)=     .291

     PEAK FLOW       (cms)=     .063 (i)
     TIME TO PEAK    (hrs)=    4.250
     RUNOFF VOLUME    (mm)=   23.522
     TOTAL RAINFALL   (mm)=   62.782
     RUNOFF COEFFICIENT   =     .375

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

-------------------------------------------------------------------------------
001:0007---------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=   28.87   Curve Number   (CN)=79.25
| 04:  400  DT= 5.00 |   Ia      (mm)=   4.990   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .460

     Unit Hyd Qpeak  (cms)=    2.397

     PEAK FLOW       (cms)=     .775 (i)
     TIME TO PEAK    (hrs)=    4.583
     RUNOFF VOLUME    (mm)=   26.870
     TOTAL RAINFALL   (mm)=   62.782
     RUNOFF COEFFICIENT   =     .428

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

-------------------------------------------------------------------------------
001:0008---------------------------------------------------------------------
--------------------
| ADD HYD (000700) | ID: NHYD     AREA     QPEAK   TPEAK   R.V.     DWF
--------------------               (ha)     (cms)   (hrs)   (mm)   (cms)
                ID1 10:001000     4.99      .097    4.92  26.16    .000
               +ID2 03:  300      2.06      .063    4.25  23.52    .000
               +ID3 04:  400     28.87      .775    4.58  26.87    .000
                ==========================================================
                SUM 07:000700    35.92      .907    4.58  26.58    .000
```

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

--------------------------------------------------------------------------------
001:0009--------------------------------------------------------------------------
  ** END OF RUN :   1

********************************************************************************




--------------------
| START            |  Project  dir.: C:\PROGRA~1\SWMHYMO\E073-067\CHICAG~3\
--------------------  Rainfall dir.: C:\PROGRA~1\SWMHYMO\E073-067\CHICAG~3\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 002
    NSTORM=   1
           #  1=C:\Program Files\SWMHYMO\E073-067\C5.stm
--------------------------------------------------------------------------------
002:0002--------------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [ Go Transit Extendsion  ]    Project Number: [  E073-067
*#  Date        : 07-26-2010
*#  Modeller    : [  E. Liu      ]
*#  Company     : UMA Engineering Ltd.
*#  License #   :  3005209
*#*****************************************************************************
*#****MANTENANCE YARD PRE CONDITIONS WITHOUT EXTERNAL DRAINAGE AREA*************
*#****TORONTO BLOOR ST DATA --12 HOURS 10 YEAR CHICAGO STORM ******************
*#*****************************************************************************
--------------------------------------------------------------------------------
002:0002--------------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: C:\Program Files\SWMHYMO\E073-067\C5.stm
| Ptotal=  83.52 mm|    Comments: 12 HR CGO-5YR
--------------------
              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
               .08   2.482 |   3.08   6.485 |   6.08   5.879 |   9.08   3.282
               .17   2.518 |   3.17   6.914 |   6.17   5.730 |   9.17   3.248
               .25   2.554 |   3.25   7.424 |   6.25   5.590 |   9.25   3.214
               .33   2.592 |   3.33   8.042 |   6.33   5.458 |   9.33   3.181
               .42   2.631 |   3.42   8.809 |   6.42   5.334 |   9.42   3.149
               .50   2.672 |   3.50   9.794 |   6.50   5.217 |   9.50   3.118
               .58   2.715 |   3.58  11.118 |   6.58   5.107 |   9.58   3.088
               .67   2.759 |   3.67  13.017 |   6.67   5.002 |   9.67   3.058
               .75   2.805 |   3.75  16.040 |   6.75   4.902 |   9.75   3.029
               .83   2.854 |   3.83  21.887 |   6.83   4.807 |   9.83   3.001
               .92   2.904 |   3.92  41.887 |   6.92   4.717 |   9.92   2.973
              1.00   2.957 |   4.00 148.557 |   7.00   4.631 |  10.00   2.946
              1.08   3.012 |   4.08  51.336 |   7.08   4.549 |  10.08   2.920
              1.17   3.070 |   4.17  31.682 |   7.17   4.470 |  10.17   2.894
              1.25   3.130 |   4.25  24.028 |   7.25   4.395 |  10.25   2.869
              1.33   3.194 |   4.33  19.784 |   7.33   4.323 |  10.33   2.844
              1.42   3.262 |   4.42  17.032 |   7.42   4.254 |  10.42   2.820
              1.50   3.333 |   4.50  15.078 |   7.50   4.187 |  10.50   2.796
              1.58   3.408 |   4.58  13.607 |   7.58   4.124 |  10.58   2.773
              1.67   3.488 |   4.67  12.451 |   7.67   4.062 |  10.67   2.751
              1.75   3.572 |   4.75  11.516 |   7.75   4.003 |  10.75   2.728
              1.83   3.662 |   4.83  10.740 |   7.83   3.946 |  10.83   2.707
              1.92   3.758 |   4.92  10.085 |   7.92   3.891 |  10.92   2.685
              2.00   3.861 |   5.00   9.522 |   8.00   3.838 |  11.00   2.664
              2.08   3.971 |   5.08   9.033 |   8.08   3.786 |  11.08   2.644
              2.17   4.089 |   5.17   8.602 |   8.17   3.737 |  11.17   2.624
              2.25   4.216 |   5.25   8.220 |   8.25   3.689 |  11.25   2.604
              2.33   4.355 |   5.33   7.879 |   8.33   3.642 |  11.33   2.585
              2.42   4.505 |   5.42   7.571 |   8.42   3.597 |  11.42   2.566
              2.50   4.670 |   5.50   7.292 |   8.50   3.554 |  11.50   2.547
              2.58   4.850 |   5.58   7.038 |   8.58   3.512 |  11.58   2.529
              2.67   5.049 |   5.67   6.805 |   8.67   3.471 |  11.67   2.511
              2.75   5.271 |   5.75   6.590 |   8.75   3.431 |  11.75   2.493
              2.83   5.519 |   5.83   6.392 |   8.83   3.392 |  11.83   2.476
              2.92   5.799 |   5.92   6.209 |   8.92   3.354 |  11.92   2.459
              3.00   6.117 |   6.00   6.038 |   9.00   3.318 |  12.00   2.442

--------------------------------------------------------------------------------
002:0003--------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    8.00   Curve Number   (CN)=76.00
| 01:  100  DT= 5.00 |   Ia      (mm)=   6.020   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .720

     Unit Hyd Qpeak  (cms)=     .424

     PEAK FLOW       (cms)=     .241 (i)
     TIME TO PEAK    (hrs)=    4.917
     RUNOFF VOLUME    (mm)=   38.083
     TOTAL RAINFALL   (mm)=   83.519
     RUNOFF COEFFICIENT   =     .456

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

--------------------------------------------------------------------------------
002:0004--------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.99   Curve Number   (CN)=78.59
| 02:  200  DT= 5.00 |   Ia      (mm)=   5.190   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .380

     Unit Hyd Qpeak  (cms)=     .502

     PEAK FLOW       (cms)=     .250 (i)
     TIME TO PEAK    (hrs)=    4.417
     RUNOFF VOLUME    (mm)=   41.589
     TOTAL RAINFALL   (mm)=   83.519
     RUNOFF COEFFICIENT   =     .498

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

--------------------------------------------------------------------------------
002:0005--------------------------------------------------------------------------
--------------------
| ROUTE CHANNEL    |     Routing time step (min) =  5.00
|  IN> 02:  200    |     Number of SEGMENTS =  3
| OUT< 10:001000   |     Slopes (%), CHANNEL= .9000  FLOODPLAIN= .9000
--------------------                 LENGTH =  820.50    (m)
```

```
            <------ DATA FOR SECTION (   3.0) ------>
            Distance      Elevation       Manning
                .00         81.00          .0500
               7.27         81.00      .0500 / .0350  Main Channel
               9.21         80.00          .0350      Main Channel
              13.60         80.00          .0350      Main Channel
              14.93         81.00      .0350 / .0500  Main Channel
              21.45         82.00          .0500
```

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

DEPTH (m)	ELEV (m)	X-VOLUME (cu.m.)	S-VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)	D x V (m2/s)
.050	80.050	.183E+03	.621E+00	.081	.362	37.78	.018
.100	80.100	.374E+03	.253E+01	.258	.566	24.17	.057
.150	80.150	.570E+03	.579E+01	.508	.731	18.71	.110
.200	80.200	.774E+03	.105E+02	.824	.873	15.66	.175
.250	80.250	.984E+03	.167E+02	1.200	1.000	13.67	.250
.300	80.300	.120E+04	.244E+02	1.634	1.116	12.26	.335
.350	80.350	.142E+04	.338E+02	2.123	1.222	11.19	.428
.400	80.400	.166E+04	.448E+02	2.666	1.321	10.35	.528
.450	80.450	.189E+04	.577E+02	3.262	1.414	9.67	.636
.500	80.500	.214E+04	.723E+02	3.910	1.502	9.11	.751
.550	80.550	.239E+04	.889E+02	4.611	1.585	8.63	.872
.600	80.600	.264E+04	.107E+03	5.363	1.664	8.22	.999
.650	80.650	.291E+04	.128E+03	6.167	1.740	7.86	1.131
.700	80.700	.318E+04	.151E+03	7.023	1.813	7.54	1.269
.750	80.750	.346E+04	.175E+03	7.931	1.883	7.26	1.412
.800	80.800	.374E+04	.203E+03	8.891	1.951	7.01	1.560
.850	80.850	.403E+04	.232E+03	9.903	2.016	6.78	1.713
.900	80.900	.433E+04	.264E+03	10.968	2.079	6.58	1.871
.950	80.950	.463E+04	.298E+03	12.086	2.141	6.39	2.034

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

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2: 200	4.99	.250	4.42	41.589	.098	.552
OUTFLOW: ID=10:001000	4.99	.179	4.75	41.589	.078	.452

002:0006----------

```
| CALIB NASHYD       |   Area    (ha)=    2.06   Curve Number   (CN)=76.00
| 03:  300  DT= 5.00 |   Ia      (mm)=   6.020   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .270

     Unit Hyd Qpeak  (cms)=     .291

     PEAK FLOW       (cms)=     .113 (i)
     TIME TO PEAK    (hrs)=    4.250
     RUNOFF VOLUME    (mm)=   38.083
     TOTAL RAINFALL   (mm)=   83.519
     RUNOFF COEFFICIENT   =     .456

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

002:0007----------

```
| CALIB NASHYD       |   Area    (ha)=   28.87   Curve Number   (CN)=79.25
| 04:  400  DT= 5.00 |   Ia      (mm)=   4.990   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .460

     Unit Hyd Qpeak  (cms)=    2.397

     PEAK FLOW       (cms)=    1.320 (i)
     TIME TO PEAK    (hrs)=    4.500
     RUNOFF VOLUME    (mm)=   42.520
     TOTAL RAINFALL   (mm)=   83.519
     RUNOFF COEFFICIENT   =     .509

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

002:0008----------

ADD HYD (000700)	ID: NHYD	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	DWF (cms)
	ID1 10:001000	4.99	.179	4.75	41.59	.000
	+ID2 03: 300	2.06	.113	4.25	38.08	.000
	+ID3 04: 400	28.87	1.320	4.50	42.52	.000
	SUM 07:000700	35.92	1.564	4.50	42.14	.000

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

002:0009----------

002:0002----------

```
  ** END OF RUN :   2
```

****

```
--------------------
| START            |  Project  dir.: C:\PROGRA~1\SWMHYMO\E073-067\CHICAG~3\
--------------------  Rainfall dir.: C:\PROGRA~1\SWMHYMO\E073-067\CHICAG~3\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 003
    NSTORM=   1
           #  1=C:\Program Files\SWMHYMO\E073-067\C10.stm
```

