CONDELAND ENGINEERING LTD.
CONSULTING ENGINEERS, PLANNERS, PROJECT MANAGERS

FUNCTIONAL SERVICING REPORT

FOR

PROPOSED RESIDENTIAL DEVELOPMENT

2147925 ONTARIO INC.

LOCATED IN THE HAMLET OF GLEN WILLIAMS

McMASTER STREET & MEAGAN DRIVE

TOWN OF HALTON HILLS (GEORGETOWN)

Revised September 2017

C.E. FILE: 09-015

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TABLE OF CONTENTS

APPENDIX 'B3' *Internal and External Sanitary Sewer Design Sheets prepared by Condeland Engineering Limited*

APPENDIX 'C' Stormwater Management

- Summary Output Files of SWMHYMO modeling
- Pre-development 2year, 5year, 25year, 50 year, 100 year
- Post-development 2year, 5year, 25year, 50 year, 100 year

APPENDIX 'D' Conceptual Design Figures

- Fig. 1, Glen Williams Pump Station Sanitary Tributary Plan
- Fig. 2, Sanitary Drainage Area Plan
- Fig. 3, General Servicing Plan
- Fig. 4, Proposed Grading Plan
- Fig. 5, Pre-development Storm Drainage Area Plan
- Fig. 6, Post-development Storm Drainage Area Plan

A.0. INTRODUCTION

The 2147925 Ontario Inc. property is located south-west of McMaster Street and Meagan Drive and immediately south of the former railway line, in the Hamlet of Glen Williams, Town of Halton Hills. South-west of the property is Eighth (8th) Line road. The site is surrounded by existing low density residential areas with open agricultural lands abutting the north-west limit. The site area is approximately 6.88 Hectares (17.00 Acres) in size and is irregular in shape. 2147925 Ontario Inc. proposes to develop the above site as a single family house development consisting of a total of 32 units. Refer to Appendix 'A' for the proposed Draft Plan of Subdivision as prepared by Mathews Planning and Management Ltd. which also includes a site location map (key plan).

In support of the proposed development, we provide this report to identify the methodology of the municipal servicing. This report will provide rationale and justification for proposed municipal services for the development; more specifically the report will substantiate the ability to provide municipal sanitary sewer, municipal water and a conceptual resolution for storm water management.

The conceptual engineering designs developed and evaluated herein for the provision of municipal servicing systems in support of the proposed development are in general conformity with good engineering practices and the guidelines and criteria of the Town of Halton Hills, Credit Valley Conservation Authority, and the Ministry of the Environment.

8.0 EXISTING TOPOGRAPHICAL CHARACTERISTICS AND DRAINAGE PATTERNS.

The natural topography for the site falls from the north at an approximate elevation of 275.00 metres to the south (at 271.00m) with average 1.0% slope.

The site for the most part is void of trees with the exception to the south boundary where there are small groupings of trees. Given the type of development proposed and the nature of disturbance related to construction activities and grading changes, we anticipate these trees can be preserved.

The site drains in four main directions. Approximately, 39% of the site (2.056 Ha) drains towards the existing ditch on 8th Line via two 450mm diameter culverts. The south part of the property, approximately (1.731 Ha) and (2.892 Ha) drains towards existing 450mm Dia. culvert located on the 8th line Road via existing ditches. The runoff is then captured by DICB which routes the flow using a 675mm Dia, concrete STM pipe located on the south side of 8th line running parallel with the eighth line. The final destination of the runoff is Silver Creek through road side ditches of Wildwood Road. The balance pf the of the site drains towards outlet 5 using existing ditch along former railway right-of way. Refer to Figure 5, Pre-development Storm Drainage Plan in Appendix 'D' for an illustration of the existing drainage patterns.

C.0. SANITARY SEWAGE CONVEYANCE AND TREATMENT

C.1. Sanitary Servicing and Conveyance

To substantiate the ability to provide sanitary servicing for the 2147925 Ontario Inc. development a conceptual sanitary sewage conveyance system is detailed as follows.

A gravity sanitary sewer system is proposed to service all 32 residential lots of the subject development. Refer to Appendix 'D' for Figure 2, Sanitary Drainage Area Plan detailing sanitary drainage catchments for the subject lands. As identified on the plan a proposed 250mm diameter sanitary sewer can easily accommodate sanitary flows from the proposed development. It is also acknowledged the gradient of the sanitary sewer will be a minimum of 1% as required by the Region of Halton. Also included on Figure 2 is the proposed sanitary sewer design chart and as indicated the invert elevation of the sewer at its upstream end (MH15A) is 271.90 metres which is approximately 2.5 metres below finished road grade, having more than sufficient depth to service the residential lots

To convey flows to the Glen Williams Pump Station an **external sanitary conveyance sewer** is required. The route of the proposed external sewer is illustrated on Figure 1 in Appendix 'D' and extends from property limit at Meagan Drive, easterly along Oak Ridge Drive, northerly along Wildwood Road to Confederation Street, and then crossing the Credit River to the Glen Williams Pump Station (off Main Street).

C.2. Glen Williams Pump Station Capacity Analysis

Figure 1 (Appendix 'D') illustrates the proposed / existing tributary sanitary drainage areas to the Glen Williams Pump Station and incorporates; the existing Sheridan development, future Bayfield and Rinaldi

developments off of Confederation Street, existing residential and commercial areas, an existing school, and the Subject development lands – 2147925 Ontario Inc. (Devins).

We reviewed the Stantec Consulting Ltd.'s "Master Servicing Plan and Financial Implementation Report – Sanitary and Water Servicing" Report which spoke to basically the same drainage area as described above. Excerpts of the Stantec report are attached in Appendix 'B'.

This capacity analysis will serve to some extent a refinement of the tributary area discussed within the aforementioned Master Servicing Plan Report. In support of the analysis refer to the following Appendices:

B1: Excerpts from Master Servicing Plan and Financial Implementation Report –Sanitary and Water Servicing prepared by Stantec Consulting Ltd. dated July 30, 2007:
- Section 3.1 - Sanitary Servicing Requirement
- Figure 3 – Sanitary Drainage Area Plan
- Section 5.3.2 - Preliminary Design, Reserve Capacity, and Opportunities for Upgrading
- Sanitary Sewer Design Sheet

B2: Pump Station Site Plan & Main Street Plan & Profile As Built drawings prepared by Stantec Consulting Ltd

B3: Internal and External Sanitary Sewer Design Sheets prepared by Condeland Engineering Limiited.

Master Servicing Plan Summary Brief

The Hamlet of Glen Williams is generally on private sewage systems. The Stantec report illustrates the preliminary tributaries assessment and the orientation of the sanitary sewer. The development included 308 residential units, a school property, and surrounding commercial properties. Refer to Appendix 'B1' and Table 1 (below) for a detailed breakdown. Specifically, this includes 158 residential units within Sheridan, Bayfield, and Rinaldi (Northwest) Development, 150 future residential connections, the existing Glen Williams Public School and surrounding commercial properties. Sufficient capacity within the existing Silver Creek trunk sanitary sewer has been confirmed.

Review and Assessment

An updated sanitary tributary plan (Figure 1) and design sheet was prepared based on current information and is attached in Appendices D & B3 respectively. Included in the updated tributary plan is 338 residential units, the school and commercial properties. Consistent with the Master Servicing Plan Report, we have applied the same criteria to establish flow, namely 3.5 persons/unit with infiltration. Below is Table 1 which provides a summary comparing the updated sanitary drainage catchment area to the Master Servicing Plan Report, and our flow determination is 45.92 lps compared to 49.13 lps established previously.

The existing "Sheridan" Development has been completed with 89 lots, and is connected to the Glen Williams Pumping Station. We have included for your ease of reference As Built drawings of the Glen Williams Pumping Station and Main Street Plan & Profile, refer to Appendix 'B2'.

The "Bayfield" and "Rinaldi" Developments have not proceeded yet nor has the construction of the sanitary gravity drain to the pumping station. We are proposing to include the subject "Devins" Development, which consist of 32 residential units, as part of this system. Our flow determination for the residential developments is 20.79 lps compared to 24.00 lps established previous. We have maintained the flows allotted by the Master Servicing Plan Report for existing residential, school, and commercial properties of 25.13 lps.

TABLE 1: GLEN WILLIAMS EXISTING PUMP CAPACITY ANALYSIS

	Stantec's MSP (July 2007)				Condeland's Update (June 2017)			
	Units	Area (ha)	Pop	Flow (lps)	Units	Area (ha)	Pop	Flow (lps)
CONSTRUCTED SHERIDAN DEVELOPMENT	91.0	36.0	319.0	14.00	89.0	20.4	312.0	9.88
PROPOSED BAYFIELD DEVELOPMENT	35.0	12.0	123.0	5.00	34.0	8.0	119.0	3.89
PROPOSED RINALDI (NORTHWEST) DEVELOPMENT	32.0	11.0	112.0	5.00	33.0	6.9	116.0	3.54
NEWLY PROPOSED DEVINS DEVELOPMENT	**NOT INCLUDED**				32.0	6.9	112.0	3.48
SUB-TOTAL RESIDENTIAL DEVELOPMENTS	**158.0**	**59.0**	**554.0**	**24.00**	**188.0**	**42.2**	**659.0**	**20.79**
ALLOWANCE FOR EXISTING RESIDENTIAL UNITS	150.0	52.5	525.0	22.00	150.0	52.5	525.0	22.00
TOTAL RESIDENTIAL	**308.0**	**111.5**	**1079.0**	**46.00**	**338.0**	**94.7**	**1184.0**	**42.79**
EXISTING COMMERCIAL (90 persons / ha)		1.5	135.0	1.88		1.5	135.0	1.88
EXISTING SCHOOL (40 persons / ha)		1.5	60.0	1.25		1.5	60.0	1.25
TOTAL	**308.0**	**114.5**	**1274.0**	**49.13**	**338.0**	**97.7**	**1379.0**	**45.92**
GLEN WILLIAMS PUMP CAPACITY (LPS)				50.00				50.00
EXCESS (LPS)				**0.87**				**4.08**

The existing Glen Williams Pumping Station has a capacity of 50 litres per second. The developments of 188 residential lots of "Sheridan", "Bayfield", "Rinaldi", and "Devins" Subdivisions utilize 20.79 lps compared to 24.00 lps established in the 2007 Master Servicing Plan Report. While the remaining surplus capacity could be distributed to service existing/future school/commercial/residential properties as outlined in the Master Servicing Plan Report.

C.3. Treatment

Halton Region staff reported that the Georgetown Wastewater Treatment Plant (WWTP) has sufficient hydraulic capacity to accommodate the build out of the Georgetown urban area including the Hamlets of Norval, Stewarttown and Glen Williams.

D.0. WATER SUPPLY AND DISTRIBUTION

D.1. Water Supply

The subject development lies in an area that is serviced by an integrated water supply system that is fed by several ground water wells, specifically; the Cedervale Well field, the Princess Anne Well field, and the Lindsay Court Well. In addition, the Georgetown water Purification Plant (WPP) treats ground water pumped from the Cedervale well field.

Class EA projects and studies by the Region of Halton are on-going to investigate the feasibility of obtaining additional water supply for Georgetown and surrounding areas.

When additional water supply capacity is released by the Region the Town of Halton Hills will determine the allocation process.