003:0002----------

```
*#*************************************************************************
*#  Project Name: [ Go Transit Extendsion  ]    Project Number: [  E073-067
*#  Date        : 07-26-2010
*#  Modeller    : [  E. Liu      ]
*#  Company     : UMA Engineering Ltd.
*#  License #   :  3005209
*#*************************************************************************
*#****MANTENANCE YARD PRE CONDITIONS WITHOUT EXTERNAL DRAINAGE AREA*************
*#****TORONTO BLOOR ST DATA --12 HOURS 10 YEAR CHICAGO STORM ******************
```

```
*#**************************************************************************
--------------------------------------------------------------------------------
003:0002----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: C:\Program Files\SWMHYMO\E073-067\C10.st
| Ptotal=  96.75 mm|    Comments: 12 HR CGO-10 YR
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	2.821	3.08	7.436	6.08	6.735	9.08	3.739
.17	2.861	3.17	7.934	6.17	6.562	9.17	3.700
.25	2.903	3.25	8.525	6.25	6.401	9.25	3.661
.33	2.947	3.33	9.241	6.33	6.249	9.33	3.623
.42	2.992	3.42	10.131	6.42	6.105	9.42	3.586
.50	3.039	3.50	11.276	6.50	5.970	9.50	3.551
.58	3.087	3.58	12.817	6.58	5.842	9.58	3.516
.67	3.138	3.67	15.030	6.67	5.721	9.67	3.481
.75	3.191	3.75	18.562	6.75	5.606	9.75	3.448
.83	3.247	3.83	25.415	6.83	5.497	9.83	3.416
.92	3.305	3.92	48.554	6.92	5.393	9.92	3.384
1.00	3.365	4.00	176.632	7.00	5.293	10.00	3.353
1.08	3.429	4.08	60.216	7.08	5.198	10.08	3.323
1.17	3.495	4.17	39.943	7.17	5.108	10.17	3.293
1.25	3.565	4.25	27.928	7.25	5.021	10.25	3.264
1.33	3.638	4.33	22.946	7.33	4.938	10.33	3.236
1.42	3.716	4.42	19.722	7.42	4.858	10.42	3.208
1.50	3.798	4.50	17.437	7.50	4.782	10.50	3.181
1.58	3.884	4.58	15.718	7.58	4.708	10.58	3.154
1.67	3.976	4.67	14.371	7.67	4.637	10.67	3.128
1.75	4.073	4.75	13.281	7.75	4.569	10.75	3.103
1.83	4.177	4.83	12.377	7.83	4.503	10.83	3.078
1.92	4.287	4.92	11.615	7.92	4.440	10.92	3.054
2.00	4.405	5.00	10.960	8.00	4.379	11.00	3.030
2.08	4.532	5.08	10.391	8.08	4.320	11.08	3.006
2.17	4.668	5.17	9.891	8.17	4.263	11.17	2.983
2.25	4.815	5.25	9.448	8.25	4.207	11.25	2.961
2.33	4.975	5.33	9.052	8.33	4.154	11.33	2.938
2.42	5.148	5.42	8.695	8.42	4.102	11.42	2.917
2.50	5.338	5.50	8.371	8.50	4.052	11.50	2.895
2.58	5.546	5.58	8.076	8.58	4.003	11.58	2.874
2.67	5.776	5.67	7.806	8.67	3.956	11.67	2.854
2.75	6.032	5.75	7.558	8.75	3.910	11.75	2.834
2.83	6.318	5.83	7.329	8.83	3.866	11.83	2.814
2.92	6.642	5.92	7.117	8.92	3.822	11.92	2.794
3.00	7.011	6.00	6.919	9.00	3.780	12.00	2.775

```
--------------------------------------------------------------------------------
003:0003----------------------------------------------------------------------
---------------------
| CALIB NASHYD      |   Area    (ha)=    8.00   Curve Number   (CN)=76.00
| 01:  100  DT= 5.00 |   Ia      (mm)=   6.020   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .720

     Unit Hyd Qpeak  (cms)=     .424

     PEAK FLOW       (cms)=     .317 (i)
     TIME TO PEAK    (hrs)=    4.917
     RUNOFF VOLUME    (mm)=   48.154
     TOTAL RAINFALL   (mm)=   96.747
     RUNOFF COEFFICIENT   =     .498

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

--------------------------------------------------------------------------------
003:0004----------------------------------------------------------------------
---------------------
| CALIB NASHYD      |   Area    (ha)=    4.99   Curve Number   (CN)=78.59
| 02:  200  DT= 5.00 |   Ia      (mm)=   5.190   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .380

     Unit Hyd Qpeak  (cms)=     .502

     PEAK FLOW       (cms)=     .328 (i)
     TIME TO PEAK    (hrs)=    4.417
     RUNOFF VOLUME    (mm)=   52.146
     TOTAL RAINFALL   (mm)=   96.747
     RUNOFF COEFFICIENT   =     .539

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

--------------------------------------------------------------------------------
003:0005----------------------------------------------------------------------
--------------------
| ROUTE CHANNEL    |     Routing time step (min) =  5.00
|  IN> 02:  200    |     Number of SEGMENTS =  3
| OUT< 10:001000   |     Slopes (%), CHANNEL= .9000  FLOODPLAIN= .9000
--------------------                   LENGTH =  820.50    (m)

              <------ DATA FOR SECTION (   3.0) ------>
              Distance      Elevation       Manning
                   .00         81.00         .0500
                  7.27         81.00     .0500 / .0350  Main Channel
                  9.21         80.00         .0350      Main Channel
                 13.60         80.00         .0350      Main Channel
                 14.93         81.00     .0350 / .0500  Main Channel
                 21.45         82.00         .0500
```

<TRAVEL TIME TABLE>

DEPTH (m)	ELEV (m)	X-VOLUME (cu.m.)	S-VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)	D x V (m2/s)
.050	80.050	.183E+03	.621E+00	.081	.362	37.78	.018
.100	80.100	.374E+03	.253E+01	.258	.566	24.17	.057
.150	80.150	.570E+03	.579E+01	.508	.731	18.71	.110
.200	80.200	.774E+03	.105E+02	.824	.873	15.66	.175
.250	80.250	.984E+03	.167E+02	1.200	1.000	13.67	.250
.300	80.300	.120E+04	.244E+02	1.634	1.116	12.26	.335
.350	80.350	.142E+04	.338E+02	2.123	1.222	11.19	.428
.400	80.400	.166E+04	.448E+02	2.666	1.321	10.35	.528
.450	80.450	.189E+04	.577E+02	3.262	1.414	9.67	.636
.500	80.500	.214E+04	.723E+02	3.910	1.502	9.11	.751
.550	80.550	.239E+04	.889E+02	4.611	1.585	8.63	.872
.600	80.600	.264E+04	.107E+03	5.363	1.664	8.22	.999
.650	80.650	.291E+04	.128E+03	6.167	1.740	7.86	1.131
.700	80.700	.318E+04	.151E+03	7.023	1.813	7.54	1.269
.750	80.750	.346E+04	.175E+03	7.931	1.883	7.26	1.412
.800	80.800	.374E+04	.203E+03	8.891	1.951	7.01	1.560
.850	80.850	.403E+04	.232E+03	9.903	2.016	6.78	1.713
.900	80.900	.433E+04	.264E+03	10.968	2.079	6.58	1.871
.950	80.950	.463E+04	.298E+03	12.086	2.141	6.39	2.034

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

                                <---- hydrograph ---->   <-pipe / channel->
                            AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                            (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2:  200     4.99     .328    4.42 52.146      .114      .604
   OUTFLOW: ID=10:001000    4.99     .260    4.75 52.146      .100      .567


--------------------------------------------------------------------------------
003:0006----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    2.06   Curve Number   (CN)=76.00
| 03:  300  DT= 5.00 |   Ia      (mm)=   6.020   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .270

     Unit Hyd Qpeak  (cms)=     .291

     PEAK FLOW       (cms)=     .150 (i)
     TIME TO PEAK    (hrs)=    4.250
     RUNOFF VOLUME    (mm)=   48.154
     TOTAL RAINFALL   (mm)=   96.747
     RUNOFF COEFFICIENT   =     .498

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

--------------------------------------------------------------------------------
003:0007----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=   28.87   Curve Number   (CN)=79.25
| 04:  400  DT= 5.00 |   Ia      (mm)=   4.990   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .460

     Unit Hyd Qpeak  (cms)=    2.397

     PEAK FLOW       (cms)=    1.725 (i)
     TIME TO PEAK    (hrs)=    4.500
     RUNOFF VOLUME    (mm)=   53.199
     TOTAL RAINFALL   (mm)=   96.747
     RUNOFF COEFFICIENT   =     .550

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

--------------------------------------------------------------------------------
003:0008----------------------------------------------------------------------
--------------------
| ADD HYD (000700) | ID: NHYD     AREA     QPEAK   TPEAK   R.V.     DWF
--------------------              (ha)     (cms)   (hrs)   (mm)   (cms)
                  ID1 10:001000     4.99     .260    4.75  52.15    .000
                 +ID2 03:  300      2.06     .150    4.25  48.15    .000
                 +ID3 04:  400     28.87    1.725    4.50  53.20    .000
                  ================================================
                  SUM 07:000700    35.92    2.064    4.50  52.76    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
003:0009----------------------------------------------------------------------
--------------------------------------------------------------------------------
003:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
003:0002----------------------------------------------------------------------
  ** END OF RUN :   3

********************************************************************************



--------------------
| START            |  Project  dir.: C:\PROGRA~1\SWMHYMO\E073-067\CHICAG~3\
--------------------  Rainfall dir.: C:\PROGRA~1\SWMHYMO\E073-067\CHICAG~3\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 004
    NSTORM=   1
           #  1=C:\Program Files\SWMHYMO\E073-067\C25.stm
--------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [ Go Transit Extendsion  ]    Project Number: [  E073-067
*#  Date        : 07-26-2010
*#  Modeller    : [  E. Liu      ]
*#  Company     : UMA Engineering Ltd.
*#  License #   :  3005209
*#*****************************************************************************
*#****MANTENANCE YARD PRE CONDITIONS WITHOUT EXTERNAL DRAINAGE AREA************
*#****TORONTO BLOOR ST DATA --12 HOURS 10 YEAR CHICAGO STORM ******************
*#*****************************************************************************
--------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: C:\Program Files\SWMHYMO\E073-067\C25.st
| Ptotal= 113.93 mm|    Comments: 12 HR CGO-25 YR
--------------------
            TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
             hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
             .08   3.302 |   3.08   8.744 |   6.08   7.915 |   9.08   4.383
             .17   3.349 |   3.17   9.331 |   6.17   7.711 |   9.17   4.336
             .25   3.398 |   3.25  10.030 |   6.25   7.520 |   9.25   4.290
             .33   3.450 |   3.33  10.877 |   6.33   7.340 |   9.33   4.246
             .42   3.503 |   3.42  11.931 |   6.42   7.172 |   9.42   4.202
             .50   3.558 |   3.50  13.286 |   6.50   7.012 |   9.50   4.160
             .58   3.615 |   3.58  15.110 |   6.58   6.862 |   9.58   4.119
             .67   3.675 |   3.67  17.734 |   6.67   6.719 |   9.67   4.079
             .75   3.738 |   3.75  21.926 |   6.75   6.583 |   9.75   4.040
             .83   3.803 |   3.83  30.072 |   6.83   6.454 |   9.83   4.002
             .92   3.871 |   3.92  57.678 |   6.92   6.331 |   9.92   3.964
            1.00   3.942 |   4.00 211.502 |   7.00   6.214 |  10.00   3.928
            1.08   4.017 |   4.08  71.614 |   7.08   6.102 |  10.08   3.892
            1.17   4.095 |   4.17  43.804 |   7.17   5.995 |  10.17   3.857
            1.25   4.177 |   4.25  33.062 |   7.25   5.893 |  10.25   3.823
            1.33   4.264 |   4.33  27.134 |   7.33   5.795 |  10.33   3.790
            1.42   4.355 |   4.42  23.303 |   7.42   5.701 |  10.42   3.757
            1.50   4.451 |   4.50  20.589 |   7.50   5.610 |  10.50   3.725
            1.58   4.553 |   4.58  18.550 |   7.58   5.524 |  10.58   3.694
            1.67   4.661 |   4.67  16.952 |   7.67   5.440 |  10.67   3.664
            1.75   4.776 |   4.75  15.660 |   7.75   5.360 |  10.75   3.634
```

1.83	4.897	4.83	14.590	7.83	5.283	10.83	3.604
1.92	5.028	4.92	13.686	7.92	5.208	10.92	3.575
2.00	5.167	5.00	12.911	8.00	5.136	11.00	3.547
2.08	5.316	5.08	12.238	8.08	5.066	11.08	3.520
2.17	5.477	5.17	11.646	8.17	4.999	11.17	3.493
2.25	5.650	5.25	11.122	8.25	4.934	11.25	3.466
2.33	5.838	5.33	10.653	8.33	4.871	11.33	3.440
2.42	6.043	5.42	10.231	8.42	4.810	11.42	3.414
2.50	6.266	5.50	9.848	8.50	4.751	11.50	3.389
2.58	6.512	5.58	9.500	8.58	4.693	11.58	3.365
2.67	6.783	5.67	9.181	8.67	4.638	11.67	3.340
2.75	7.085	5.75	8.888	8.75	4.584	11.75	3.317
2.83	7.423	5.83	8.617	8.83	4.531	11.83	3.293
2.92	7.805	5.92	8.366	8.92	4.480	11.92	3.270
3.00	8.241	6.00	8.133	9.00	4.431	12.00	3.248

004:0003

CALIB NASHYD	Area (ha)= 8.00	Curve Number (CN)=76.00
01: 100 DT= 5.00	Ia (mm)= 6.020	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .720	

Unit Hyd Qpeak (cms)= .424

PEAK FLOW (cms)= .418 (i)
TIME TO PEAK (hrs)= 4.833
RUNOFF VOLUME (mm)= 61.897
TOTAL RAINFALL (mm)= 113.926
RUNOFF COEFFICIENT = .543

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

004:0004

CALIB NASHYD	Area (ha)= 4.99	Curve Number (CN)=78.59
02: 200 DT= 5.00	Ia (mm)= 5.190	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .380	

Unit Hyd Qpeak (cms)= .502

PEAK FLOW (cms)= .429 (i)
TIME TO PEAK (hrs)= 4.417
RUNOFF VOLUME (mm)= 66.450
TOTAL RAINFALL (mm)= 113.926
RUNOFF COEFFICIENT = .583

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

004:0005

ROUTE CHANNEL	Routing time step (min) = 5.00
IN> 02: 200	Number of SEGMENTS = 3
OUT< 10:001000	Slopes (%), CHANNEL= .9000 FLOODPLAIN= .9000
	LENGTH = 820.50 (m)

<------ DATA FOR SECTION (3.0) ------>

Distance	Elevation	Manning		
.00	81.00	.0500		
7.27	81.00	.0500 / .0350	Main Channel	
9.21	80.00	.0350	Main Channel	
13.60	80.00	.0350	Main Channel	
14.93	81.00	.0350 / .0500	Main Channel	
21.45	82.00	.0500		

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

DEPTH (m)	ELEV (m)	X-VOLUME (cu.m.)	S-VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)	D x V (m2/s)
.050	80.050	.183E+03	.621E+00	.081	.362	37.78	.018
.100	80.100	.374E+03	.253E+01	.258	.566	24.17	.057
.150	80.150	.570E+03	.579E+01	.508	.731	18.71	.110
.200	80.200	.774E+03	.105E+02	.824	.873	15.66	.175
.250	80.250	.984E+03	.167E+02	1.200	1.000	13.67	.250
.300	80.300	.120E+04	.244E+02	1.634	1.116	12.26	.335
.350	80.350	.142E+04	.338E+02	2.123	1.222	11.19	.428
.400	80.400	.166E+04	.448E+02	2.666	1.321	10.35	.528
.450	80.450	.189E+04	.577E+02	3.262	1.414	9.67	.636
.500	80.500	.214E+04	.723E+02	3.910	1.502	9.11	.751
.550	80.550	.239E+04	.889E+02	4.611	1.585	8.63	.872
.600	80.600	.264E+04	.107E+03	5.363	1.664	8.22	.999
.650	80.650	.291E+04	.128E+03	6.167	1.740	7.86	1.131
.700	80.700	.318E+04	.151E+03	7.023	1.813	7.54	1.269
.750	80.750	.346E+04	.175E+03	7.931	1.883	7.26	1.412
.800	80.800	.374E+04	.203E+03	8.891	1.951	7.01	1.560
.850	80.850	.403E+04	.232E+03	9.903	2.016	6.78	1.713
.900	80.900	.433E+04	.264E+03	10.968	2.079	6.58	1.871
.950	80.950	.463E+04	.298E+03	12.086	2.141	6.39	2.034

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

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2: 200	4.99	.429	4.42	66.450	.134	.669
OUTFLOW: ID=10:001000	4.99	.344	4.67	66.450	.117	.613

004:0006

CALIB NASHYD	Area (ha)= 2.06	Curve Number (CN)=76.00
03: 300 DT= 5.00	Ia (mm)= 6.020	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .270	

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .200 (i)
TIME TO PEAK (hrs)= 4.250
RUNOFF VOLUME (mm)= 61.896
TOTAL RAINFALL (mm)= 113.926
RUNOFF COEFFICIENT = .543

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

004:0007

```
| CALIB NASHYD       |   Area    (ha)=   28.87   Curve Number   (CN)=79.25
| 04:  400  DT= 5.00 |   Ia      (mm)=   4.990   # of Linear Res.(N)= 3.00
---------------------   U.H. Tp(hrs)=    .460

     Unit Hyd Qpeak  (cms)=    2.397

     PEAK FLOW       (cms)=    2.250 (i)
     TIME TO PEAK    (hrs)=    4.500
     RUNOFF VOLUME    (mm)=   67.642
     TOTAL RAINFALL   (mm)=  113.926
     RUNOFF COEFFICIENT   =     .594

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

--------------------------------------------------------------------------------
004:0008----------------------------------------------------------------------
--------------------
| ADD HYD (000700) | ID: NHYD     AREA     QPEAK   TPEAK   R.V.     DWF
--------------------              (ha)     (cms)   (hrs)   (mm)   (cms)
                ID1 10:001000     4.99     .344    4.67  66.45    .000
               +ID2 03:  300      2.06     .200    4.25  61.90    .000
               +ID3 04:  400     28.87    2.250    4.50  67.64    .000
                ==========================================================
                SUM 07:000700    35.92    2.725    4.50  67.15    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0009----------------------------------------------------------------------
--------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
  ** END OF RUN :   4

********************************************************************************
```

```
--------------------
| START            |  Project  dir.: C:\PROGRA~1\SWMHYMO\E073-067\CHICAG~3\
--------------------  Rainfall dir.: C:\PROGRA~1\SWMHYMO\E073-067\CHICAG~3\
    TZERO =   .00 hrs on       0
    METOUT=   2 (output = METRIC)
    NRUN  = 005
    NSTORM=   1
          #  1=C:\Program Files\SWMHYMO\E073-067\C50.stm
--------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
*#****************************************************************************
*#  Project Name: [ Go Transit Extendsion  ]    Project Number: [  E073-067
*#  Date        : 07-26-2010
*#  Modeller    : [  E. Liu      ]
*#  Company     : UMA Engineering Ltd.
*#  License #   :  3005209
*#****************************************************************************
*#****MANTENANCE YARD PRE CONDITIONS WITHOUT EXTERNAL DRAINAGE AREA*************
*#****TORONTO BLOOR ST DATA --12 HOURS 10 YEAR CHICAGO STORM ******************
*#****************************************************************************
--------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: C:\Program Files\SWMHYMO\E073-067\C50.st
| Ptotal= 125.62 mm|    Comments: 12 HR CGO-50 YR
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	3.598	3.08	9.588	6.08	8.673	9.08	4.785
.17	3.650	3.17	10.236	6.17	8.449	9.17	4.733
.25	3.704	3.25	11.007	6.25	8.238	9.25	4.683
.33	3.761	3.33	11.943	6.33	8.041	9.33	4.634
.42	3.819	3.42	13.108	6.42	7.854	9.42	4.587
.50	3.879	3.50	14.607	6.50	7.678	9.50	4.541
.58	3.942	3.58	16.628	6.58	7.512	9.58	4.495
.67	4.008	3.67	19.536	6.67	7.355	9.67	4.451
.75	4.077	3.75	24.189	6.75	7.205	9.75	4.408
.83	4.148	3.83	33.253	6.83	7.063	9.83	4.366
.92	4.223	3.92	64.119	6.92	6.928	9.92	4.325
1.00	4.301	4.00	237.640	7.00	6.799	10.00	4.285
1.08	4.383	4.08	79.732	7.08	6.676	10.08	4.246
1.17	4.469	4.17	48.574	7.17	6.558	10.17	4.208
1.25	4.559	4.25	36.583	7.25	6.445	10.25	4.170
1.33	4.654	4.33	29.981	7.33	6.338	10.33	4.134
1.42	4.754	4.42	25.719	7.42	6.234	10.42	4.098
1.50	4.860	4.50	22.704	7.50	6.135	10.50	4.063
1.58	4.972	4.58	20.441	7.58	6.039	10.58	4.029
1.67	5.091	4.67	18.669	7.67	5.947	10.67	3.995
1.75	5.217	4.75	17.236	7.75	5.859	10.75	3.962
1.83	5.351	4.83	16.051	7.83	5.774	10.83	3.930
1.92	5.494	4.92	15.050	7.92	5.692	10.92	3.899
2.00	5.647	5.00	14.193	8.00	5.613	11.00	3.868
2.08	5.811	5.08	13.448	8.08	5.536	11.08	3.837
2.17	5.987	5.17	12.794	8.17	5.462	11.17	3.808
2.25	6.178	5.25	12.214	8.25	5.390	11.25	3.779
2.33	6.385	5.33	11.696	8.33	5.321	11.33	3.750
2.42	6.610	5.42	11.229	8.42	5.254	11.42	3.722
2.50	6.856	5.50	10.807	8.50	5.189	11.50	3.694
2.58	7.127	5.58	10.422	8.58	5.126	11.58	3.667
2.67	7.426	5.67	10.070	8.67	5.065	11.67	3.641
2.75	7.759	5.75	9.746	8.75	5.006	11.75	3.615
2.83	8.131	5.83	9.447	8.83	4.948	11.83	3.589
2.92	8.553	5.92	9.171	8.92	4.892	11.92	3.564
3.00	9.033	6.00	8.913	9.00	4.838	12.00	3.539

```
--------------------------------------------------------------------------------
005:0003----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    8.00   Curve Number   (CN)=76.00
| 01:  100  DT= 5.00 |   Ia      (mm)=   6.020   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .720

     Unit Hyd Qpeak  (cms)=     .424

     PEAK FLOW       (cms)=     .494 (i)
     TIME TO PEAK    (hrs)=    4.833
     RUNOFF VOLUME    (mm)=   71.585
```

```
     TOTAL RAINFALL   (mm)=  125.616
     RUNOFF COEFFICIENT   =     .570

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

-------------------------------------------------------------------------------
005:0004-------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.99   Curve Number   (CN)=78.59
| 02:  200  DT= 5.00 |   Ia      (mm)=   5.190   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .380

     Unit Hyd Qpeak  (cms)=     .502

     PEAK FLOW       (cms)=     .505 (i)
     TIME TO PEAK    (hrs)=    4.417
     RUNOFF VOLUME    (mm)=   76.481
     TOTAL RAINFALL   (mm)=  125.616
     RUNOFF COEFFICIENT   =     .609

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

-------------------------------------------------------------------------------
005:0005-------------------------------------------------------------------------
--------------------
| ROUTE CHANNEL    |     Routing time step (min) =  5.00
|  IN> 02:  200    |     Number of SEGMENTS =  3
| OUT< 10:001000   |     Slopes (%), CHANNEL= .9000  FLOODPLAIN= .9000
--------------------                     LENGTH =  820.50    (m)

              <------ DATA FOR SECTION (   3.0) ------>
              Distance      Elevation       Manning
                   .00         81.00         .0500
                  7.27         81.00     .0500 / .0350  Main Channel
                  9.21         80.00         .0350      Main Channel
                 13.60         80.00         .0350      Main Channel
                 14.93         81.00     .0350 / .0500  Main Channel
                 21.45         82.00         .0500

   <---------------------------- TRAVEL TIME TABLE ---------------------------->
    DEPTH     ELEV   X-VOLUME  S-VOLUME  FLOW RATE  VELOCITY  TRAV.TIME   D x V
      (m)      (m)   (cu.m.)   (cu.m.)      (cms)     (m/s)     (min)   (m2/s)
     .050   80.050  .183E+03  .621E+00       .081      .362     37.78     .018
     .100   80.100  .374E+03  .253E+01       .258      .566     24.17     .057
     .150   80.150  .570E+03  .579E+01       .508      .731     18.71     .110
     .200   80.200  .774E+03  .105E+02       .824      .873     15.66     .175
     .250   80.250  .984E+03  .167E+02      1.200     1.000     13.67     .250
     .300   80.300  .120E+04  .244E+02      1.634     1.116     12.26     .335
     .350   80.350  .142E+04  .338E+02      2.123     1.222     11.19     .428
     .400   80.400  .166E+04  .448E+02      2.666     1.321     10.35     .528
     .450   80.450  .189E+04  .577E+02      3.262     1.414      9.67     .636
     .500   80.500  .214E+04  .723E+02      3.910     1.502      9.11     .751
     .550   80.550  .239E+04  .889E+02      4.611     1.585      8.63     .872
     .600   80.600  .264E+04  .107E+03      5.363     1.664      8.22     .999
     .650   80.650  .291E+04  .128E+03      6.167     1.740      7.86    1.131
     .700   80.700  .318E+04  .151E+03      7.023     1.813      7.54    1.269
     .750   80.750  .346E+04  .175E+03      7.931     1.883      7.26    1.412
     .800   80.800  .374E+04  .203E+03      8.891     1.951      7.01    1.560
     .850   80.850  .403E+04  .232E+03      9.903     2.016      6.78    1.713
     .900   80.900  .433E+04  .264E+03     10.968     2.079      6.58    1.871
     .950   80.950  .463E+04  .298E+03     12.086     2.141      6.39    2.034

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

                                      <---- hydrograph ---->   <-pipe / channel->
                                   AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                   (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2:  200            4.99     .505    4.42 76.481      .149      .728
   OUTFLOW: ID=10:001000           4.99     .413    4.67 76.480      .131      .658


-------------------------------------------------------------------------------
005:0006-------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    2.06   Curve Number   (CN)=76.00
| 03:  300  DT= 5.00 |   Ia      (mm)=   6.020   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .270

     Unit Hyd Qpeak  (cms)=     .291

     PEAK FLOW       (cms)=     .237 (i)
     TIME TO PEAK    (hrs)=    4.250
     RUNOFF VOLUME    (mm)=   71.585
     TOTAL RAINFALL   (mm)=  125.616
     RUNOFF COEFFICIENT   =     .570

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

-------------------------------------------------------------------------------
005:0007-------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=   28.87   Curve Number   (CN)=79.25
| 04:  400  DT= 5.00 |   Ia      (mm)=   4.990   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .460

     Unit Hyd Qpeak  (cms)=    2.397

     PEAK FLOW       (cms)=    2.645 (i)
     TIME TO PEAK    (hrs)=    4.500
     RUNOFF VOLUME    (mm)=   77.757
     TOTAL RAINFALL   (mm)=  125.616
     RUNOFF COEFFICIENT   =     .619