As confirmed by the previous consultant for this development area, hydrant flow testing was conducted in June 2006 under the supervision of the Region of Halton. Static pressures of 38 psi were recorded at the hydrants located at the McMaster Street / Oak Ridge Drive and the Meagan Drive/McMaster Street intersections. The hydrants on Oak Ridge Drive are at an approximate elevation of 275 metres and with proposed grades for the subject development lots ranging from 0.50 to 2.50 metres lower, will serve to slightly increase the static pressure (0.7-3.5 psi) for the new lots. Further hydrant flow testing revealed a 4 psi drop in static pressure (residual pressure) at the Meagan Drive hydrant after opening the hydrant at McMaster Street, with a recorded flow of 88 U.S.GPM.

Although these measured pressures are slightly below the minimum Regional criteria of 40 psi they are typical for the area and therefore the proposed development will not adversely impact supply to the surrounding residential lands.

D.2. Water Distribution

Water servicing distribution for the subject development will be provided by the proposed installation of a 250mm diameter watermain along Street A. Refer to Figure 3, General Servicing Plan in Appendix 'D' for the proposed watermain alignment. As indicated on the plan the watermain will connect to existing 250mm diameter watermain stubs on both McMaster Street and Meagan Drive. In addition, a proposed interconnection to the existing 200mm/300mm diameter watermain on Eighth Line is shown from the subject lands via an existing 10 metre wide Regional servicing easement between existing residential properties. This interconnection will serve to improve fire flow pressures for the current development.

6.0. PROPOSED ROAD GRADE AND LOT GRADING DESIGN

6.1. Road Grade Design

Refer to Figure 4, Proposed Grading Plan enclosed in Appendix 'D' for the conceptual road and lot grading design for the subject development. As noted on the plan Street A is a "crescent" type road with grade connections to existing McMaster Street and Meagan Drive, along the subject land's north-east limit. The proposed road grade is designed to direct major storm overland flow from McMaster Street and Meagan Drive south-westerly to an overall low-point adjacent to the proposed Stormwater Management (SWM) Pond Block (Block 33). The Street A road connections to both McMaster Street and Meagan Drive will create a road high-point confirming that no external drainage from the existing municipal right-of-ways will be conveyed into the subject development. Due to downstream storm outlet constraints, we have elevated the proposed SWM Pond as much as possible and in doing so Street A has been designed with flatter grades (minimum of 0.50%) and requires "saw-backs" to ensure the overland flow route is maintained. "Saw-backs" refer to localized low-points designed to ensure minimum road grades are maintained for effective drainage while still providing major overland flow routing via cascading flows. It should also be noted that the proposed angle bends have been designed with centerline road grades of 1.0% or greater ensuring gutter longitudinal slopes on the outside radius of the bends are at a minimum of 0.70% for adequate drainage.

6.2. Lot Grading Design

As described in the preceding section and as illustrated on Figure 4 the road grades range from a minimum of 0.50% to a maximum of 1.0%. The road is somewhat elevated as compared with the perimeter of the development area where existing grades must be matched. Therefore the proposed

front lot grades are in general slightly higher than the rear lot grades. To accommodate this grading condition a split-lot drainage style is proposed for all of the residential lots. As indicated on the Proposed Grading Plan, Figure 4, the grade differential between the front and the rear is minimal which results in very common house styles. Back-splits and basement walkout styles will not likely be possible, unless forced by artificially raising the houses. As the majority of lots back onto existing surrounding properties rear yard drainage will have to be intercepted by rear lot swales and then captured by rear lot catchbasins to direct storm drainage to the proposed storm sewer system. The storm drainage design will be detailed in the next section of this report.

F.0. STORMWATER MANAGEMENT QUANTITY AND QUALITY CONTROL

F.1 Existing Conditions

Drainage from the subject lands is conveyed in four sub catchments as noted below, as discussed in Section B and illustrated in Figure 5, in Appendix 'D':

The Soil type in this area is "Oneida clay loam", which has a well draining characteristic as noted from the Halton County Soil Maps prepared by the Canadian Department of Agriculture.

F.2 Proposed Conditions

F.2.1 Quantity Control

Utilizing SWMHYMO 99 Version 4.02 program we have modeled the 2year, 5year, 25year, 50year, and the 100year SCS Storm events.

Below is the summary of the predevelopment flows for the various storm events in cubic meters per second.

Storm Event	300	301	302	303	303+304
2yr	0.12	0.023	0.11	0.19	0.30
5yr	0.154	0.029	0.141	0.243	0.384
10yr	0.194	0.032	0.172	0.293	0.466
25yr	0.304	0.056	0.275	0.472	0.747
50yr	0.340	0.063	0.307	0.529	0.836
100yr	0.381	0.07	0.344	0.591	0.934

Subcatchment 300 represents the north area of the plan which includes .200 Ha of external flow from the existing subdivision, Sub area 301 represents 0.287 Ha located centrally in the plan and drains through two existing homes fronting the 8th line . Sub Area 302 and 303, which represents a substantial portion of the subject lands , some 2.892 Ha, drains also to the 8th line, following existing swales on either side of an existing home on the 8th line. Eventually flows from area 302 and 303 cross the 8th line via culvert then captured by a DICB into an existing 675mm storm sewer running parallel with the 8th line falling towards Wildwood Road. We have combined the flows from sub area 302 and 303 for the purposes of comparison with post development conditions. It is our proposal to maintain some of the current outlets in order to meet the existing grading conditions surrounding the site. Alternatively, if the municipality prefers the removal of the extraneous flows, rear lot catchbasins could be introduced and the drainage would be diverted to the Proposed Storm Water Management Pond.

Under Post development conditions we have subdivided the area into three sub catchments, area 600, rear yard drainage, will outlet at the same location as area 300; area 601, again rear yard drainage, will outlet at the same location as area 301; and area 602 which includes the balance of the plan, roads, driveways, homes and front yard drainage, and will discharge to the pond, will compare with the combined pre-development flows of Sub area 302 and 303.

Below is the summary of the post-development flows for the various storm events in cubic meters per second.

	600	601	602
2yr	0.023	0.017	0.446

5yr	0.030	0.022	0.534
10yr	0.022	0.026	0.532
25yr	0.058	0.045	0.92
50yr	0.065	0.050	1.008
100yr	0.073	0.056	1.155

In our preliminary analysis we have used the subroutine "Compute Volume" to provide a volume required during the 100 year storm. Based on the output file found in Appendix "C "the total storage required is 1,800 cubic meters. At elevation 273.50 the total active storage available in the SWM pond is 2,000 cubic meters. Details of the pond design and control structure will be provided at Detailed Engineering Design stage.

F.2.2 Quality Control

For Outlet 4, Water Quality control for the subject lands will be addressed by storage and extended storage within the proposed pond,

Storage and Extended Storage

Quality control will be based on Level 1 or Enhanced Protection in accordance with Table 3.2 of the Storm Water Management Planning and Design Manual, March 2003.

Table 3.0 Quality Control Analysis

Watershed Area (Hectares)	Enhanced Protection Volume (cum) (140cum/Ha)	Extended Detention Volume (cum) (40cum/Ha)	Storage required (cum)
5.496	769.44	Included in 140cum/ha	769.44

Based on the preliminary base Pond elevation of 267.35 the Permanent Storage provided is 850 cu.m.

To ensure 24 Hour drawn down time plus 10% freebaord we are proposing to use IPEX Inlet Control Device (ICD) within the proposed control structure.

For Sub catchment areas 600 and 601, given the soil types, infiltration trenches along the rear lot lines will be feasible.

6.0. PROPOSED EROSION CONTROL MEASURES

Prior to the Building Construction Program, the installation of a silt control fence will be in place surrounding the disturbed area of the site with allowance for construction access. This will control the quality of runoff and localize the areas of intense erosion and sedimentation. The perimeter properties are to be protected via siltation control fence. Regular maintenance and all necessary repairs shall be performed including the safe disposal of all sediment material. Maintenance, which in most cases will require the removal of sediment and the installation of a new device, shall be conducted when the level of performance of the implemented control device is reduced to less than 40% of its initial capacity based on the Engineers observation.

H.0. CONCLUSIONS AND RECOMMENDATIONS

In summary, the existing municipal services are such that they can support the subject development.

On a basis of our investigation and examination, it is the conclusion of the writer that:

- The subject development can be drained for sanitary sewage purposes;
- The existing municipal water supply infrastructure is readily available to the subject development subject to Council allocation of capacity when it becomes available;
- Adequate storm drainage and storm water management facilities for both quantitative and qualitative can be provided within the subject development area to neutralize the impact of urbanized runoff.

Respectfully submitted by:

CONDELAND ENGINEERING LIMITED

Consulting Engineers, Planners, Project Managers

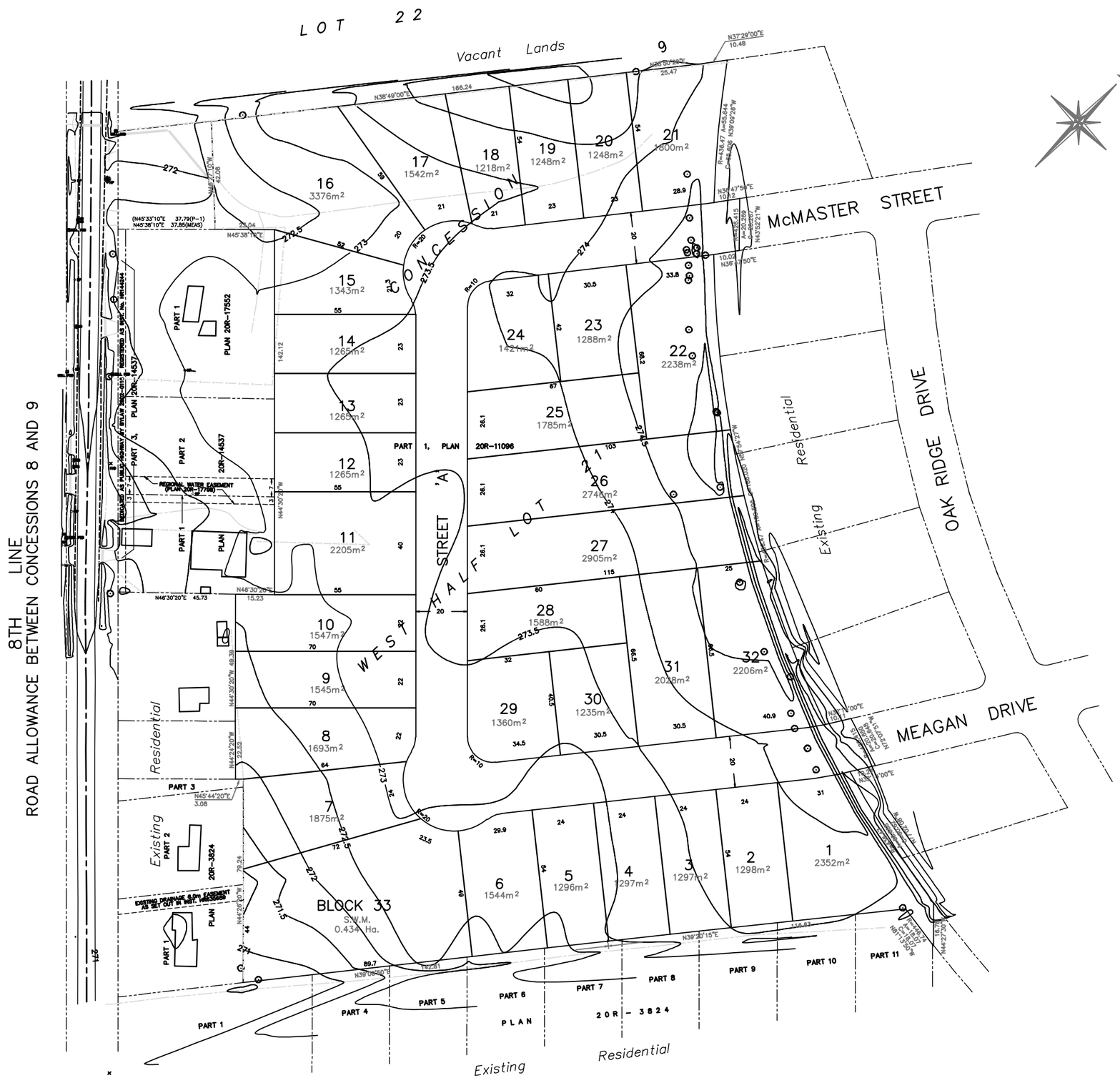
PROFESSIONAL ENGINEER
M. E. HALL
SEP 0 6 2017
PROVINCE OF ONTARIO

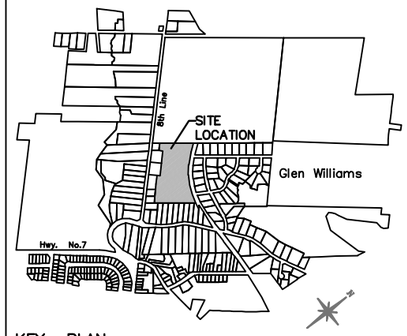
Robert DeAngelis, P. Eng,
Principal

Michael Hall, P. Eng,
Senior Engineer

APPENDIX 'A'

Draft Plan of Subdivision prepared
by Matthews Planning & Management Ltd.





KEY PLAN
NOT TO SCALE

DRAFT PLAN OF SUBDIVISION

OF

PART OF LOT 21
CONCESSION 9
(GEOGRAPHIC TOWNSHIP OF ESQUESING)
TOWN OF HALTON HILLS
REGIONAL MUNICIPALITY OF HALTON

SCALE: 1:750

25m 0 25 50m

METRIC:
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

GENERAL NOTES

LAND USE	LOTS/BLOCKS	AREA(Ha.)
SINGLE-DETACHED RESIDENTIAL (@ 5 UNITS/NET Ha.)	LOTS 1-32	5.432
STORMWATER MANAGEMENT POND	BLOCK 33	0.434
ROAD 20m RIGHT-OF-WAY x 472m LENGTH		1.020
TOTAL AREA		6.886 Hectares

ADDITIONAL NOTES

(UNDER SECTION 51 (2) OF THE PLANNING ACT)

INFORMATION REQUIRED BY CLAUSES a,b,c,e,f,g,j & l SHOWN ON DRAFT PLAN AND KEY PLAN.

(d) RESIDENTIAL, SWM POND
(h) MUNICIPAL SUPPLY TO BE MADE AVAILABLE
(i) CLAY LOAM
(k) FULL MUNICIPAL SERVICES TO BE MADE AVAILABLE

OWNERS CERTIFICATE

2147925 ONTARIO INC. BEING THE REGISTERED OWNERS OF THE SUBJECT LANDS HEREBY AUTHORIZE MATTHEWS PLANNING & MANAGEMENT LTD. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

2147925 ONTARIO INC.

SURVEYORS CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

MAY 14, 2009

DAN C. DOLLIVER, ONTARIO LAND SURVEYOR
DOLLIVER SURVEYING INC.

CANADIAN INSTITUTE OF PLANNERS — MEMBER — INSTITUT CANADIEN DES URBANISTES
DAVID MATTHEWS

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PLOTTED: MAY 29, 2009 FILE: DEVINS-R2.DWG

APPENDIX 'B'

Sanitary Servicing

APPENDIX 'B1' *Excerpts from Master Servicing Plan and Financial Implementation Report – Sanitary and Water Servicing prepared by Stantec Consulting Ltd. dated July 30, 2007:*

- Section 3.1 - Sanitary Servicing Requirement
- Figure 3 – Sanitary Drainage Area Plan
- Section 5.3.2 - Preliminary Design, Reserve Capacity, and Opportunities for Upgrading
- Sanitary Sewer Design Sheet

APPENDIX 'B2' *Pump Station Site Plan & Main Street Plan & Profile As Built drawings prepared by Stantec Consulting Ltd.*

APPENDIX 'B3' *Internal and External Sanitary Sewer Design Sheets prepared by Condeland Engineering Limited*

APPENDIX 'B1'

Excerpts from Master Servicing Plan and Financial Implementation Report – Sanitary and Water Servicing prepared by Stantec Consulting Ltd. dated July 30, 2007:

- Section 3.1 - Sanitary Servicing Requirement
- Figure 3 – Sanitary Drainage Area Plan
- Section 5.3.2 - Preliminary Design, Reserve Capacity, and Opportunities for Upgrading
- Sanitary Sewer Design Sheet

Appendix B-1 i)

3.0 Proposed Servicing Requirements

3.1 SANITARY SERVICING REQUIREMENTS

As previously noted herein, the sanitary system is to be designed to accommodate all three proposed developments. Two different methods were used to obtain the theoretical peak design flow for the system.

The first method was based on the contributing residential area from all three developments of 60 ha and a population density of 55 persons/ha. However, based on the requirement of the Secondary Plan that limits the size of the individual lots to be no less that 0.25 acres, the density of 55 persons/ha is considered too high and not a representative figure. Therefore, the theoretical peak flow calculated using this method was not considered to be a good representation of the actual flows.

The second method for the calculation of the theoretical peak flow was based on the number of contributing dwelling units. Based on the anticipated Draft Plans for the three developments, a total of 158 units is expected. Using a population density of approximately 3.5 persons per unit, this method yielded a theoretical peak flow of 24 l/s.

Therefore, the latter method (based on the number of contributing units) was used to determine the theoretical peak design flow for the proposed sanitary sewer system. Detailed calculations are attached in Appendix D. The following Figure 3 provides the approximate contributing area and contributing population for each development.

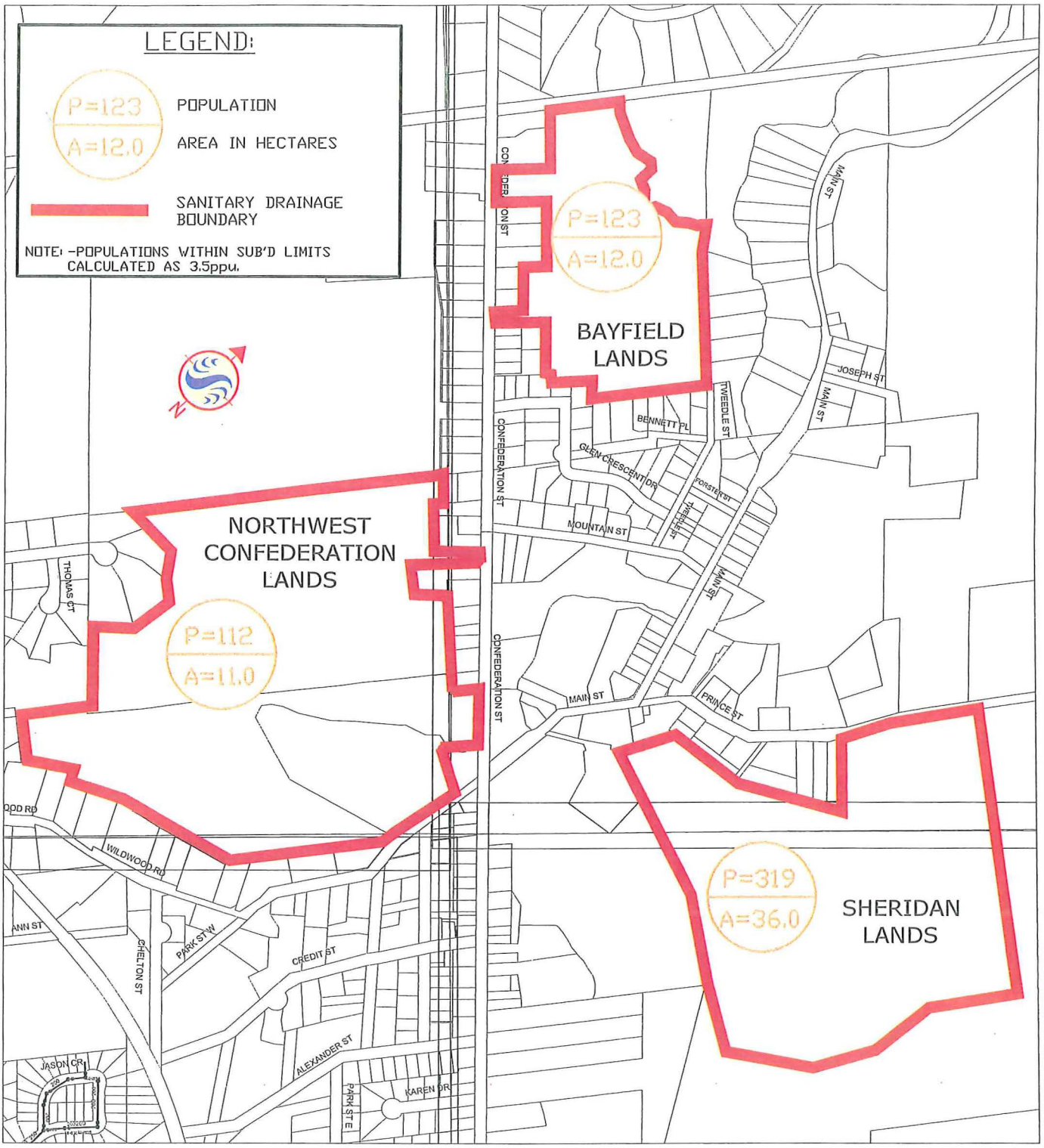
The sanitary system was sized to accommodate approximately two times the theoretical peak flow of 24 l/s, or 50 l/s, providing a residual capacity of 25 l/s for future connections in the Hamlet. Refer to section 5.3.2 for a discussion on residual or additional capacity.

3.2 WATER SERVICING REQUIREMENTS

A watermain distribution analysis was completed for the proposed Sheridan, Bayfield and Northwest Confederation lands. The intent of the analysis is to determine the appropriate watermain sizes that will distribute domestic and fire flow water demand scenarios in accordance with Region of Halton (Region) and Ministry of the Environment (MOE) pressure and distribution criteria. Refer to Appendix E for supporting calculations and select correspondence.

In order to provide adequate water circulation and fire protection capacity, the Sheridan lands require a second feed, in addition to the existing watermain on Prince Street, and an internally looped watermain connection. Based on preliminary modeling, it is recommended that a looped connection also be provided for the Bayfield and Northwest Confederation lands, although it is not required to achieve minimum fire protection flows. The details of the connections can be

Appendix B-1 ii)



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2006-08-16 03:58PM By: bleguerrier

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GLEN WILLIAMS

MASTER SERVICING REPORT

SANITARY DRAINAGE AREA PLAN

FIGURE 3

DATE: AUGUST 2006
PROJECT: 1603-10944
SCALE: N.T.S.