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

-------------------------------------------------------------------------------
005:0008-------------------------------------------------------------------------
--------------------
| ADD HYD (000700) | ID: NHYD     AREA     QPEAK   TPEAK   R.V.     DWF
--------------------               (ha)     (cms)   (hrs)   (mm)   (cms)
                    ID1 10:001000     4.99     .413    4.67  76.48    .000
                   +ID2 03:  300      2.06     .237    4.25  71.59    .000
                   +ID3 04:  400     28.87    2.645    4.50  77.76    .000
                    ==========================================================
                    SUM 07:000700    35.92    3.219    4.50  77.23    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

```
005:0009-------------------------------------------------------------------------
-------------------------------------------------------------------------------
005:0002-------------------------------------------------------------------------
-------------------------------------------------------------------------------
005:0002-------------------------------------------------------------------------
-------------------------------------------------------------------------------
005:0002-------------------------------------------------------------------------
-------------------------------------------------------------------------------
005:0002-------------------------------------------------------------------------
  ** END OF RUN :   5

*******************************************************************************




--------------------
| START            |  Project  dir.: C:\PROGRA~1\SWMHYMO\E073-067\CHICAG~3\
--------------------  Rainfall dir.: C:\PROGRA~1\SWMHYMO\E073-067\CHICAG~3\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 006
    NSTORM=   1
           #  1=C:\Program Files\SWMHYMO\E073-067\C100.stm
-------------------------------------------------------------------------------
006:0002-------------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [ Go Transit Extendsion  ]    Project Number: [  E073-067
*#  Date        : 07-26-2010
*#  Modeller    : [  E. Liu      ]
*#  Company     : UMA Engineering Ltd.
*#  License #   :  3005209
*#*****************************************************************************
*#****MANTENANCE YARD PRE CONDITIONS WITHOUT EXTERNAL DRAINAGE AREA*************
*#****TORONTO BLOOR ST DATA --12 HOURS 10 YEAR CHICAGO STORM ******************
*#*****************************************************************************
-------------------------------------------------------------------------------
006:0002-------------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: C:\Program Files\SWMHYMO\E073-067\C100.s
| Ptotal= 138.30 mm|    Comments: 12 HR CGO-100 YR
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	3.931	3.08	10.507	6.08	9.502	9.08	5.232
.17	3.988	3.17	11.220	6.17	9.255	9.17	5.176
.25	4.048	3.25	12.068	6.25	9.024	9.25	5.121
.33	4.109	3.33	13.097	6.33	8.806	9.33	5.067
.42	4.173	3.42	14.379	6.42	8.602	9.42	5.015
.50	4.239	3.50	16.030	6.50	8.409	9.50	4.964
.58	4.308	3.58	18.254	6.58	8.226	9.58	7.915
.67	4.380	3.67	21.459	6.67	8.053	9.67	4.866
.75	4.455	3.75	26.590	6.75	7.889	9.75	4.819
.83	4.534	3.83	36.596	6.83	7.733	9.83	4.773
.92	4.616	3.92	70.755	6.92	7.584	9.92	4.728
1.00	4.702	4.00	263.602	7.00	7.442	10.00	4.684
1.08	4.791	4.08	88.052	7.08	7.307	10.08	4.641
1.17	4.886	4.17	53.534	7.17	7.178	10.17	4.599
1.25	4.985	4.25	40.274	7.25	7.054	10.25	4.558
1.33	5.089	4.33	32.981	7.33	6.936	10.33	4.518
1.42	5.199	4.42	28.277	7.42	6.822	10.42	4.479
1.50	5.315	4.50	24.952	7.50	6.713	10.50	4.441
1.58	5.438	4.58	22.457	7.58	6.609	10.58	4.403
1.67	5.568	4.67	20.503	7.67	6.508	10.67	4.366
1.75	5.706	4.75	18.925	7.75	6.411	10.75	4.330
1.83	5.853	4.83	17.619	7.83	6.317	10.83	4.295
1.92	6.010	4.92	16.517	7.92	6.227	10.92	4.261
2.00	6.178	5.00	15.573	8.00	6.140	11.00	4.227
2.08	6.358	5.08	14.753	8.08	6.056	11.08	4.193
2.17	6.552	5.17	14.033	8.17	5.975	11.17	4.161
2.25	6.761	5.25	13.395	8.25	5.897	11.25	4.129
2.33	6.988	5.33	12.825	8.33	5.821	11.33	4.097
2.42	7.236	5.42	12.312	8.42	5.747	11.42	4.067
2.50	7.506	5.50	11.847	8.50	5.676	11.50	4.037
2.58	7.803	5.58	11.424	8.58	5.607	11.58	4.007
2.67	8.131	5.67	11.037	8.67	5.540	11.67	3.978
2.75	8.497	5.75	10.681	8.75	5.475	11.75	3.949
2.83	8.906	5.83	10.353	8.83	5.411	11.83	3.921
2.92	9.369	5.92	10.048	8.92	5.350	11.92	3.894
3.00	9.897	6.00	9.765	9.00	5.290	12.00	3.867

```
-------------------------------------------------------------------------------
006:0003-------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    8.00   Curve Number   (CN)=76.00
| 01:  100  DT= 5.00 |   Ia      (mm)=   6.020   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .720

     Unit Hyd Qpeak  (cms)=     .424

     PEAK FLOW       (cms)=     .576 (i)
     TIME TO PEAK    (hrs)=    4.833
     RUNOFF VOLUME    (mm)=   82.345
     TOTAL RAINFALL   (mm)=  138.297
     RUNOFF COEFFICIENT   =     .595

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

-------------------------------------------------------------------------------
006:0004-------------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    4.99   Curve Number   (CN)=78.59
| 02:  200  DT= 5.00 |   Ia      (mm)=   5.190   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .380

     Unit Hyd Qpeak  (cms)=     .502

     PEAK FLOW       (cms)=     .587 (i)
     TIME TO PEAK    (hrs)=    4.417
     RUNOFF VOLUME    (mm)=   87.579
     TOTAL RAINFALL   (mm)=  138.297
     RUNOFF COEFFICIENT   =     .633

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

-------------------------------------------------------------------------------
006:0005-------------------------------------------------------------------------
--------------------
| ROUTE CHANNEL    |     Routing time step (min) =  5.00
```

```
|  IN> 02:  200    |     Number of SEGMENTS =  3
| OUT< 10:001000   |     Slopes (%), CHANNEL= .9000  FLOODPLAIN= .9000
--------------------                 LENGTH =  820.50    (m)

              <------ DATA FOR SECTION (   3.0) ------>
              Distance      Elevation       Manning
                   .00         81.00         .0500
                  7.27         81.00     .0500 / .0350  Main Channel
                  9.21         80.00         .0350      Main Channel
                 13.60         80.00         .0350      Main Channel
                 14.93         81.00     .0350 / .0500  Main Channel
                 21.45         82.00         .0500
```

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

DEPTH (m)	ELEV (m)	X-VOLUME (cu.m.)	S-VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)	D x V (m2/s)
.050	80.050	.183E+03	.621E+00	.081	.362	37.78	.018
.100	80.100	.374E+03	.253E+01	.258	.566	24.17	.057
.150	80.150	.570E+03	.579E+01	.508	.731	18.71	.110
.200	80.200	.774E+03	.105E+02	.824	.873	15.66	.175
.250	80.250	.984E+03	.167E+02	1.200	1.000	13.67	.250
.300	80.300	.120E+04	.244E+02	1.634	1.116	12.26	.335
.350	80.350	.142E+04	.338E+02	2.123	1.222	11.19	.428
.400	80.400	.166E+04	.448E+02	2.666	1.321	10.35	.528
.450	80.450	.189E+04	.577E+02	3.262	1.414	9.67	.636
.500	80.500	.214E+04	.723E+02	3.910	1.502	9.11	.751
.550	80.550	.239E+04	.889E+02	4.611	1.585	8.63	.872
.600	80.600	.264E+04	.107E+03	5.363	1.664	8.22	.999
.650	80.650	.291E+04	.128E+03	6.167	1.740	7.86	1.131
.700	80.700	.318E+04	.151E+03	7.023	1.813	7.54	1.269
.750	80.750	.346E+04	.175E+03	7.931	1.883	7.26	1.412
.800	80.800	.374E+04	.203E+03	8.891	1.951	7.01	1.560
.850	80.850	.403E+04	.232E+03	9.903	2.016	6.78	1.713
.900	80.900	.433E+04	.264E+03	10.968	2.079	6.58	1.871
.950	80.950	.463E+04	.298E+03	12.086	2.141	6.39	2.034

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

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2: 200	4.99	.587	4.42	87.579	.162	.762
OUTFLOW: ID=10:001000	4.99	.495	4.67	87.579	.147	.719

```
--------------------------------------------------------------------------------
006:0006----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=    2.06   Curve Number   (CN)=76.00
| 03:  300  DT= 5.00 |   Ia      (mm)=   6.020   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .270

     Unit Hyd Qpeak  (cms)=     .291

     PEAK FLOW       (cms)=     .278 (i)
     TIME TO PEAK    (hrs)=    4.250
     RUNOFF VOLUME    (mm)=   82.345
     TOTAL RAINFALL   (mm)=  138.297
     RUNOFF COEFFICIENT   =     .595

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

--------------------------------------------------------------------------------
006:0007----------------------------------------------------------------------
----------------------
| CALIB NASHYD       |   Area    (ha)=   28.87   Curve Number   (CN)=79.25
| 04:  400  DT= 5.00 |   Ia      (mm)=   4.990   # of Linear Res.(N)= 3.00
----------------------   U.H. Tp(hrs)=    .460

     Unit Hyd Qpeak  (cms)=    2.397

     PEAK FLOW       (cms)=    3.065 (i)
     TIME TO PEAK    (hrs)=    4.500
     RUNOFF VOLUME    (mm)=   88.938
     TOTAL RAINFALL   (mm)=  138.297
     RUNOFF COEFFICIENT   =     .643

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

--------------------------------------------------------------------------------
006:0008----------------------------------------------------------------------
--------------------
| ADD HYD (000700) | ID: NHYD     AREA     QPEAK   TPEAK   R.V.     DWF
--------------------                (ha)     (cms)   (hrs)   (mm)   (cms)
                  ID1 10:001000     4.99     .495    4.67  87.58    .000
                 +ID2 03:  300      2.06     .278    4.25  82.34    .000
                 +ID3 04:  400     28.87    3.065    4.50  88.94    .000
                  ========================================================
                  SUM 07:000700    35.92    3.747    4.50  88.37    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0009----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
      FINISH
--------------------------------------------------------------------------------
********************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2010-11-11     at 13:55:20
================================================================================
```

Proposed Conditions
12 Hour Chicago Storms

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

 SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999  =========
 S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
 SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9 Ver. 4.02
     S   W W   M   M  H   H    Y    M   M  O   O       9999   9999 July 1999
 SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9 =========
                                                      9   9  9   9 # 3005209
      StormWater Management HYdrologic Model           999    999  =========

 ***************************************************************************
 ************************** SWMHYMO-99 Ver/4.02 ****************************
 *******  A single event and continuous hydrologic simulation model  *******
 *******     based on the principles of HYMO and its successors      *******
 *******                 OTTHYMO-83 and OTTHYMO-89.                  *******
 ***************************************************************************
 ******* Distributed by:  J.F. Sabourin and Associates Inc.          *******
 *******                   Ottawa,  Ontario: (613) 727-5199          *******
 *******                   Gatineau, Quebec: (819) 243-6858          *******
 *******                   E-Mail: swmhymo@jfsa.Com                  *******
 ***************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++ Licensed user: UMA Engineering Ltd.                          +++++++
 +++++++                Mississauga          SERIAL#:3005209         +++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ***************************************************************************
 *******           ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *******
 *******           Maximum value for ID numbers  :     10            *******
 *******           Max. number of rainfall points:  15000            *******
 *******           Max. number of flow points    :  15000            *******
 ***************************************************************************


 ******************   D E T A I L E D   O U T P U T   ******************
 ***************************************************************************
 *       DATE: 2010-11-11     TIME: 16:24:29     RUN COUNTER: 001026       *
 ***************************************************************************
 * Input   filename: C:\PROGRA~1\SWMHYMO\E073-067\POST-1~1\2RC12PT.dat     *
 * Output  filename: C:\PROGRA~1\SWMHYMO\E073-067\POST-1~1\2RC12PT.out     *
 * Summary filename: C:\PROGRA~1\SWMHYMO\E073-067\POST-1~1\2RC12PT.sum     *
 * User comments:                                                          *
 * 1:_____________________________________________________________________*
 * 2:_____________________________________________________________________*
 * 3:_____________________________________________________________________*
 ***************************************************************************

--------------------------------------------------------------------------------
001:0001----------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [ Go Transit Extendsion  ]    Project Number: [  E073-067
*#  Date        : 07-26-2010
*#  Modeller    : [  E. Liu      ]
*#  Company     : UMA Engineering Ltd.
*#  License #   :  3005209
*#*************************************************************************
*#****MANTENANCE YARD POST CONDITIONS EXCLUDING EXTERNAL AREA*****************
*#*************************************************************************
*#****TORONTO BLOOR ST RAINFALL DATA 12 HOURS 2 TO 100 YEAR CHICAGO STORM ******
*#*************************************************************************
--------------------
| START            |  Project  dir.: C:\PROGRA~1\SWMHYMO\E073-067\POST-1~1\
--------------------  Rainfall dir.: C:\PROGRA~1\SWMHYMO\E073-067\POST-1~1\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   0
--------------------------------------------------------------------------------
001:0002----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: C:\Program Files\SWMHYMO\E073-067\C2.stm
| Ptotal=  62.78 mm|    Comments: 12 HR CGO-2YR
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	1.916	3.08	4.939	6.08	4.483	9.08	2.498
.17	1.943	3.17	5.261	6.17	4.371	9.17	2.472
.25	1.971	3.25	5.643	6.25	4.266	9.25	2.447
.33	2.000	3.33	6.105	6.33	4.167	9.33	2.423
.42	2.030	3.42	6.679	6.42	4.074	9.42	2.399
.50	2.061	3.50	7.414	6.50	3.986	9.50	2.376
.58	2.093	3.58	8.400	6.58	3.902	9.58	2.354
.67	2.127	3.67	9.811	6.67	3.823	9.67	2.332
.75	2.162	3.75	12.051	6.75	3.748	9.75	2.310
.83	2.199	3.83	16.360	6.83	3.677	9.83	2.289
.92	2.237	3.92	30.652	6.92	3.609	9.92	2.269
1.00	2.277	4.00	107.213	7.00	3.544	10.00	2.249
1.08	2.319	4.08	37.801	7.08	3.482	10.08	2.229
1.17	2.363	4.17	23.535	7.17	3.423	10.17	2.210
1.25	2.409	4.25	17.934	7.25	3.366	10.25	2.191
1.33	2.457	4.33	14.814	7.33	3.311	10.33	2.173
1.42	2.509	4.42	12.784	7.42	3.259	10.42	2.155
1.50	2.562	4.50	11.339	7.50	3.209	10.50	2.138
1.58	2.619	4.58	10.249	7.58	3.161	10.58	2.120
1.67	2.680	4.67	9.392	7.67	3.114	10.67	2.100
1.75	2.744	4.75	8.696	7.75	3.070	10.75	2.104
1.83	2.812	4.83	8.119	7.83	2.985	10.83	2.087
1.92	2.884	4.92	7.631	7.92	2.945	10.92	2.071
2.00	2.962	5.00	7.211	8.00	2.906	11.00	2.055
2.08	3.045	5.08	6.846	8.08	2.868	11.08	2.039
2.17	3.135	5.17	6.524	8.17	2.832	11.17	2.024
2.25	3.231	5.25	6.239	8.25	2.797	11.25	2.009
2.33	3.335	5.33	5.983	8.33	2.763	11.33	1.994
2.42	3.449	5.42	5.753	8.42	2.730	11.42	1.980
2.50	3.573	5.50	5.544	8.50	2.698	11.50	1.966
2.58	3.709	5.58	5.353	8.58	2.667	11.58	1.952
2.67	3.859	5.67	5.179	8.67	2.637	11.67	1.938
2.75	4.026	5.75	5.018	8.75	2.607	11.75	1.925
2.83	4.213	5.83	4.869	8.83	2.579	11.83	1.912
2.92	4.423	5.92	4.731	8.92	2.551	11.92	1.899
3.00	4.663	6.00	4.603	9.00	2.524	12.00	1.886

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--------------------------------------------------------------------------------
001:0003----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    4.50
| 01:  100  DT= 5.00 |   Total Imp(%)=   90.00   Dir. Conn.(%)=   90.00
----------------------

                             IMPERVIOUS    PERVIOUS (i)
```

```
     Surface Area     (ha)=       4.05          .45
     Dep. Storage     (mm)=       1.00         6.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     173.50        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     107.21        16.35
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       3.46 (ii)   18.02 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .26          .06
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .99          .01          .998 (iii)
     TIME TO PEAK    (hrs)=       4.00         4.25         4.000
     RUNOFF VOLUME    (mm)=      61.78        23.54        57.957
     TOTAL RAINFALL   (mm)=      62.78        62.78        62.782
     RUNOFF COEFFICIENT   =        .98          .37          .923
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (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.

--------------------------------------------------------------------------------
001:0004----------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  5.0 min.
|  IN>01:(  100 )   |
| OUT<10:(001000)   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    1.037  .1125E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (  100 )       4.50      .998     4.000     57.957
     OUTFLOW<10: (001000)       4.50      .404     4.167     57.957
    OVERFLOW<09: (005000)        .00      .000      .000       .000

                   TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                   CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                   PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=   40.483
                   TIME SHIFT OF PEAK FLOW         (min)=    10.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.4471E-01

--------------------------------------------------------------------------------
001:0005----------------------------------------------------------------------
---------------------
| CALIB STANDHYD    |   Area    (ha)=    2.49
| 02:  200  DT= 5.00 |   Total Imp(%)=   60.00   Dir. Conn.(%)=   60.00
---------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.49         1.00
     Dep. Storage     (mm)=       1.00         6.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     129.00        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     107.21        19.19
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       2.89 (ii)   16.56 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .28          .07
                                                      *TOTALS*
     PEAK FLOW       (cms)=        .39          .03          .399 (iii)
     TIME TO PEAK    (hrs)=       4.00         4.17         4.000
     RUNOFF VOLUME    (mm)=      61.78        23.54        46.483
     TOTAL RAINFALL   (mm)=      62.78        62.78        62.782
     RUNOFF COEFFICIENT   =        .98          .37          .740
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (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.

--------------------------------------------------------------------------------
001:0006----------------------------------------------------------------------
---------------------
| CALIB STANDHYD    |   Area    (ha)=   25.20
| 03: 300   DT= 5.00 |   Total Imp(%)=   32.00   Dir. Conn.(%)=   32.00
---------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.06        17.14
     Dep. Storage     (mm)=       1.00         6.00
     Average Slope     (%)=        .50          .50
     Length            (m)=     410.00        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=      72.51        12.10
               over (min)       10.00        35.00
     Storage Coeff.  (min)=       8.34 (ii)   33.24 (ii)
     Unit Hyd. Tpeak (min)=      10.00        35.00
     Unit Hyd. peak  (cms)=        .13          .03
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.25          .35          1.354 (iii)
     TIME TO PEAK    (hrs)=       4.08         4.58         4.083
     RUNOFF VOLUME    (mm)=      61.78        23.54        35.774
     TOTAL RAINFALL   (mm)=      62.78        62.78        62.782
     RUNOFF COEFFICIENT   =        .98          .37          .570

       (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.

--------------------------------------------------------------------------------
001:0007----------------------------------------------------------------------
--------------------
| ADD HYD (000500) | ID: NHYD     AREA     QPEAK   TPEAK   R.V.     DWF
--------------------               (ha)     (cms)   (hrs)   (mm)   (cms)
```

```
 ID1 10:001000     4.50     .404    4.17  57.96    .000
+ID2 02:  200      2.49     .399    4.00  46.48    .000
+ID3 03: 300      25.20    1.354    4.08  35.77    .000
 ==================================================
 SUM 05:000500    32.19    1.961    4.08  39.70    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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001:0008----------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  5.0 min.
|  IN>05:(000500)   |
| OUT<06:(000600)   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    2.064  .6030E+00
                           .047  .4000E+00   |    2.725  .6950E+00
                           .907  .4440E+00   |    3.219  .7640E+00
                          1.564  .5300E+00   |    3.747  .8520E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >05: (000500)      32.19     1.961     4.083     39.704
     OUTFLOW<06: (000600)      32.19      .905     4.667     39.703
    OVERFLOW<07: (000500)        .00      .000      .000       .000

                  TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                  CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                  PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=   46.153
                  TIME SHIFT OF PEAK FLOW         (min)=    35.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.4441E+00

------------------------------------------------------------------------------
001:0009----------------------------------------------------------------------
  ** END OF RUN :   1

********************************************************************************




--------------------
| START            |  Project  dir.: C:\PROGRA~1\SWMHYMO\E073-067\POST-1~1\
--------------------  Rainfall dir.: C:\PROGRA~1\SWMHYMO\E073-067\POST-1~1\
    TZERO =   .00 hrs on       0
    METOUT=   2 (output = METRIC)
    NRUN  = 002
    NSTORM=   1
           #  1=C:\Program Files\SWMHYMO\E073-067\C5.stm
------------------------------------------------------------------------------
002:0002----------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [ Go Transit Extendsion  ]    Project Number: [  E073-067
*#  Date        : 07-26-2010
*#  Modeller    : [  E. Liu      ]
*#  Company     : UMA Engineering Ltd.
*#  License #   :  3005209
*#*****************************************************************************
*#****MANTENANCE YARD POST CONDITIONS EXCLUDING EXTERNAL AREA******************
*#*****************************************************************************
*#****TORONTO BLOOR ST RAINFALL DATA 12 HOURS 2 TO 100 YEAR CHICAGO STORM ******
*#*****************************************************************************
------------------------------------------------------------------------------
002:0002----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: C:\Program Files\SWMHYMO\E073-067\C5.stm
| Ptotal=  83.52 mm|    Comments: 12 HR CGO-5YR
--------------------
            TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
             hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
             .08   2.482 |   3.08   6.485 |   6.08   5.879 |   9.08   3.282
             .17   2.518 |   3.17   6.914 |   6.17   5.730 |   9.17   3.248
             .25   2.554 |   3.25   7.424 |   6.25   5.590 |   9.25   3.214
             .33   2.592 |   3.33   8.042 |   6.33   5.458 |   9.33   3.181
             .42   2.631 |   3.42   8.809 |   6.42   5.334 |   9.42   3.149
             .50   2.672 |   3.50   9.794 |   6.50   5.217 |   9.50   3.118
             .58   2.715 |   3.58  11.118 |   6.58   5.107 |   9.58   3.088
             .67   2.759 |   3.67  13.017 |   6.67   5.002 |   9.67   3.058
             .75   2.805 |   3.75  16.040 |   6.75   4.902 |   9.75   3.029
             .83   2.854 |   3.83  21.887 |   6.83   4.807 |   9.83   3.001
             .92   2.904 |   3.92  41.887 |   6.92   4.717 |   9.92   2.973
            1.00   2.957 |   4.00 148.557 |   7.00   4.631 |  10.00   2.946
            1.08   3.012 |   4.08  51.336 |   7.08   4.549 |  10.08   2.920
            1.17   3.070 |   4.17  31.682 |   7.17   4.470 |  10.17   2.894
            1.25   3.130 |   4.25  24.028 |   7.25   4.395 |  10.25   2.869
            1.33   3.194 |   4.33  19.784 |   7.33   4.323 |  10.33   2.844
            1.42   3.262 |   4.42  17.032 |   7.42   4.254 |  10.42   2.820
            1.50   3.333 |   4.50  15.078 |   7.50   4.187 |  10.50   2.796
            1.58   3.408 |   4.58  13.607 |   7.58   4.124 |  10.58   2.773
            1.67   3.488 |   4.67  12.451 |   7.67   4.062 |  10.67   2.751
            1.75   3.572 |   4.75  11.516 |   7.75   4.003 |  10.75   2.728
            1.83   3.662 |   4.83  10.740 |   7.83   3.946 |  10.83   2.707
            1.92   3.758 |   4.92  10.085 |   7.92   3.891 |  10.92   2.685
            2.00   3.861 |   5.00   9.522 |   8.00   3.838 |  11.00   2.664
            2.08   3.971 |   5.08   9.033 |   8.08   3.786 |  11.08   2.644
            2.17   4.089 |   5.17   8.602 |   8.17   3.737 |  11.17   2.624
            2.25   4.216 |   5.25   8.220 |   8.25   3.689 |  11.25   2.604
            2.33   4.355 |   5.33   7.879 |   8.33   3.642 |  11.33   2.585
            2.42   4.505 |   5.42   7.571 |   8.42   3.597 |  11.42   2.566
            2.50   4.670 |   5.50   7.292 |   8.50   3.554 |  11.50   2.547
            2.58   4.850 |   5.58   7.038 |   8.58   3.512 |  11.58   2.529
            2.67   5.049 |   5.67   6.805 |   8.67   3.471 |  11.67   2.511
            2.75   5.271 |   5.75   6.590 |   8.75   3.431 |  11.75   2.493
            2.83   5.519 |   5.83   6.392 |   8.83   3.392 |  11.83   2.476
            2.92   5.799 |   5.92   6.209 |   8.92   3.354 |  11.92   2.459
            3.00   6.117 |   6.00   6.038 |   9.00   3.318 |  12.00   2.442

------------------------------------------------------------------------------
002:0003----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    4.50
| 01:  100  DT= 5.00 |   Total Imp(%)=   90.00   Dir. Conn.(%)=   90.00
----------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.05           .45
```

```
     Dep. Storage     (mm)=       1.00         6.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     173.50        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     148.56        33.82
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       3.04 (ii)   13.92 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .27          .08
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.43          .03          1.443 (iii)
     TIME TO PEAK    (hrs)=       4.00         4.17          4.000
     RUNOFF VOLUME    (mm)=      82.52        38.10         78.077
     TOTAL RAINFALL   (mm)=      83.52        83.52         83.519
     RUNOFF COEFFICIENT   =        .99          .46           .935
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (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.

--------------------------------------------------------------------------------
002:0004----------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  5.0 min.
|  IN>01:(  100 )   |
| OUT<10:(001000)   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    1.037  .1125E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (  100 )       4.50     1.443     4.000     78.077
     OUTFLOW<10: (001000)       4.50      .562     4.167     78.077
    OVERFLOW<09: (005000)        .00      .000      .000       .000

                  TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                  CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                  PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=   38.929