Appendix B-1 iii)

- The depth to the existing groundwater elevation at the top of the slope ranges from 16 m to 18 m below ground surface, which is nearly equivalent to the height of the slope itself. Therefore, the proposed sewer pipe will be situated above the groundwater table from the top of the slope to nearly the toe of the slope
- Trenchless technology is the construction methodology being proposed to install the sewer/watermain and therefore no granular pipe bedding materials are required. Oftentimes it is the granular bedding material that acts as a conduit for preferential groundwater movement; however, that will not be the case with the trenchless method
- The alignment of the proposed sewer/watermain is parallel to the interpreted groundwater flow direction and therefore the sewer/watermain will not intercept groundwater as it is already traveling in the same down gradient flow direction as the sewer/watermain

5.3 SELECTION OF RECOMMENDED ALTERNATIVE AND PRELIMINARY DESIGN

5.3.1 Sanitary Servicing

As a result of the evaluation and discussions with the key agencies, etc., Pumping Station Alternative 4C combined with Sanitary Sewer Alternative 2A for the Sheridan lands and Sanitary Sewer Alternative 2 for the Bayfield lands are the recommended alternatives comprising the total servicing solution. The Northwest Confederation lands will connect into the pumping station directly via a sewer across the Credit River (in combination with proposed gravity sewers down Confederation Street for the Bayfield lands), as previously described in Section 4.1.2.2.

5.3.2 Preliminary Design, Reserve Capacity, and Opportunities for Upgrading

The calculated theoretical flow from the three proposed developments requires a pumping station to accommodate a flow of 24 l/s. However, the owners of the Sheridan property have indicated a willingness to provide a forcemain and to oversize the pumping station to provide approximately twice the required flow, or 50 l/s. The additional cost of the oversizing would be apportioned to the Sheridan lands only and not cost-shared between the three developers.

The proposed residual capacity could be allocated to service the school located on Prince Street, the existing commercial businesses (up to a total area of 1.5 ha) and approximately 150 additional homes or single detached equivalent units (SDEs). The supporting sanitary calculations are attached as Appendix D.

A preliminary design of the proposed sewage pumping station and forcemain was completed and a memo indicating the details of this design is attached as Appendix H. Both the pumping station and the forcemain were designed to accommodate a peak flow of 50 l/s. The pumping station would consist of a 3000 mm diameter wet well at a depth of approximately 10 m, along with two fixed speed submersible style wastewater pumps. A separate control building

(approximately 35 m^2) will house the pump controls, generator, odor control system and other services. The station would require a 600V, three phase service, and would include an alarm and standby power generator with an automatic transfer switch. The station would be equipped with a bypass connection to allow for the connection of a portable pump in the event of an emergency or during major modifications. In the event of a complete failure of the station, an emergency gravity overflow will be installed.

A 200 mm diameter forcemain is required to accommodate the proposed flows.

A preliminary design of the recommended alternative has been completed including a site plan of the proposed pumping station and a profile that includes the proposed overflow for the pumping station. Please refer to Appendix G for an illustration of both the site plan and the profile.

During the design of the overflow at the pumping station, it was determined that since some of the basements of the existing homes on the west side of the river are at elevations lower than the river, there is not an overflow that would protect these basements in the case of a flood. Therefore, either backflow prevention valves would need to be provided, or sanitary services that provide for main floor levels only could be provided. If a service that accommodates main floor levels only is provided, the existing sanitary sewers on Mullen Place cannot be used, as the sewer system will not be low enough to accommodate them.

5.3.3 Water Servicing

There is an existing watermain system within the Hamlet; therefore, it is recommended that the Bayfield and Northwest Confederation lands connect into the existing system as discussed in Section 3.2 of this study.

The recommended route for the second watermain connection into the Sheridan lands is via the existing slope. This alternative coincides with the recommended alternative for the gravity sanitary sewer. Installing both the watermain and gravity sewer via the slope minimizes the impacts to the existing residents on Prince Street during construction and provides for an efficient design and construction procedure.

Appendix B-1 iv)

Stantec

SUBDIVISION
Glen Williams - Proposed Allocation of Residual Capacity

DATE: July 25, 2006
DESIGNED BY: JMK
CHECKED BY:

SANITARY SEWER

DESIGN SHEET

Region of Halton

DESIGN PARAMETERS

AVERAGE DAILY FLOW PER PERSON = 275 l/p/day

MINIMUM VELOCITY = 0.600 m/s
n = 0.013
MAX PEAK FAC.= 4.500
MIN PEAK FAC.= 1.500

RESIDENTIAL: 0.000003183 cums/Ha
COMMERCIAL: 0.00028646 cums/Ha
INDUSTRIAL: 0.00039786 cums/Ha
INSTITUTIONAL: 0.0004 cums/Ha
INFILTRATION: 0.000286 cums/Ha
RESIDENTIAL HARMON PEAKING FACTOR

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INDUST		INSTIT		C+I+I	INFILTRATION			TOTAL	PIPE					
STREET	FROM M.H.	TO M.H.	AREA (ha)	POP. DENSITY (p/ha)	EQUIV. POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (m3/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (m3/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (m3/s)	FLOW (m3/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (m3/s)	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
School Site																										
Start of Run																0.000	0.00	0.00	0.000							
Middle of run	2	1	1.50	40	60	1.50	60	4.298	0.00082							0.000	1.50	1.50	0.000429	0.00125	100.00	200	0.5	0.023	0.73	0.34
End of Run	1															0.000	0.00	1.50	0.000							
Light Commercial																										
Start of Run																0.000	0.00	0.00								
Middle of run	3	1	1.50	90	135	1.50	135	3.365	0.00145							0.000	1.50	1.50	0.000429	0.00188	100.00	200	0.5	0.023	0.73	0.42
End of Run	1															0.000	0.00	1.50	0.000							
Residential																										
Start of Run																0.000	0.00	0.00								
Middle of run	4	1	52.50	10	525	52.50	525	3.963	0.007							0.000	52.50	52.50	0.015	0.022	100.00	200	0.5	0.023	0.73	0.84
End of Run	1															0.000	0.00	52.50	0.015							

Stantec

SUBDIVISION
Sheridan, Pilutti and Bayfield Lands

DATE: April 18, 2006
DESIGNED BY: PQ
CHECKED BY: RCL

SANITARY SEWER

DESIGN SHEET

Region of Halton

DESIGN PARAMETERS

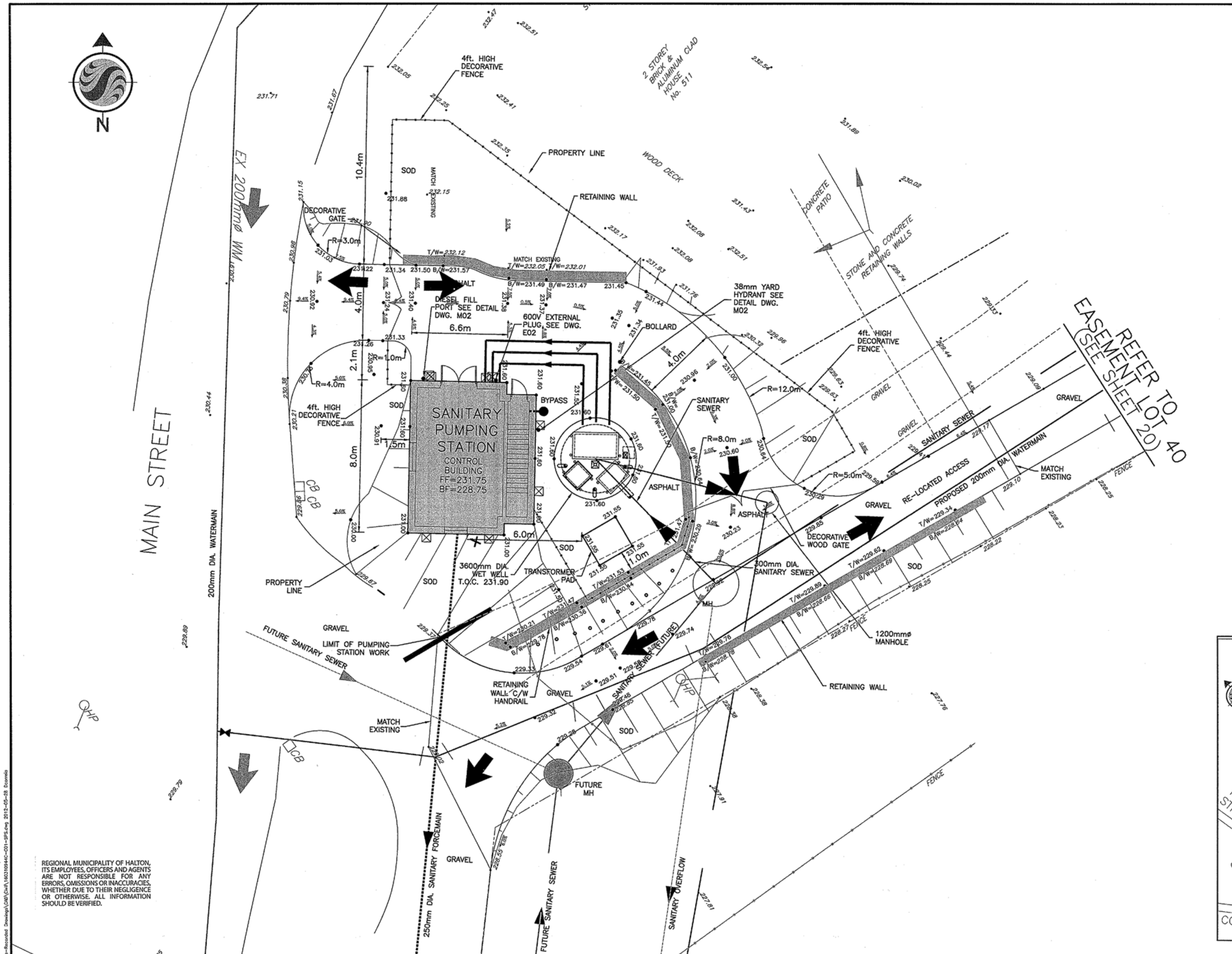
AVERAGE DAILY FLOW PER PERSON =	275	l/p/day	RESIDENTIAL:	0.000003183	cums/Ha
			COMMERCIAL:	0.00028646	cums/Ha
MINIMUM VELOCITY =	0.600	m/s	INDUSTRIAL:	0.00039786	cums/Ha
n =	0.013		INSTITUTIONAL:	0	cums/Ha
MAX PEAK FAC.=	4.500		INFILTRATION:	0.000286	cums/Ha
MIN PEAK FAC.=	1.500		RESIDENTIAL HARMON PEAKING FACTOR		