                  TIME SHIFT OF PEAK FLOW         (min)=    10.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.6249E-01

--------------------------------------------------------------------------------
002:0005----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    2.49
| 02:  200  DT= 5.00 |   Total Imp(%)=   60.00   Dir. Conn.(%)=   60.00
----------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.49         1.00
     Dep. Storage     (mm)=       1.00         6.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     129.00        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     148.56        33.82
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       2.54 (ii)   13.43 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=        .29          .08
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .55          .06           .579 (iii)
     TIME TO PEAK    (hrs)=       4.00         4.17          4.000
     RUNOFF VOLUME    (mm)=      82.52        38.10         64.750
     TOTAL RAINFALL   (mm)=      83.52        83.52         83.519
     RUNOFF COEFFICIENT   =        .99          .46           .775
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (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.

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002:0006----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=   25.20
| 03: 300   DT= 5.00 |   Total Imp(%)=   32.00   Dir. Conn.(%)=   32.00
----------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.06        17.14
     Dep. Storage     (mm)=       1.00         6.00
     Average Slope     (%)=        .50          .50
     Length            (m)=     410.00        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     148.56        25.42
               over (min)        5.00        25.00
     Storage Coeff.  (min)=       6.26 (ii)   24.76 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=        .19          .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       2.15          .75          2.350 (iii)
     TIME TO PEAK    (hrs)=       4.00         4.42          4.000
     RUNOFF VOLUME    (mm)=      82.52        38.10         52.313
     TOTAL RAINFALL   (mm)=      83.52        83.52         83.519
     RUNOFF COEFFICIENT   =        .99          .46           .626

       (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.

--------------------------------------------------------------------------------
002:0007----------------------------------------------------------------------
--------------------
| ADD HYD (000500) | ID: NHYD     AREA     QPEAK   TPEAK   R.V.     DWF
--------------------               (ha)     (cms)   (hrs)   (mm)   (cms)
                ID1 10:001000     4.50      .562    4.17  78.08    .000
```

```
              +ID2 02:  200      2.49     .579    4.00  64.75    .000
              +ID3 03: 300      25.20    2.350    4.00  52.31    .000
               ================================================
               SUM 05:000500    32.19    3.296    4.00  56.88    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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002:0008----------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  5.0 min.
|  IN>05:(000500)   |
| OUT<06:(000600)   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    2.064  .6030E+00
                           .047  .4000E+00   |    2.725  .6950E+00
                           .907  .4440E+00   |    3.219  .7640E+00
                          1.564  .5300E+00   |    3.747  .8520E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >05: (000500)      32.19     3.296     4.000     56.876
     OUTFLOW<06: (000600)      32.19     1.562     4.500     56.876
    OVERFLOW<07: (000500)        .00      .000      .000       .000

                  TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                  CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                  PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=   47.394
                  TIME SHIFT OF PEAK FLOW         (min)=    30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.5302E+00

------------------------------------------------------------------------------
002:0009----------------------------------------------------------------------
------------------------------------------------------------------------------
002:0002----------------------------------------------------------------------
  ** END OF RUN :   2

*******************************************************************************




--------------------
| START            |  Project  dir.: C:\PROGRA~1\SWMHYMO\E073-067\POST-1~1\
--------------------  Rainfall dir.: C:\PROGRA~1\SWMHYMO\E073-067\POST-1~1\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 003
    NSTORM=   1
           #  1=C:\Program Files\SWMHYMO\E073-067\C10.stm
------------------------------------------------------------------------------
003:0002----------------------------------------------------------------------
*#*****************************************************************************
*#  Project Name: [ Go Transit Extendsion  ]    Project Number: [  E073-067
*#  Date        : 07-26-2010
*#  Modeller    : [  E. Liu      ]
*#  Company     : UMA Engineering Ltd.
*#  License #   :  3005209
*#*****************************************************************************
*#****MANTENANCE YARD POST CONDITIONS EXCLUDING EXTERNAL AREA******************
*#*****************************************************************************
*#****TORONTO BLOOR ST RAINFALL DATA 12 HOURS 2 TO 100 YEAR CHICAGO STORM ******
*#*****************************************************************************
------------------------------------------------------------------------------
003:0002----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: C:\Program Files\SWMHYMO\E073-067\C10.st
| Ptotal=  96.75 mm|    Comments: 12 HR CGO-10 YR
--------------------
            TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
             hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
             .08   2.821 |   3.08   7.436 |   6.08   6.735 |   9.08   3.739
             .17   2.861 |   3.17   7.934 |   6.17   6.562 |   9.17   3.700
             .25   2.903 |   3.25   8.525 |   6.25   6.401 |   9.25   3.661
             .33   2.947 |   3.33   9.241 |   6.33   6.249 |   9.33   3.623
             .42   2.992 |   3.42  10.131 |   6.42   6.105 |   9.42   3.586
             .50   3.039 |   3.50  11.276 |   6.50   5.970 |   9.50   3.551
             .58   3.087 |   3.58  12.817 |   6.58   5.842 |   9.58   3.516
             .67   3.138 |   3.67  15.030 |   6.67   5.721 |   9.67   3.481
             .75   3.191 |   3.75  18.562 |   6.75   5.606 |   9.75   3.448
             .83   3.247 |   3.83  25.415 |   6.83   5.497 |   9.83   3.416
             .92   3.305 |   3.92  48.554 |   6.92   5.393 |   9.92   3.384
            1.00   3.365 |   4.00 176.632 |   7.00   5.293 |  10.00   3.353
            1.08   3.429 |   4.08  60.216 |   7.08   5.198 |  10.08   3.323
            1.17   3.495 |   4.17  39.943 |   7.17   5.108 |  10.17   3.293
            1.25   3.565 |   4.25  27.928 |   7.25   5.021 |  10.25   3.264
            1.33   3.638 |   4.33  22.946 |   7.33   4.938 |  10.33   3.236
            1.42   3.716 |   4.42  19.722 |   7.42   4.858 |  10.42   3.208
            1.50   3.798 |   4.50  17.437 |   7.50   4.782 |  10.50   3.181
            1.58   3.884 |   4.58  15.718 |   7.58   4.708 |  10.58   3.154
            1.67   3.976 |   4.67  14.371 |   7.67   4.637 |  10.67   3.128
            1.75   4.073 |   4.75  13.281 |   7.75   4.569 |  10.75   3.103
            1.83   4.177 |   4.83  12.377 |   7.83   4.503 |  10.83   3.078
            1.92   4.287 |   4.92  11.615 |   7.92   4.440 |  10.92   3.054
            2.00   4.405 |   5.00  10.960 |   8.00   4.379 |  11.00   3.030
            2.08   4.532 |   5.08  10.391 |   8.08   4.320 |  11.08   3.006
            2.17   4.668 |   5.17   9.891 |   8.17   4.263 |  11.17   2.983
            2.25   4.815 |   5.25   9.448 |   8.25   4.207 |  11.25   2.961
            2.33   4.975 |   5.33   9.052 |   8.33   4.154 |  11.33   2.938
            2.42   5.148 |   5.42   8.695 |   8.42   4.102 |  11.42   2.917
            2.50   5.338 |   5.50   8.371 |   8.50   4.052 |  11.50   2.895
            2.58   5.546 |   5.58   8.076 |   8.58   4.003 |  11.58   2.874
            2.67   5.776 |   5.67   7.806 |   8.67   3.956 |  11.67   2.854
            2.75   6.032 |   5.75   7.558 |   8.75   3.910 |  11.75   2.834
            2.83   6.318 |   5.83   7.329 |   8.83   3.866 |  11.83   2.814
            2.92   6.642 |   5.92   7.117 |   8.92   3.822 |  11.92   2.794
            3.00   7.011 |   6.00   6.919 |   9.00   3.780 |  12.00   2.775

------------------------------------------------------------------------------
003:0003----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    4.50
| 01:  100  DT= 5.00 |   Total Imp(%)=   90.00   Dir. Conn.(%)=   90.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
```

```
     Surface Area     (ha)=       4.05          .45
     Dep. Storage     (mm)=       1.00         6.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     173.50        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     176.63        56.28
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.83 (ii)   11.71 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .28          .10
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.73          .04          1.757 (iii)
     TIME TO PEAK    (hrs)=       4.00         4.08          4.000
     RUNOFF VOLUME    (mm)=      95.75        48.17         90.989
     TOTAL RAINFALL   (mm)=      96.75        96.75         96.747
     RUNOFF COEFFICIENT   =        .99          .50           .940
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (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.

--------------------------------------------------------------------------------
003:0004----------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  5.0 min.
|  IN>01:(  100 )   |
| OUT<10:(001000)   |    =========  OUTLFOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    1.037  .1125E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (  100 )       4.50     1.757     4.000     90.989
     OUTFLOW<10: (001000)       4.50      .673     4.167     90.989
    OVERFLOW<09: (005000)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   38.323
                    TIME SHIFT OF PEAK FLOW         (min)=    10.00
                    MAXIMUM  STORAGE   USED      (ha.m.)=.7477E-01

--------------------------------------------------------------------------------
003:0005----------------------------------------------------------------------
---------------------
| CALIB STANDHYD    |   Area    (ha)=    2.49
| 02:  200  DT= 5.00 |   Total Imp(%)=   60.00   Dir. Conn.(%)=   60.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.49         1.00
     Dep. Storage     (mm)=       1.00         6.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     129.00        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     176.63        56.28
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.37 (ii)   11.25 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .30          .10
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .67          .10           .723 (iii)
     TIME TO PEAK    (hrs)=       4.00         4.08          4.000
     RUNOFF VOLUME    (mm)=      95.75        48.17         76.716
     TOTAL RAINFALL   (mm)=      96.75        96.75         96.747
     RUNOFF COEFFICIENT   =        .99          .50           .793
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (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.

--------------------------------------------------------------------------------
003:0006----------------------------------------------------------------------
---------------------
| CALIB STANDHYD    |   Area    (ha)=   25.20
| 03: 300   DT= 5.00 |   Total Imp(%)=   32.00   Dir. Conn.(%)=   32.00
---------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.06        17.14
     Dep. Storage     (mm)=       1.00         6.00
     Average Slope     (%)=        .50          .50
     Length            (m)=     410.00        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     176.63        38.07
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       5.84 (ii)   21.58 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .20          .05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       2.63         1.09          2.990 (iii)
     TIME TO PEAK    (hrs)=       4.00         4.25          4.000
     RUNOFF VOLUME    (mm)=      95.75        48.17         63.395
     TOTAL RAINFALL   (mm)=      96.75        96.75         96.747
     RUNOFF COEFFICIENT   =        .99          .50           .655

       (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.

--------------------------------------------------------------------------------
003:0007----------------------------------------------------------------------
--------------------
| ADD HYD (000500) | ID: NHYD     AREA     QPEAK   TPEAK   R.V.     DWF
--------------------               (ha)     (cms)   (hrs)   (mm)   (cms)
```

```
 ID1 10:001000     4.50     .673    4.17  90.99    .000
+ID2 02:  200      2.49     .723    4.00  76.72    .000
+ID3 03: 300      25.20    2.990    4.00  63.39    .000
 ==================================================
 SUM 05:000500    32.19    4.152    4.00  68.28    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
003:0008----------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  5.0 min.
|  IN>05:(000500)   |
| OUT<06:(000600)   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    2.064  .6030E+00
                           .047  .4000E+00   |    2.725  .6950E+00
                           .907  .4440E+00   |    3.219  .7640E+00
                          1.564  .5300E+00   |    3.747  .8520E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     -------------------         (ha)     (cms)     (hrs)       (mm)
     INFLOW >05: (000500)      32.19     4.152     4.000     68.283
     OUTFLOW<06: (000600)      32.19     2.081     4.500     68.282
    OVERFLOW<07: (000500)        .00      .000      .000       .000

                  TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                  CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                  PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=   50.114
                  TIME SHIFT OF PEAK FLOW         (min)=    30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.6072E+00

------------------------------------------------------------------------------
003:0009----------------------------------------------------------------------
------------------------------------------------------------------------------
003:0002----------------------------------------------------------------------
------------------------------------------------------------------------------
003:0002----------------------------------------------------------------------
  ** END OF RUN :   3

********************************************************************************




--------------------
| START            |  Project  dir.: C:\PROGRA~1\SWMHYMO\E073-067\POST-1~1\
--------------------  Rainfall dir.: C:\PROGRA~1\SWMHYMO\E073-067\POST-1~1\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 004
    NSTORM=   1
           #  1=C:\Program Files\SWMHYMO\E073-067\C25.stm
------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
```

```
*#*****************************************************************************
*#  Project Name: [ Go Transit Extendsion  ]    Project Number: [  E073-067
*#  Date        : 07-26-2010
*#  Modeller    : [  E. Liu      ]
*#  Company     : UMA Engineering Ltd.
*#  License #   :  3005209
*#*****************************************************************************
*#****MANTENANCE YARD POST CONDITIONS EXCLUDING EXTERNAL AREA******************
*#*****************************************************************************
*#****TORONTO BLOOR ST RAINFALL DATA 12 HOURS 2 TO 100 YEAR CHICAGO STORM ******
*#*****************************************************************************
------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: C:\Program Files\SWMHYMO\E073-067\C25.st
| Ptotal= 113.93 mm|    Comments: 12 HR CGO-25 YR
--------------------
             TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
              hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
              .08   3.302 |   3.08   8.744 |   6.08   7.915 |   9.08   4.383
              .17   3.349 |   3.17   9.331 |   6.17   7.711 |   9.17   4.336
              .25   3.398 |   3.25  10.030 |   6.25   7.520 |   9.25   4.290
              .33   3.450 |   3.33  10.877 |   6.33   7.340 |   9.33   4.246
              .42   3.503 |   3.42  11.931 |   6.42   7.172 |   9.42   4.202
              .50   3.558 |   3.50  13.286 |   6.50   7.012 |   9.50   4.160
              .58   3.615 |   3.58  15.110 |   6.58   6.862 |   9.58   4.119
              .67   3.675 |   3.67  17.734 |   6.67   6.719 |   9.67   4.079
              .75   3.738 |   3.75  21.926 |   6.75   6.583 |   9.75   4.040
              .83   3.803 |   3.83  30.072 |   6.83   6.454 |   9.83   4.002
              .92   3.871 |   3.92  57.678 |   6.92   6.331 |   9.92   3.964
             1.00   3.942 |   4.00 211.502 |   7.00   6.214 |  10.00   3.928
             1.08   4.017 |   4.08  71.614 |   7.08   6.102 |  10.08   3.892
             1.17   4.095 |   4.17  43.804 |   7.17   5.995 |  10.17   3.857
             1.25   4.177 |   4.25  33.062 |   7.25   5.893 |  10.25   3.823
             1.33   4.264 |   4.33  27.134 |   7.33   5.795 |  10.33   3.790
             1.42   4.355 |   4.42  23.303 |   7.42   5.701 |  10.42   3.757
             1.50   4.451 |   4.50  20.589 |   7.50   5.610 |  10.50   3.725
             1.58   4.553 |   4.58  18.550 |   7.58   5.524 |  10.58   3.694
             1.67   4.661 |   4.67  16.952 |   7.67   5.440 |  10.67   3.664
             1.75   4.776 |   4.75  15.660 |   7.75   5.360 |  10.75   3.634
             1.83   4.897 |   4.83  14.590 |   7.83   5.283 |  10.83   3.604
             1.92   5.028 |   4.92  13.686 |   7.92   5.208 |  10.92   3.575
             2.00   5.167 |   5.00  12.911 |   8.00   5.136 |  11.00   3.547
             2.08   5.316 |   5.08  12.238 |   8.08   5.066 |  11.08   3.520
             2.17   5.477 |   5.17  11.646 |   8.17   4.999 |  11.17   3.493
             2.25   5.650 |   5.25  11.122 |   8.25   4.934 |  11.25   3.466
             2.33   5.838 |   5.33  10.653 |   8.33   4.871 |  11.33   3.440
             2.42   6.043 |   5.42  10.231 |   8.42   4.810 |  11.42   3.414
             2.50   6.266 |   5.50   9.848 |   8.50   4.751 |  11.50   3.389
             2.58   6.512 |   5.58   9.500 |   8.58   4.693 |  11.58   3.365
             2.67   6.783 |   5.67   9.181 |   8.67   4.638 |  11.67   3.340
             2.75   7.085 |   5.75   8.888 |   8.75   4.584 |  11.75   3.317
             2.83   7.423 |   5.83   8.617 |   8.83   4.531 |  11.83   3.293
             2.92   7.805 |   5.92   8.366 |   8.92   4.480 |  11.92   3.270
             3.00   8.241 |   6.00   8.133 |   9.00   4.431 |  12.00   3.248

------------------------------------------------------------------------------
004:0003----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    4.50
```

```
| 01:  100  DT= 5.00 |   Total Imp(%)=   90.00   Dir. Conn.(%)=   90.00
----------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.05          .45
     Dep. Storage     (mm)=       1.00         6.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     173.50        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     211.50        75.38
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.64 (ii)   10.54 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .29          .11
                                                    *TOTALS*
     PEAK FLOW       (cms)=       2.11          .06          2.148 (iii)
     TIME TO PEAK    (hrs)=       4.00         4.08          4.000
     RUNOFF VOLUME    (mm)=     112.93        61.91        107.825
     TOTAL RAINFALL   (mm)=     113.93       113.93        113.926
     RUNOFF COEFFICIENT   =        .99          .54           .946
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (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.

--------------------------------------------------------------------------------
004:0004----------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  5.0 min.
|  IN>01:(  100 )   |
| OUT<10:(001000)   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    1.037  .1125E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (  100 )       4.50     2.148     4.000    107.825
     OUTFLOW<10: (001000)       4.50      .805     4.167    107.825
    OVERFLOW<09: (005000)        .00      .000      .000       .000

                   TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                   CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                   PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=   37.460
                   TIME SHIFT OF PEAK FLOW         (min)=    10.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=.9001E-01

--------------------------------------------------------------------------------
004:0005----------------------------------------------------------------------
--------------------
| CALIB STANDHYD     |   Area    (ha)=    2.49
| 02:  200  DT= 5.00 |   Total Imp(%)=   60.00   Dir. Conn.(%)=   60.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.49         1.00
     Dep. Storage     (mm)=       1.00         6.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     129.00        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     211.50        75.38
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.21 (ii)   10.11 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .30          .11
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .81          .14           .890 (iii)
     TIME TO PEAK    (hrs)=       4.00         4.08          4.000
     RUNOFF VOLUME    (mm)=     112.93        61.91         92.521
     TOTAL RAINFALL   (mm)=     113.93       113.93        113.926
     RUNOFF COEFFICIENT   =        .99          .54           .812
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (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.

--------------------------------------------------------------------------------
004:0006----------------------------------------------------------------------
--------------------
| CALIB STANDHYD     |   Area    (ha)=   25.20
| 03: 300   DT= 5.00 |   Total Imp(%)=   32.00   Dir. Conn.(%)=   32.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.06        17.14
     Dep. Storage     (mm)=       1.00         6.00
     Average Slope     (%)=        .50          .50
     Length            (m)=     410.00        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     211.50        50.36
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       5.43 (ii)   19.51 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=        .20          .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=       3.25         1.54          3.778 (iii)
     TIME TO PEAK    (hrs)=       4.00         4.25          4.000
     RUNOFF VOLUME    (mm)=     112.93        61.91         78.237
     TOTAL RAINFALL   (mm)=     113.93       113.93        113.926
     RUNOFF COEFFICIENT   =        .99          .54           .687

       (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.

--------------------------------------------------------------------------------
004:0007----------------------------------------------------------------------
```

```
--------------------
| ADD HYD (000500) | ID: NHYD     AREA     QPEAK   TPEAK   R.V.      DWF
--------------------              (ha)     (cms)   (hrs)   (mm)    (cms)
                ID1 10:001000     4.50      .805    4.17 107.83    .000
               +ID2 02:  200      2.49      .890    4.00  92.52    .000
               +ID3 03: 300      25.20    3.778    4.00  78.24    .000
                ==========================================================
                SUM 05:000500    32.19    5.200    4.00  83.48    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
004:0008----------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  5.0 min.
|  IN>05:(000500)   |
| OUT<06:(000600)   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    2.064  .6030E+00
                           .047  .4000E+00   |    2.725  .6950E+00
                           .907  .4440E+00   |    3.219  .7640E+00
                          1.564  .5300E+00   |    3.747  .8520E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >05: (000500)      32.19     5.200     4.000     83.478
     OUTFLOW<06: (000600)      32.19     2.724     4.417     83.478
    OVERFLOW<07: (000500)        .00      .000      .000       .000

                  TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                  CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                  PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=   52.383
                  TIME SHIFT OF PEAK FLOW         (min)=    25.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.6955E+00

--------------------------------------------------------------------------------
004:0009----------------------------------------------------------------------
--------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
004:0002----------------------------------------------------------------------
  ** END OF RUN :   4

********************************************************************************




--------------------
| START            |  Project  dir.: C:\PROGRA~1\SWMHYMO\E073-067\POST-1~1\
--------------------  Rainfall dir.: C:\PROGRA~1\SWMHYMO\E073-067\POST-1~1\
    TZERO =   .00 hrs on       0
    METOUT=   2 (output = METRIC)
    NRUN  = 005
    NSTORM=   1
          #  1=C:\Program Files\SWMHYMO\E073-067\C50.stm
--------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
*#**************************************************************************
*#  Project Name: [ Go Transit Extendsion  ]    Project Number: [  E073-067
*#  Date        : 07-26-2010
*#  Modeller    : [  E. Liu      ]
*#  Company     : UMA Engineering Ltd.
*#  License #   :  3005209
*#**************************************************************************
*#****MANTENANCE YARD POST CONDITIONS EXCLUDING EXTERNAL AREA******************
*#**************************************************************************
*#****TORONTO BLOOR ST RAINFALL DATA 12 HOURS 2 TO 100 YEAR CHICAGO STORM ******
*#**************************************************************************
--------------------------------------------------------------------------------
005:0002----------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: C:\Program Files\SWMHYMO\E073-067\C50.st
| Ptotal= 125.62 mm|    Comments: 12 HR CGO-50 YR
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	3.598	3.08	9.588	6.08	8.673	9.08	4.785
.17	3.650	3.17	10.236	6.17	8.449	9.17	4.733
.25	3.704	3.25	11.007	6.25	8.238	9.25	4.683
.33	3.761	3.33	11.943	6.33	8.041	9.33	4.634
.42	3.819	3.42	13.108	6.42	7.854	9.42	4.587
.50	3.879	3.50	14.607	6.50	7.678	9.50	4.541
.58	3.942	3.58	16.628	6.58	7.512	9.58	4.495
.67	4.008	3.67	19.536	6.67	7.355	9.67	4.451
.75	4.077	3.75	24.189	6.75	7.205	9.75	4.408
.83	4.148	3.83	33.253	6.83	7.063	9.83	4.366
.92	4.223	3.92	64.119	6.92	6.928	9.92	4.325
1.00	4.301	4.00	237.640	7.00	6.799	10.00	4.285
1.08	4.383	4.08	79.732	7.08	6.676	10.08	4.246
1.17	4.469	4.17	48.574	7.17	6.558	10.17	4.208
1.25	4.559	4.25	36.583	7.25	6.445	10.25	4.170
1.33	4.654	4.33	29.981	7.33	6.338	10.33	4.134
1.42	4.754	4.42	25.719	7.42	6.234	10.42	4.098
1.50	4.860	4.50	22.704	7.50	6.135	10.50	4.063
1.58	4.972	4.58	20.441	7.58	6.039	10.58	4.029
1.67	5.091	4.67	18.669	7.67	5.947	10.67	3.995
1.75	5.217	4.75	17.236	7.75	5.859	10.75	3.962
1.83	5.351	4.83	16.051	7.83	5.774	10.83	3.930
1.92	5.494	4.92	15.050	7.92	5.692	10.92	3.899
2.00	5.647	5.00	14.193	8.00	5.613	11.00	3.868
2.08	5.811	5.08	13.448	8.08	5.536	11.08	3.837
2.17	5.987	5.17	12.794	8.17	5.462	11.17	3.808
2.25	6.178	5.25	12.214	8.25	5.390	11.25	3.779
2.33	6.385	5.33	11.696	8.33	5.321	11.33	3.750
2.42	6.610	5.42	11.229	8.42	5.254	11.42	3.722
2.50	6.856	5.50	10.807	8.50	5.189	11.50	3.694
2.58	7.127	5.58	10.422	8.58	5.126	11.58	3.667
2.67	7.426	5.67	10.070	8.67	5.065	11.67	3.641
2.75	7.759	5.75	9.746	8.75	5.006	11.75	3.615
2.83	8.131	5.83	9.447	8.83	4.948	11.83	3.589
2.92	8.553	5.92	9.171	8.92	4.892	11.92	3.564
3.00	9.033	6.00	8.913	9.00	4.838	12.00	3.539

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--------------------------------------------------------------------------------
005:0003----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    4.50
| 01:  100  DT= 5.00 |   Total Imp(%)=   90.00   Dir. Conn.(%)=   90.00
----------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.05          .45
     Dep. Storage     (mm)=       1.00         6.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     173.50        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     237.64        89.83
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.52 (ii)    9.88 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .29          .11
                                                    *TOTALS*
     PEAK FLOW       (cms)=       2.40          .07         2.443 (iii)
     TIME TO PEAK    (hrs)=       4.00         4.08         4.000
     RUNOFF VOLUME    (mm)=     124.62        71.60       119.315
     TOTAL RAINFALL   (mm)=     125.62       125.62       125.616
     RUNOFF COEFFICIENT   =        .99          .57          .950
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (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.

--------------------------------------------------------------------------------
005:0004----------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  5.0 min.
|  IN>01:(  100 )   |
| OUT<10:(001000)   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    1.037  .1125E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (  100 )       4.50     2.443     4.000    119.315
     OUTFLOW<10: (001000)       4.50      .903     4.167    119.315
    OVERFLOW<09: (005000)        .00      .000      .000       .000

                  TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                  CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                  PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=   36.948
                  TIME SHIFT OF PEAK FLOW         (min)=    10.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.1011E+00

--------------------------------------------------------------------------------
005:0005----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    2.49
| 02:  200  DT= 5.00 |   Total Imp(%)=   60.00   Dir. Conn.(%)=   60.00
----------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.49          1.00
     Dep. Storage     (mm)=       1.00          6.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     129.00         40.00
     Mannings n           =       .013          .250

     Max.eff.Inten.(mm/hr)=     237.64         89.83
               over (min)        5.00         10.00
     Storage Coeff.  (min)=       2.11 (ii)    9.47 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=        .31           .12
                                                    *TOTALS*
     PEAK FLOW       (cms)=        .92           .17          1.018 (iii)
     TIME TO PEAK    (hrs)=       4.00          4.08          4.000
     RUNOFF VOLUME    (mm)=     124.62         71.60        103.410
     TOTAL RAINFALL   (mm)=     125.62        125.62        125.616
     RUNOFF COEFFICIENT   =        .99           .57           .823
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (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.

--------------------------------------------------------------------------------
005:0006----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=   25.20
| 03: 300   DT= 5.00 |   Total Imp(%)=   32.00   Dir. Conn.(%)=   32.00
----------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.06         17.14
     Dep. Storage     (mm)=       1.00          6.00
     Average Slope     (%)=        .50           .50
     Length            (m)=     410.00         40.00
     Mannings n           =       .013          .250

     Max.eff.Inten.(mm/hr)=     237.64         59.89
               over (min)        5.00         20.00
     Storage Coeff.  (min)=       5.19 (ii)   18.32 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=        .21           .06
                                                    *TOTALS*
     PEAK FLOW       (cms)=       3.73          1.91          4.379 (iii)
     TIME TO PEAK    (hrs)=       4.00          4.25          4.000
     RUNOFF VOLUME    (mm)=     124.62         71.60         88.567
     TOTAL RAINFALL   (mm)=     125.62        125.62        125.616
     RUNOFF COEFFICIENT   =        .99           .57           .705

       (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.

--------------------------------------------------------------------------------
005:0007--------------------------------------------------------------------------
--------------------
| ADD HYD (000500) | ID: NHYD     AREA     QPEAK   TPEAK   R.V.     DWF
--------------------              (ha)     (cms)   (hrs)   (mm)   (cms)
                 ID1 10:001000     4.50     .903    4.17 119.31    .000
                +ID2 02:  200      2.49    1.018    4.00 103.41    .000
                +ID3 03: 300      25.20    4.379    4.00  88.57    .000
                 ==================================================
                 SUM 05:000500    32.19    5.995    4.00  94.01    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
005:0008--------------------------------------------------------------------------
---------------------
| ROUTE RESERVOIR   |    Requested routing time step =  5.0 min.
|  IN>05:(000500)   |
| OUT<06:(000600)   |    =========  OUTFLOW STORAGE TABLE  =========
---------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                           (cms)    (ha.m.)   |    (cms)    (ha.m.)
                            .000  .0000E+00   |    2.064  .6030E+00
                            .047  .4000E+00   |    2.725  .6950E+00
                            .907  .4440E+00   |    3.219  .7640E+00
                           1.564  .5300E+00   |    3.747  .8520E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------        (ha)     (cms)     (hrs)       (mm)
     INFLOW >05: (000500)      32.19     5.995     4.000     94.013
     OUTFLOW<06: (000600)      32.19     3.211     4.417     94.013
    OVERFLOW<07: (000500)        .00      .000      .000      .000

                  TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                  CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                  PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=   53.560
                  TIME SHIFT OF PEAK FLOW         (min)=    25.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.7632E+00

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005:0009--------------------------------------------------------------------------
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005:0002--------------------------------------------------------------------------
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005:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
005:0002--------------------------------------------------------------------------
--------------------------------------------------------------------------------
005:0002--------------------------------------------------------------------------
  ** END OF RUN :   5

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--------------------
| START            |  Project  dir.: C:\PROGRA~1\SWMHYMO\E073-067\POST-1~1\
--------------------  Rainfall dir.: C:\PROGRA~1\SWMHYMO\E073-067\POST-1~1\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 006
    NSTORM=   1
           #  1=C:\Program Files\SWMHYMO\E073-067\C100.stm
--------------------------------------------------------------------------------
006:0002--------------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [ Go Transit Extendsion  ]    Project Number: [  E073-067
*#  Date        : 07-26-2010
*#  Modeller    : [  E. Liu      ]
*#  Company     : UMA Engineering Ltd.
*#  License #   :  3005209
*#*************************************************************************
*#****MANTENANCE YARD POST CONDITIONS EXCLUDING EXTERNAL AREA******************
*#*************************************************************************
*#****TORONTO BLOOR ST RAINFALL DATA 12 HOURS 2 TO 100 YEAR CHICAGO STORM ******
*#*************************************************************************
--------------------------------------------------------------------------------
006:0002--------------------------------------------------------------------------
--------------------
| READ STORM       |    Filename: C:\Program Files\SWMHYMO\E073-067\C100.s
| Ptotal= 138.30 mm|    Comments: 12 HR CGO-100 YR
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	3.931	3.08	10.507	6.08	9.502	9.08	5.232
.17	3.988	3.17	11.220	6.17	9.255	9.17	5.176
.25	4.048	3.25	12.068	6.25	9.024	9.25	5.121
.33	4.109	3.33	13.097	6.33	8.806	9.33	5.067
.42	4.173	3.42	14.379	6.42	8.602	9.42	5.015
.50	4.239	3.50	16.030	6.50	8.409	9.50	4.964
.58	4.308	3.58	18.254	6.58	8.226	9.58	7.915
.67	4.380	3.67	21.459	6.67	8.053	9.67	4.866
.75	4.455	3.75	26.590	6.75	7.889	9.75	4.819
.83	4.534	3.83	36.596	6.83	7.733	9.83	4.773
.92	4.616	3.92	70.755	6.92	7.584	9.92	4.728
1.00	4.702	4.00	263.602	7.00	7.442	10.00	4.684
1.08	4.791	4.08	88.052	7.08	7.307	10.08	4.641
1.17	4.886	4.17	53.534	7.17	7.178	10.17	4.599
1.25	4.985	4.25	40.274	7.25	7.054	10.25	4.558
1.33	5.089	4.33	32.981	7.33	6.936	10.33	4.518
1.42	5.199	4.42	28.277	7.42	6.822	10.42	4.479
1.50	5.315	4.50	24.952	7.50	6.713	10.50	4.441
1.58	5.438	4.58	22.457	7.58	6.609	10.58	4.403
1.67	5.568	4.67	20.503	7.67	6.508	10.67	4.366
1.75	5.706	4.75	18.925	7.75	6.411	10.75	4.330
1.83	5.853	4.83	17.619	7.83	6.317	10.83	4.295
1.92	6.010	4.92	16.517	7.92	6.227	10.92	4.261
2.00	6.178	5.00	15.573	8.00	6.140	11.00	4.227
2.08	6.358	5.08	14.753	8.08	6.056	11.08	4.193
2.17	6.552	5.17	14.033	8.17	5.975	11.17	4.161
2.25	6.761	5.25	13.395	8.25	5.897	11.25	4.129
2.33	6.988	5.33	12.825	8.33	5.821	11.33	4.097
2.42	7.236	5.42	12.312	8.42	5.747	11.42	4.067