LOCATION			RESIDENTIAL AREA AND POPULATION						COMM		INDUST		INSTIT		C+I+I	INFILTRATION			TOTAL	PIPE					
STREET	FROM M.H.	TO M.H.	AREA (ha)	POP. DENSITY (p/ha)	POP.*	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (m3/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (m3/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (m3/s)	FLOW (m3/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (m3/s)	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
Sheridan																										
Start of Run					0											0.000	0.00	0.00								
Middle of run	2	1	36.00		319	36.00	319	4.067	0.004							0.000	36.00	36.00	0.010	0.014	100.00	200	0.5	0.023	0.73	0.77
End of Run	1				0											0.000	0.00	36.00	0.010							
Bayfield																										
Start of Run					0											0.000	0.00	0.00								
Middle of run	3	1	12.00		123	12.00	123	4.218	0.002							0.000	12.00	12.00	0.003	0.005	100.00	200	0.5	0.023	0.73	0.55
End of Run	1				0											0.000	0.00	12.00	0.000							
Pilutti																										
Start of Run					0											0.000	0.00	0.00								
Middle of run	4	1	11.00		112	11.00	112	4.230	0.002							0.000	11.00	11.00	0.003	0.005	100.00	200	0.5	0.023	0.73	0.55
End of Run	1				0											0.000	0.00	11.00	0.000							
PS																										
Start of Run					0											0.000	0.00	0.00								
Middle of run	1	PS	0.00	0	554	59.00	554	3.951	0.007							0.000	0.00	59.00	0.017	0.024	100.00	250	0.5	0.042	0.85	0.88
End of Run	PS				0											0.000	0.00	59.00	0.017							

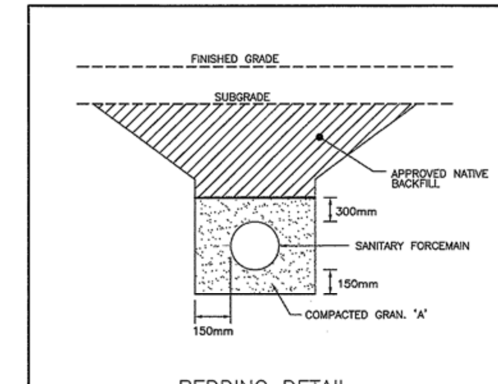
Note: Population based on 3.5 persons per unit

APPENDIX 'B2'

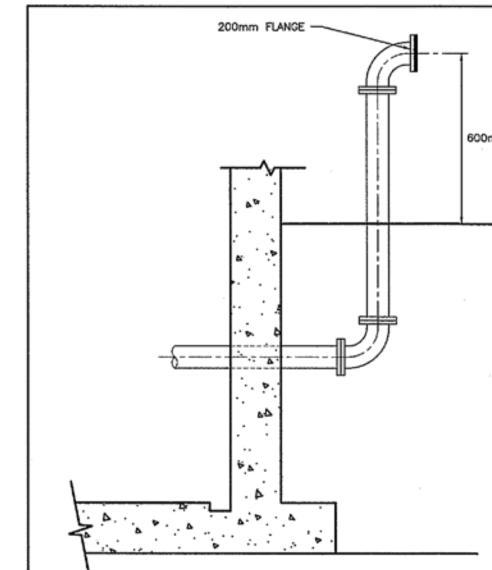
Pump Station Site Plan & Main Street Plan & Profile As Built drawings prepared by Stantec Consulting Ltd.



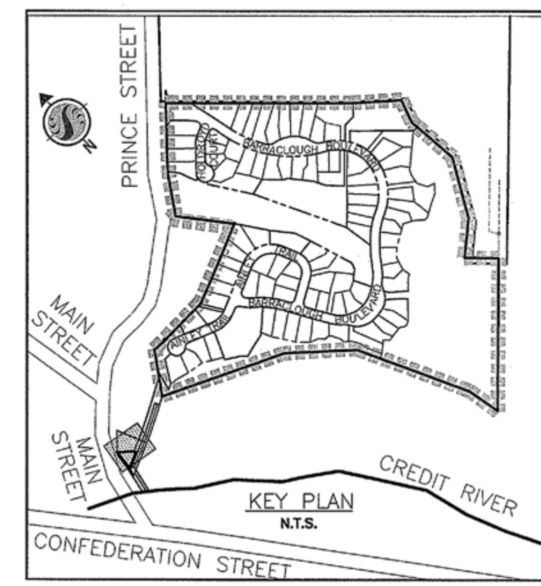
REGIONAL MUNICIPALITY OF HALTON, ITS EMPLOYEES, OFFICERS AND AGENTS ARE NOT RESPONSIBLE FOR ANY ERRORS, OMISSIONS OR INACCURACIES, WHETHER DUE TO THEIR NEGLIGENCE OR OTHERWISE. ALL INFORMATION SHOULD BE VERIFIED.



BEDDING DETAIL
N.T.S.



BYPASS CONNECTION DETAIL
N.T.S.



KEY PLAN
N.T.S.

Notes:

1. BEDDING AND COVER MATERIAL FOR SANITARY SEWERS, SANITARY FORCEMAINS AND SERVICE CONNECTIONS SHALL BE GRANULAR 'A' COMPACTED TO 98% STANDARD PROCTOR DENSITY.
2. ALL SITE GATE VALVES COME WITH STEM OPERATING EXTENSIONS AS REQUIRED TO ENSURE OPERATING NUT IS MAXIMUM 0.3m BELOW GROUND LEVEL.
3. ALL JOINTS & FITTINGS ON FORCEMAIN WITHIN PUMPING STATION SITE ARE TO BE MECHANICALLY RESTRAINED.
4. FORCEMAIN TO BE CLASS 53 DUCTILE IRON OR SERIES 160 PVC.

Legend

- ASPHALT DRIVEWAY
- 307.37 PROPOSED SPOT ELEVATION
- PROPERTY LINE
- BUILDING ACCESS
- X TREES TO BE REMOVED
- HEAVY DUTY SILT FENCE
- TREE PROTECTION SILT FENCE
- EXTERIOR LIGHT

ASPHALT RESTORATION SCHEDULE:

–300mm GRAN 'B' COMPACTED TO 98% SPD
–150mm GRAN 'A' COMPACTED TO 100% SPD

Nº	Date	By	REVISIONS	MANU	CAD
5	MAR 12	BM	AS–RECORDED		X
4	JUN 09	BM	REISSUED FOR CONSTRUCTION		X
3	JUN 08	BM	ISSUED FOR CONSTRUCTION		X
2	APR 08	BM	ISSUED FOR TENDER		X
1	FEB 08	BM	FIRST SUBMISSION		X

Design	RR	Ch'kd	X	Date 2008 APRIL
Drawn	CDK	Ch'kd	X	
Scale 1:100				References

Field Notes

Stamp

APPROVALS

Municipal

Regional

Director, Engineering Services

Manager, Design Services

Stantec Consulting Ltd.
49 Frederick Street Kitchener ON Canada N2H 6M7
Tel. 519 579 4410 Fax. 519 579 8664 www.stantec.com

Halton

TITLE

GLEN WILLIAMS W.W. PUMPING STATION
SITE PLAN
TOWN OF HALTON HILLS
(GEORGETOWN)

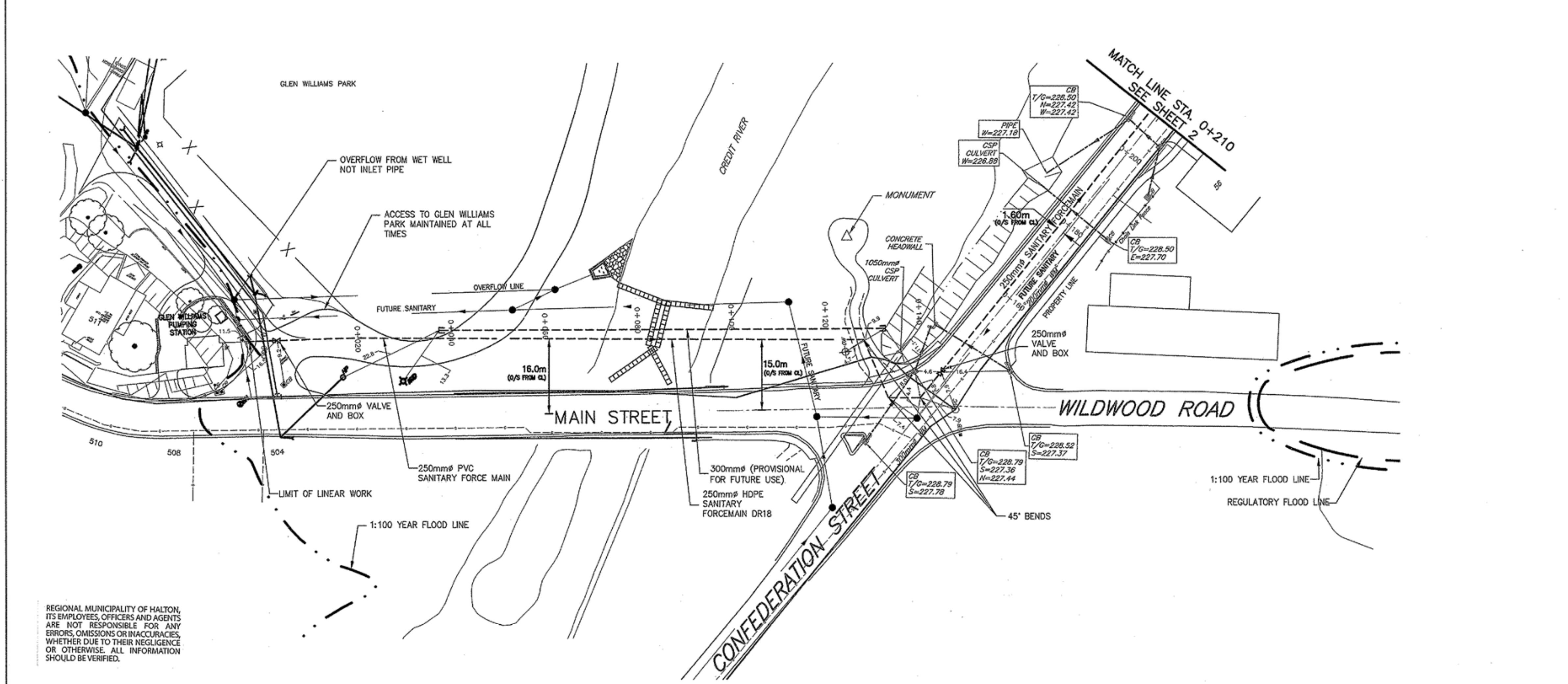
Consultant File Nº 160310944

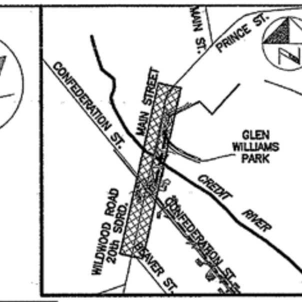
H-01231

CONTRACT Nº DH-0242 08-20944-01

Drawing Nº C01

SHEET OF





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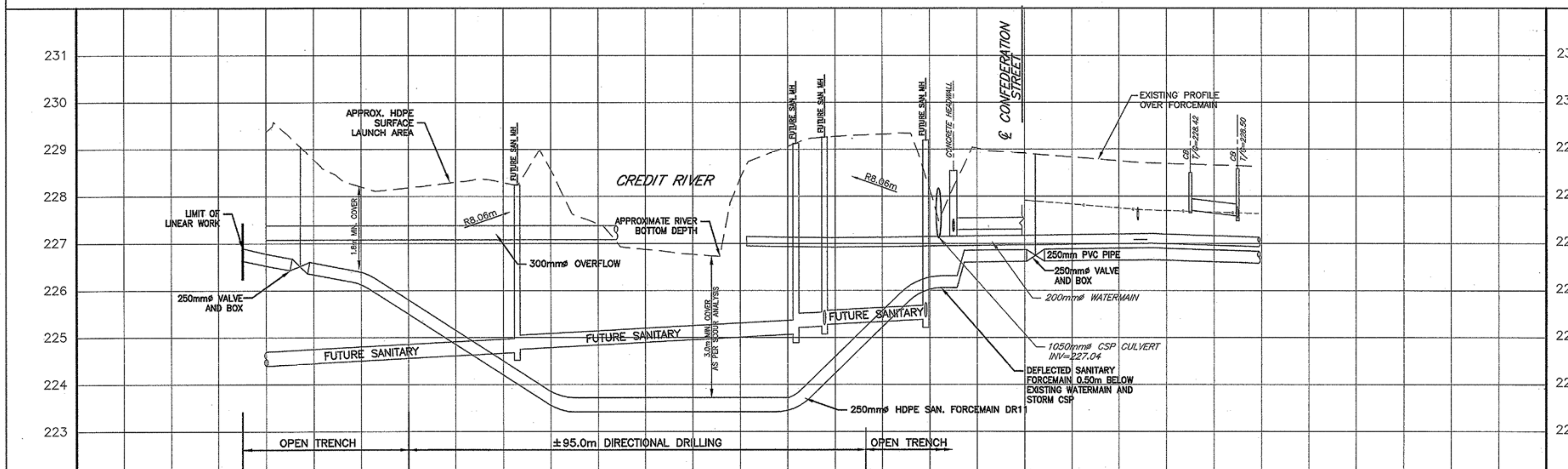
Notes

BENCHMARK:

1. CUT CROSS ON THE NW SIDE OF SIDEWALK OF THE BRIDGE NO. 1 (MAIN ST./CONFEDERATION ST. INTERSECTION). CONTROL STATION 106.
   ELEVATION: 234.028m
   IRON BAR IN SHOULDER EAST OF MAIN ST., SOUTH OF JOSEPH ST. CONTROL STATION 207.
   ELEVATION: 231.383m
2. TOPOGRAPHICAL SURVEY BY STANTEC CONSULTING LTD., DATED APRIL 2006. ADDITIONAL TOPOGRAPHICAL SURVEY BY STANTEC CONSULTING LTD., DATED JUNE 2008.
3. SANITARY FORCEMAIN MATERIAL SHALL BE AS FOLLOWS:
   • UNDERNEATH CREDIT RIVER – 250mm DIA. HIGH DENSITY POLYETHYLENE, DR 18 IN ACCORDANCE W/ CSA B182.6, OPSS 1840 AND OPSD 806.02
   • EVERYWHERE ELSE – PVC DR 18 IN ACCORDANCE W/ CSA B182.2, OPSS 1841 AND OPSD 806.040 AND OPSD 806.06
4. SANITARY FORCEMAIN SHOULD BE INSTALLED IN ACCORDANCE WITH OPSD 802.010 AND 802.014. BEDDING MATERIAL FOR SANITARY FORCEMAIN SHALL BE CLASS B COMPACTED TO MINIMUM 100% STANDARD PROCTOR DENSITY. BACKFILL NATIVE MATERIAL (DIRECTED BY GEOTECHNICAL ENGINEER) COMPACTED TO 100% STANDARD PROCTOR DENSITY.
5. PROPOSED SANITARY FORCEMAIN TO HAVE 1.0m MINIMUM HORIZONTAL SEPARATION FROM EXISTING GAS LINE.
6. REFER TO DETAIL SHEET 8, DWG. C09 FOR TYPICAL ROAD RESTORATION DETAILS.
7. DUMPSITE FOR SURPLUS FILL MATERIAL MAY BE SUBJECT TO SITE ALTERATION BY-LAW NO. 01-076. CONTRACTOR SHALL PROVIDE THE PROPOSED DUMPSITE LOCATION PRIOR TO COMMENCING ANY ON-SITE WORK FOR REVIEW BY THE TOWN.

Legend

- EXISTING STORM MANHOLE
- EXISTING STORM CATCHBASIN MANHOLE
- EXISTING CATCHBASIN
- EXISTING SANITARY MANHOLE
- EXISTING VALVE & BOX
- EXISTING HYDRANT
- PROPOSED SANITARY FORCEMAIN
- EXISTING SANITARY FORCEMAIN
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING STORM SEWER
- EXISTING GAS LINE
- EXISTING DRIP LINE



℄ ELEVATIONS	229.30	228.12	228.22	228.49	228.79	228.30	229.19	228.08	228.84	228.67	228.58	228.52
SANITARY FORCEMAIN INVERTS												
STORM SEWER DRAINAGE INVERTS								N 227.18 W 227.21			S 227.62 N 227.50 E 227.45	
CHAINAGE	0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+180	0+200	0+220

H-01232

Nº	Date	By	REVISIONS	MANU	CAD
9	JUN 10	CM	AS-RECORDED		
8	SEP 09	RW	ISSUED FOR FINAL APPROVAL		
7	AUG 09	RW	ISSUED FOR FINAL APPROVAL		
5	JUL 08	RW	ISSUED FOR FINAL APPROVAL		
4	JUN 08	RW	REVISED FOR APPROVALS		
3	MAY 08	MK	ISSUED FOR APPROVALS		
2	APR 08	RW	ISSUED FOR TENDER		
1	FEB 08	BM	FIRST SUBMISSION		

Design		Ch'kd		Date 2007 NOVEMBER
Drawn		Ch'kd		

Scale 1:500 Horiz. 1:50 Vert.

References

APPROVALS

MUNICIPAL
DESIGN ACCEPTED SUBJECT TO DETAIL CONSTRUCTION CONFORMING TO TOWN OF HALTON HILLS STANDARDS AND SPECIFICATIONS. THIS ACCEPTANCE IS NOT TO BE CONSTRUED AS VERIFICATION OF ENGINEERING CONTENT.
Signed ____________ Dated ____________
Engineering, Public Works & Building Services

REGIONAL
DESIGN OF SANITARY AND WATER SERVICES APPROVED SUBJECT TO DETAIL CONSTRUCTION CONFORMING TO HALTON REGION STANDARDS AND SPECIFICATIONS AND LOCATION APPROVAL FROM AREA MUNICIPALITY.
Signed ____________ Dated ____________
Planning & Public Works Department

Stamp
LICENSED PROFESSIONAL ENGINEER
R. M. WIERSMA
JUNE 4/10
PROVINCE OF ONTARIO

Stantec
Stantec Consulting Ltd.
49 Frederick Street
Kitchener ON Canada
N2H 6M7
Tel. 519 579 4410
Fax. 519 579 8664
www.stantec.com

Halton

SANITARY FORCEMAIN CONSTRUCTION
MAIN STREET
TOWN OF HALTON HILLS (GEORGETOWN)
GLEN WILLIAMS PUMPING STATION TO
JOHN STREET PUMPING STATION

Consultant File Nº 160310944	Regional Drawing Nº DH-0242
CONTRACT Nº #	Drawing Nº C02 SHEET 1 OF 8

APPENDIX 'B3'

Internal and External Sanitary Sewer Design Sheets
prepared by Condeland Engineering Limited

STREET	FROM MH #	TO MH #	NO. OF UNITS	SECTION AREA (ha)	ACCUMULATED AREA (ha)	POPULATION	ACCUMULATED POPULATION	PEAKING FACTOR	PEAK DAY FLOW = (8)(0.003183)(9) (L/s)	INFILTRATION (L/s)	TOTAL FLOW = (10) + (11) (L/s)	PIPE DIAMETER (mm)	TYPE OF PIPE	PIPE LENGTH (m)	SLOPE (%)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	ACTUAL FLOW VELOCITY (m/s)	UPPER END INVERT (m)	UPPER END MH LOSSES (m)	LOWER END INVERT (m)	REMARKS %FULL
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
2147925 ONTARIO INC.																						
STREET "A"	MH15A	MH14A	7	1.241	1.241	25	25	4.37	0.341	0.35	0.696	250	PVC	90.00	1.00%	59.41	1.21		271.900		271.000	1.2%
STREET "A"	MH14A	MH13A	2	0.553	1.794	7	32	4.35	0.436	0.51	0.949	250	PVC	15.14	1.00%	59.41	1.21		270.970	0.03	270.819	1.6%
STREET "A"	MH13A	MH12A	6	1.150	2.944	21	53	4.31	0.720	0.84	1.562	250	PVC	90.00	1.00%	59.41	1.21		270.789	0.03	269.889	2.6%
STREET "A"	MH12A	MH11A	6	1.328	4.272	21	74	4.28	1.001	1.22	2.223	250	PVC	90.00	1.00%	59.41	1.21		269.859	0.03	268.959	3.7%
STREET "A"	MH11A	MH10A	1	0.239	4.511	4	77	4.27	1.047	1.29	2.337	250	PVC	16.74	1.00%	59.41	1.21		268.929	0.03	268.761	3.9%
STREET "A"	MH10A	MH09A	4	0.668	5.179	14	91	4.25	1.232	1.48	2.714	250	PVC	44.40	1.00%	59.41	1.21		268.731	0.03	268.287	4.6%
STREET "A"	MH09A	MH08A	6	1.235	6.414	21	112	4.23	1.508	1.83	3.342	250	PVC	90.00	1.00%	59.41	1.21		268.257	0.03	267.357	5.6%
MEAGAN DRIVE																						
MEAGAN DRIVE	MH08A/MH110A	MH109A	0	0.000	6.414	0	112	4.23	1.508	1.83	3.342	250	PVC	77.76	1.00%	59.41	1.21		267.332	0.025	266.555	5.6%

NOTES:

POPULATION DENSITY (Single Family Residential): New develop.= 55 persons / hectare or 3.5 persons per unit
DESIGN FLOW = 3.183x 10^-3 L/sec per person equivalent to 275 L per day per person
PEAKING FACTOR = $1 + 14/(4+P^{(1/2)})$
WHERE P = POP. IN 1000's
WET WEATHER INFILTRATION 0.286 L/s/ha

Designed by: S.N.
Checked by: M.E.H.
Date: 06-Sep-17

REGION MUNICIPALITY OF HALTON

ENGINEERING AND PUBLIC WORKS DEPARTMENT

SANITARY SEWER DESIGN SHEET

SHEET 1 OF 1

STREET	TRIB. AREA ID	NO. OF UNITS	SECTION AREA (ha)	ACCUMULATED AREA (ha)	POPULATION	ACCUMULATED POPULATION	PEAKING FACTOR	PEAK DAY FLOW = (8)(0.003183)(9) (L/s)	INFILTRATION (L/s)	TOTAL FLOW = (10) + (11) (L/s)								
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**								
CONSTRUCTED SHERIDAN DEVELOPMENT																		
BARRACLOUGH BLVD.	A1	89	20.42	20.42	312	312	4.07	4.043	5.84	9.883								
PROPOSED BAYFIELD DEVELOPMENT																		
CONFEDERATION ST.	A2	34	8.01	8.01	119	119	4.22	1.599	2.29	3.890								
PROPOSED RINALDI (NORTHWEST) DEVELOPMENT																		
CONFEDERATION ST.	A3	33	6.92	6.92	116	116	4.23	1.560	1.98	3.539								
NEWLY PROPOSED DEVINS DEVELOPMENT																		
MEAGAN DR.	A4	32	6.89	6.89	112	112	4.23	1.508	1.97	3.478								