```
            2.50   7.506 |   5.50  11.847 |   8.50   5.676 |  11.50   4.037
            2.58   7.803 |   5.58  11.424 |   8.58   5.607 |  11.58   4.007
            2.67   8.131 |   5.67  11.037 |   8.67   5.540 |  11.67   3.978
            2.75   8.497 |   5.75  10.681 |   8.75   5.475 |  11.75   3.949
            2.83   8.906 |   5.83  10.353 |   8.83   5.411 |  11.83   3.921
            2.92   9.369 |   5.92  10.048 |   8.92   5.350 |  11.92   3.894
            3.00   9.897 |   6.00   9.765 |   9.00   5.290 |  12.00   3.867

--------------------------------------------------------------------------------
006:0003----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    4.50
| 01:  100  DT= 5.00 |   Total Imp(%)=   90.00   Dir. Conn.(%)=   90.00
----------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.05          .45
     Dep. Storage     (mm)=       1.00         6.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     173.50        40.00
     Mannings n           =       .013         .250

     Max.eff.Inten.(mm/hr)=     263.60       105.10
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.41 (ii)    9.33 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=        .30          .12
                                                    *TOTALS*
     PEAK FLOW       (cms)=       2.69          .09         2.739 (iii)
     TIME TO PEAK    (hrs)=       4.00         4.08         4.000
     RUNOFF VOLUME    (mm)=     137.30        82.36        131.804
     TOTAL RAINFALL   (mm)=     138.30       138.30        138.297
     RUNOFF COEFFICIENT   =        .99          .60           .953
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (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.

--------------------------------------------------------------------------------
006:0004----------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR  |    Requested routing time step =  5.0 min.
|  IN>01:(  100 )  |
| OUT<10:(001000)  |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    1.037  .1125E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >01: (  100 )       4.50     2.739     4.000    131.804
     OUTFLOW<10: (001000)       4.50     1.003     4.167    131.804
    OVERFLOW<09: (005000)        .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   36.596
                    TIME SHIFT OF PEAK FLOW         (min)=    10.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.1125E+00

--------------------------------------------------------------------------------
006:0005----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=    2.49
| 02:  200  DT= 5.00 |   Total Imp(%)=   60.00   Dir. Conn.(%)=   60.00
----------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.49          1.00
     Dep. Storage     (mm)=       1.00          6.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     129.00         40.00
     Mannings n           =       .013          .250

     Max.eff.Inten.(mm/hr)=     263.60        105.10
               over (min)        5.00         10.00
     Storage Coeff.  (min)=       2.02 (ii)    8.94 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=        .31           .12
                                                    *TOTALS*
     PEAK FLOW       (cms)=       1.03          .20          1.146 (iii)
     TIME TO PEAK    (hrs)=       4.00         4.08          4.000
     RUNOFF VOLUME    (mm)=     137.30        82.36        115.323
     TOTAL RAINFALL   (mm)=     138.30       138.30        138.297
     RUNOFF COEFFICIENT   =        .99          .60           .834
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (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.

--------------------------------------------------------------------------------
006:0006----------------------------------------------------------------------
----------------------
| CALIB STANDHYD     |   Area    (ha)=   25.20
| 03: 300   DT= 5.00 |   Total Imp(%)=   32.00   Dir. Conn.(%)=   32.00
----------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.06         17.14
     Dep. Storage     (mm)=       1.00          6.00
     Average Slope     (%)=        .50           .50
     Length            (m)=     410.00         40.00
     Mannings n           =       .013          .250

     Max.eff.Inten.(mm/hr)=     263.60         82.39
               over (min)        5.00         15.00
     Storage Coeff.  (min)=       4.98 (ii)   16.54 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=        .22           .07
                                                    *TOTALS*
     PEAK FLOW       (cms)=       4.21          2.42          5.257 (iii)
     TIME TO PEAK    (hrs)=       4.00         4.17          4.000
```

```
     RUNOFF VOLUME    (mm)=     137.30        82.36         99.941
     TOTAL RAINFALL   (mm)=     138.30       138.30        138.297
     RUNOFF COEFFICIENT   =        .99          .60           .723
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.

       (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.

--------------------------------------------------------------------------------
006:0007----------------------------------------------------------------------
--------------------
| ADD HYD (000500) | ID: NHYD     AREA     QPEAK   TPEAK   R.V.     DWF
--------------------               (ha)     (cms)   (hrs)   (mm)   (cms)
                ID1 10:001000     4.50    1.003    4.17 131.80    .000
               +ID2 02:  200      2.49    1.146    4.00 115.32    .000
               +ID3 03: 300      25.20    5.257    4.00  99.94    .000
                ==================================================
                SUM 05:000500    32.19    7.070    4.00 105.59    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
006:0008----------------------------------------------------------------------
--------------------
| ROUTE RESERVOIR   |    Requested routing time step =  5.0 min.
|  IN>05:(000500)   |
| OUT<06:(000600)   |    =========  OUTLFOW STORAGE TABLE  =========
--------------------    OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
                          (cms)    (ha.m.)   |    (cms)    (ha.m.)
                           .000  .0000E+00   |    2.064  .6030E+00
                           .047  .4000E+00   |    2.725  .6950E+00
                           .907  .4440E+00   |    3.219  .7640E+00
                          1.564  .5300E+00   |    3.747  .8520E+00

     ROUTING RESULTS            AREA     QPEAK     TPEAK       R.V.
     --------------------       (ha)     (cms)     (hrs)       (mm)
     INFLOW >05: (000500)      32.19     7.070     4.000    105.585
     OUTFLOW<06: (000600)      32.19     3.743     4.417    105.585
    OVERFLOW<07: (000500)        .00      .000      .000       .000

                  TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                  CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                  PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=   52.945
                  TIME SHIFT OF PEAK FLOW         (min)=    25.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=.8547E+00

--------------------------------------------------------------------------------
006:0009----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
--------------------------------------------------------------------------------
006:0002----------------------------------------------------------------------
      FINISH
--------------------------------------------------------------------------------
********************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
 001:0003 CALIB STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 001:0005 CALIB STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 002:0003 CALIB STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 002:0005 CALIB STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 003:0003 CALIB STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 003:0005 CALIB STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 004:0003 CALIB STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 004:0005 CALIB STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 005:0003 CALIB STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 005:0005 CALIB STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 006:0003 CALIB STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 006:0005 CALIB STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
 006:0006 CALIB STANDHYD
      *** WARNING: Storage Coefficient is smaller than DT!
                   Use a smaller DT or a larger area.
   Simulation ended on 2010-11-11     at 16:24:30
================================================================================
```