NOTES:

POPULATION DENSITY (Single Family Residential): New develop.= 3.5 persons / unit
(Commercial = 90 persons/ha, Institutional = 40 persons/ha
DESIGN FLOW = 3.183x 10^-3 L/sec per person equivalent to 275 L per day per person
PEAKING FACTOR = $1 + 14/(4+P^{(1/2)})$
WHERE P = POP. IN 1000's
WET WEATHER INFILTRATION 0.286 L/s/ha

Designed by: S.N.
Checked by: M.E.H.
Date: 16-Jun-17

REGION MUNICIPALITY OF HALTON

ENGINEERING AND PUBLIC WORKS DEPARTMENT

DEVELOPMENTS - SANITARY SEWER DESIGN SHEET

SHEET 1 OF 1

APPENDIX 'C'

Stormwater Management

- Summary Output files of SWMHYMO modeling
- Pre-development 2year, 5year, 25year, 50 year, 100 year
- Post-development 2year, 5year, 25year, 50 year, 100 year

```
00001> ================================================================================
00002>
00003>  SSSSS  W   W  M   M  H   H   Y   Y  M   M   OOO         999    999  =========
00004>  S      W W W  MM MM  H   H    Y Y   MM MM  O   O       9   9  9   9
00005>  SSSSS  W W W  M M M  HHHHH     Y    M M M  O   O  ##   9   9  9   9  Ver. 4.02
00006>      S   W W   M   M  H   H     Y    M   M  O   O        9999   9999  July 1999
00007>  SSSSS   W W   H   M  H   H     Y    M   M   OOO           9      9  =========
00008>                                                          9   9  9   9  # 4377549
00009>       StormWater Management HYdrologic Model              999    999  =========
00010>
00011>  ********************************************************************************
00012>  ************************** SWMHYMO-99 Ver/4.02 ***********************************
00013>  *******   A single event and continuous hydrologic simulation model   ********
00014>  *******      based on the principles of HYMO and its successors       ********
00015>  *******                OTTHYMO-83 and OTTHYMO-89.                     ********
00016>  ********************************************************************************
00017>  ******* Distributed by:  J.F. Sabourin and Associates Inc.            ********
00018>  *******                  Ottawa,  Ontario: (613) 727-5199             ********
00019>  *******                  Gatineau, Quebec: (819) 243-6858             ********
00020>  *******                  E-Mail: swmhymo@jfsa.Com                     ********
00021>  ********************************************************************************
00022>
00023>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024>  +++++++ Licensed user: Condeland Engineering Limited                  ++++++++
00025>  +++++++                Toronto                 SERIAL#:4377549       +++++++
00026>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028>  ********************************************************************************
00029>  *******          ++++++ PROGRAM ARRAY DIMENSIONS ++++++                ********
00030>  *******          Maximum value for ID numbers  :     10               ********
00031>  *******          Max. number of rainfall points:  15000               ********
00032>  *******          Max. number of flow points    :  15000               ********
00033>  ********************************************************************************
00034>
00035>
00036>  ********************   D E T A I L E D   O U T P U T   ********************
00037>  ********************************************************************************
00038>  *       DATE: 2009-05-27       TIME: 18:51:58       RUN COUNTER: 000032       *
00039>  ********************************************************************************
00040>  * Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE2YR.dat          *
00041>  * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE2YR.out          *
00042>  * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE2YR.sum          *
00043>  * User comments:                                                              *
00044>  * 1:_____________________________________________________________________     *
00045>  * 2:_____________________________________________________________________     *
00046>  * 3:_____________________________________________________________________     *
00047>  ********************************************************************************
00048>
00049> --------------------------------------------------------------------------------
00050> 001:0001----------------------------------------------------------------------
00051> *#*****************************************************************************
00052> *#  Project Name: [2147925 Ontario Limited]    Project Number: [09-015]
00053> *#  Date        : 05-20-2009
00054> *#  Modeller    : [ROBERT DE ANGELIS]
00055> *#  Company     : Condeland Engineering Limited
00056> *#  License #   :  4377549
00057> *#*****************************************************************************
00058>  --------------------
00059> | START            |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00060>  --------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00061>     TZERO =   4.00 hrs on      0
00062>     METOUT=   2 (output = METRIC)
00063>     NRUN  = 001
00064>     NSTORM=   0
00065> --------------------------------------------------------------------------------
00066> 001:0002----------------------------------------------------------------------
00067>  --------------------
00068> | DESIGN NASHYD     |   Area     (ha)=    2.06   Curve Number    (CN)=81.00
00069> | 01:300    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00070>  --------------------   U.H. Tp(hrs)=    .126
00071>
00072>                              New rainfall entered directly by user.
00073>                              TIME STEP= 5.00 min   # of STEPS= 200
00074>                              DURATION =16.67 hrs   TOTAL RAIN=  43.87 mm
00075>
00076>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00077>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00078>               .08  21.420 |   4.25   1.520 |   8.42   1.520 |  12.58    .760
00079>               .17   1.020 |   4.33   1.520 |   8.50   1.520 |  12.67    .760
00080>               .25   1.020 |   4.42   1.520 |   8.58   1.520 |  12.75    .760
00081>               .33   1.020 |   4.50   1.520 |   8.67   1.520 |  12.83    .760
00082>               .42   1.020 |   4.58   1.520 |   8.75   1.520 |  12.92    .760
00083>               .50   1.020 |   4.67   1.520 |   8.83   1.520 |  13.00    .760
00084>               .58   1.020 |   4.75   1.520 |   8.92   1.520 |  13.08    .760
00085>               .67   1.020 |   4.83   1.520 |   9.00   1.520 |  13.17    .760
00086>               .75   1.020 |   4.92   1.520 |   9.08   1.520 |  13.25    .760
00087>               .83   1.020 |   5.00   1.520 |   9.17   1.520 |  13.33    .760
00088>               .92   1.020 |   5.08   3.050 |   9.25   1.520 |  13.42    .760
00089>              1.00   1.020 |   5.17   3.050 |   9.33   1.520 |  13.50    .760
00090>              1.08   1.020 |   5.25   3.050 |   9.42   1.520 |  13.58    .760
00091>              1.17   1.020 |   5.33   3.050 |   9.50   1.520 |  13.67    .760
00092>              1.25   1.020 |   5.42   3.050 |   9.58   1.520 |  13.75    .760
00093>              1.33   1.020 |   5.50   3.050 |   9.67   1.520 |  13.83    .760
00094>              1.42   1.020 |   5.58   3.050 |   9.75   1.520 |  13.92    .760
00095>              1.50   1.020 |   5.67   3.050 |   9.83   1.520 |  14.00    .760
00096>              1.58   1.020 |   5.75   3.050 |   9.92   1.520 |  14.08    .760
00097>              1.67   1.020 |   5.83   3.050 |  10.00   1.520 |  14.17    .760
00098>              1.75   1.020 |   5.92   4.060 |  10.08   1.020 |  14.25    .510
00099>              1.83   1.020 |   6.00   4.060 |  10.17   1.020 |  14.33    .510
00100>              1.92   1.020 |   6.08   5.840 |  10.25   1.020 |  14.42    .510
00101>              2.00   1.020 |   6.17   5.840 |  10.33   1.020 |  14.50    .510
00102>              2.08   1.020 |   6.25  13.210 |  10.42   1.020 |  14.58    .510
00103>              2.17   1.020 |   6.33  13.210 |  10.50   1.020 |  14.67    .510
00104>              2.25   1.020 |   6.42  28.960 |  10.58   1.020 |  14.75    .510
00105>              2.33   1.020 |   6.50  28.960 |  10.67   1.020 |  14.83    .510
00106>              2.42   1.020 |   6.58  60.450 |  10.75   1.020 |  14.92    .510
00107>              2.50   1.020 |   6.67  60.450 |  10.83   1.020 |  15.00    .510
00108>              2.58   1.020 |   6.75  10.670 |  10.92   1.020 |  15.08    .510
00109>              2.67   1.020 |   6.83  10.670 |  11.00   1.020 |  15.17    .510
00110>              2.75   1.020 |   6.92   6.600 |  11.08   1.020 |  15.25    .510
00111>              2.83   1.020 |   7.00   6.600 |  11.17   1.020 |  15.33    .510
00112>              2.92   1.020 |   7.08   4.830 |  11.25   1.020 |  15.42    .510
00113>              3.00   1.020 |   7.17   4.830 |  11.33   1.020 |  15.50    .510
00114>              3.08   1.020 |   7.25   4.570 |  11.42   1.020 |  15.58    .510
00115>              3.17   1.020 |   7.33   4.570 |  11.50   1.020 |  15.67    .510
00116>              3.25   1.020 |   7.42   3.300 |  11.58   1.020 |  15.75    .510
00117>              3.33   1.020 |   7.50   3.300 |  11.67   1.020 |  15.83    .510
00118>              3.42   1.520 |   7.58   2.790 |  11.75   1.020 |  15.92    .510
00119>              3.50   1.520 |   7.67   2.790 |  11.83   1.020 |  16.00    .510
00120>              3.58   1.520 |   7.75   2.790 |  11.92   1.020 |  16.08    .510
00121>              3.67   1.520 |   7.83   2.790 |  12.00   1.020 |  16.17    .510
00122>              3.75   1.520 |   7.92   2.790 |  12.08   1.020 |  16.25    .510
00123>              3.83   1.520 |   8.00   2.790 |  12.17   1.020 |  16.33    .510
00124>              3.92   1.520 |   8.08   2.790 |  12.25   1.020 |  16.42    .510
00125>              4.00   1.520 |   8.17   2.790 |  12.33   1.020 |  16.50    .510
00126>              4.08   1.520 |   8.25   2.790 |  12.42   1.020 |  16.58    .510
00127>              4.17   1.520 |   8.33   2.790 |  12.50   1.020 |  16.67    .510
00128>
00129>      Unit Hyd Qpeak  (cms)=     .623
00130>
00131>      PEAK FLOW       (cms)=     .123 (i)
00132>      TIME TO PEAK    (hrs)=   10.667
00133>      RUNOFF VOLUME    (mm)=   17.611
00134>      TOTAL RAINFALL   (mm)=   43.873
00135>      RUNOFF COEFFICIENT   =     .401
00136>
00137>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00138>
00139>       *** WARNING: Time step is too large for value of TP.
00140>                    R.V. may be ok.  Peak flow could be off.
00141> --------------------------------------------------------------------------------
00142> 001:0003----------------------------------------------------------------------
00143>  --------------------
00144> | ROUTE PIPE culver|     PIPE Number     =    1.00
00145> | IN= 1---> OUT= 8 |     Diameter     (mm)=  450.00
00146> | DT=  5.0 min     |     Length       (m)=   45.00
00147>  --------------------     Slope      (m/m)= .01100
00148>                           Manning n        =   .025
00149>
00150>      <-------------------- TRAVEL TIME TABLE ------------------->
00151>        DEPTH       VOLUME     FLOW RATE     VELOCITY     TRAV.TIME
00152>          (m)      (cu.m.)       (cms)         (m/s)          min
00153>         .024     .144E+00       .001          .260          2.89
00154>         .047     .402E+00       .004          .405          1.85
00155>         .071     .725E+00       .008          .522          1.44
00156>         .095     .110E+01       .015          .620          1.21
00157>         .118     .150E+01       .024          .706          1.06
00158>         .142     .194E+01       .034          .781           .96
00159>         .166     .239E+01       .045          .847           .89
00160>         .189     .286E+01       .058          .905           .83
00161>         .213     .334E+01       .071          .956           .78
00162>         .237     .382E+01       .085          .999           .75
00163>         .261     .429E+01       .099         1.036           .72
00164>         .284     .476E+01       .113         1.067           .70
00165>         .308     .522E+01       .126         1.090           .69
00166>         .332     .565E+01       .139         1.106           .68
00167>         .355     .606E+01       .150         1.114           .67
00168>         .379     .643E+01       .159         1.114           .67
00169>         .403     .676E+01       .165         1.102           .68
00170>         .426     .701E+01       .167         1.073           .70
00171>         .450     .716E+01       .156          .979           .77
00172>                                        <---- hydrograph ---->   <-pipe / channel->
00173>                                 AREA    QPEAK   TPEAK   R.V.   MAX DEPTH   MAX VEL
00174>                                 (ha)    (cms)   (hrs)   (mm)     (m)       (m/s)
00175>    INFLOW : ID= 1:300           2.06     .123   10.67 17.611      .303      1.085
00176>    OUTFLOW: ID= 8:culver        2.06     .120   10.67 17.611      .297      1.079
00177>
00178>
00179> --------------------------------------------------------------------------------
00180> 001:0004----------------------------------------------------------------------
00181>  --------------------
00182> | DESIGN NASHYD     |   Area     (ha)=     .29   Curve Number    (CN)=81.00
00183> | 02:301    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00184>  --------------------   U.H. Tp(hrs)=    .063
00185>
00186>      Unit Hyd Qpeak  (cms)=     .174
00187>
00188>      PEAK FLOW       (cms)=     .023 (i)
00189>      TIME TO PEAK    (hrs)=   10.667
00190>      RUNOFF VOLUME    (mm)=   17.611
00191>      TOTAL RAINFALL   (mm)=   43.873
00192>      RUNOFF COEFFICIENT   =     .401
00193>
00194>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00195>
00196>       *** WARNING: Time step is too large for value of TP.
00197>                    R.V. may be ok.  Peak flow could be off.
00198> --------------------------------------------------------------------------------
00199> 001:0005----------------------------------------------------------------------
00200>  --------------------
00201> | DESIGN NASHYD     |   Area     (ha)=    1.73   Curve Number    (CN)=81.00
00202> | 03:302    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00203>  --------------------   U.H. Tp(hrs)=    .115
00204>
00205>      Unit Hyd Qpeak  (cms)=     .575
00206>
00207>      PEAK FLOW       (cms)=     .110 (i)
00208>      TIME TO PEAK    (hrs)=   10.667
00209>      RUNOFF VOLUME    (mm)=   17.611
00210>      TOTAL RAINFALL   (mm)=   43.873
00211>      RUNOFF COEFFICIENT   =     .401
00212>
00213>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00214>
00215>       *** WARNING: Time step is too large for value of TP.
00216>                    R.V. may be ok.  Peak flow could be off.
00217> --------------------------------------------------------------------------------
00218> 001:0006----------------------------------------------------------------------
00219>  --------------------
00220> | DESIGN NASHYD     |   Area     (ha)=    2.89   Curve Number    (CN)=81.00
00221> | 04:303    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00222>  --------------------   U.H. Tp(hrs)=    .109
00223>
00224>      Unit Hyd Qpeak  (cms)=    1.013
00225>
00226>      PEAK FLOW       (cms)=     .190 (i)
00227>      TIME TO PEAK    (hrs)=   10.667
00228>      RUNOFF VOLUME    (mm)=   17.611
00229>      TOTAL RAINFALL   (mm)=   43.873
00230>      RUNOFF COEFFICIENT   =     .401
00231>
00232>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00233>
00234>       *** WARNING: Time step is too large for value of TP.
00235>                    R.V. may be ok.  Peak flow could be off.
00236> --------------------------------------------------------------------------------
00237> 001:0007----------------------------------------------------------------------
00238>  --------------------
00239> | ADD HYD (outlet) | ID: NHYD     AREA     QPEAK   TPEAK   R.V.    DWF
00240>  --------------------              (ha)     (cms)   (hrs)   (mm)    (cms)
00241>                     ID1 03:302      1.73     .110   10.67  17.61    .000
00242>                   +ID2 04:303      2.89     .190   10.67  17.61    .000
00243>                     ================================================
00244>                     SUM 10:outlet    4.62     .300   10.67  17.61    .000
00245>
00246>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00247>
00248> --------------------------------------------------------------------------------
00249> 001:0008----------------------------------------------------------------------
00250>       FINISH
00251> --------------------------------------------------------------------------------
00252> ********************************************************************************
00253>      WARNINGS / ERRORS / NOTES
00254>      -------------------------
00255>  001:0002 DESIGN NASHYD
00256>       *** WARNING: Time step is too large for value of TP.
00257>                    R.V. may be ok.  Peak flow could be off.
00258>  001:0004 DESIGN NASHYD
00259>       *** WARNING: Time step is too large for value of TP.
00260>                    R.V. may be ok.  Peak flow could be off.
00261>  001:0005 DESIGN NASHYD
00262>       *** WARNING: Time step is too large for value of TP.
00263>                    R.V. may be ok.  Peak flow could be off.
00264>  001:0006 DESIGN NASHYD
00265>       *** WARNING: Time step is too large for value of TP.
00266>                    R.V. may be ok.  Peak flow could be off.
00267>    Simulation ended on 2009-05-27     at 18:51:58
00268> ================================================================================
00269>
00270>
```

```
00001> ================================================================================
00002>
00003>  SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO         999    999  =========
00004>  S      W W W  MM MM  H   H   Y Y   MM MM  O   O       9   9  9   9
00005>  SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##   9   9  9   9  Ver. 4.02
00006>      S   W W   M   M  H   H    Y    M   M  O   O        9999   9999  July 1999
00007>  SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9  =========
00008>                                                        9   9  9   9  # 4377549
00009>       StormWater Management HYdrologic Model           999    999  =========
00010>
00011>  ********************************************************************************
00012>  ************************** SWMHYMO-99 Ver/4.02 ********************************
00013>  *******  A single event and continuous hydrologic simulation model  ********
00014>  *******     based on the principles of HYMO and its successors       ********
00015>  *******              OTTHYMO-83 and OTTHYMO-89.                      ********
00016>  ********************************************************************************
00017>  ******* Distributed by:  J.F. Sabourin and Associates Inc.           ********
00018>  *******                  Ottawa,  Ontario: (613) 727-5199           ********
00019>  *******                  Gatineau, Quebec: (819) 243-6858           ********
00020>  *******                  E-Mail: swmhymo@jfsa.Com                   ********
00021>  ********************************************************************************
00022>
00023>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024>  +++++++ Licensed user: Condeland Engineering Limited                 +++++++
00025>  +++++++               Toronto                 SERIAL#:4377549      +++++++
00026>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028>  ********************************************************************************
00029>  *******          ++++++ PROGRAM ARRAY DIMENSIONS ++++++                ********
00030>  *******          Maximum value for ID numbers  :     10               ********
00031>  *******          Max. number of rainfall points:  15000               ********
00032>  *******          Max. number of flow points    :  15000               ********
00033>  ********************************************************************************
00034>
00035>
00036>  ********************   D E T A I L E D   O U T P U T   ********************
00037>  ********************************************************************************
00038>  *       DATE: 2009-05-27       TIME: 19:02:13      RUN COUNTER: 000035       *
00039>  ********************************************************************************
00040>  * Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE5YR.dat    *
00041>  * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE5YR.out    *
00042>  * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE5YR.sum    *
00043>  * User comments:                                                         *
00044>  * 1:_____________________________________________________________________*
00045>  * 2:_____________________________________________________________________*
00046>  * 3:_____________________________________________________________________*
00047>  ********************************************************************************
00048>
00049>  --------------------------------------------------------------------------------
00050>  001:0001----------------------------------------------------------------------
00051>  *#*****************************************************************************
00052>  *#  Project Name: [2147925 Ontario Limited]    Project Number: [09-015]
00053>  *#  Date        : 05-20-2009
00054>  *#  Modeller    : [ROBERT DE ANGELIS]
00055>  *#  Company     : Condeland Engineering Limited
00056>  *#  License #   :  4377549
00057>  *#*****************************************************************************
00058>  ---------------------
00059>  | START             |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00060>  ---------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00061>      TZERO =   4.00 hrs on       0
00062>      METOUT=   2 (output = METRIC)
00063>      NRUN  = 001
00064>      NSTORM=   0
00065>  --------------------------------------------------------------------------------
00066>  001:0002----------------------------------------------------------------------
00067>  ---------------------
00068>  | DESIGN NASHYD     |   Area     (ha)=    2.06   Curve Number   (CN)=81.00
00069>  | 01:300    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00070>  ---------------------   U.H. Tp(hrs)=    .126
00071>
00072>                              New rainfall entered directly by user.
00073>                              TIME STEP= 5.00 min   # of STEPS= 200
00074>                              DURATION =16.67 hrs   TOTAL RAIN=  52.03 mm
00075>
00076>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00077>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00078>               .08  31.750 |   4.25   1.780 |   8.42   1.780 |  12.58   1.020
00079>               .17   1.270 |   4.33   1.780 |   8.50   1.780 |  12.67   1.020
00080>               .25   1.270 |   4.42   1.780 |   8.58   1.780 |  12.75   1.020
00081>               .33   1.270 |   4.50   1.780 |   8.67   1.780 |  12.83   1.020
00082>               .42   1.270 |   4.58   1.780 |   8.75   1.780 |  12.92   1.020
00083>               .50   1.270 |   4.67   1.780 |   8.83   1.780 |  13.00   1.020
00084>               .58   1.270 |   4.75   1.780 |   8.92   1.780 |  13.08   1.020
00085>               .67   1.270 |   4.83   1.780 |   9.00   1.780 |  13.17   1.020
00086>               .75   1.270 |   4.92   1.780 |   9.08   1.780 |  13.25   1.020
00087>               .83   1.270 |   5.00   1.780 |   9.17   1.780 |  13.33   1.020
00088>               .92   1.270 |   5.08   3.300 |   9.25   1.780 |  13.42   1.020
00089>              1.00   1.270 |   5.17   3.300 |   9.33   1.780 |  13.50   1.020
00090>              1.08   1.270 |   5.25   3.300 |   9.42   1.780 |  13.58   1.020
00091>              1.17   1.270 |   5.33   3.300 |   9.50   1.780 |  13.67   1.020
00092>              1.25   1.270 |   5.42   3.300 |   9.58   1.780 |  13.75   1.020
00093>              1.33   1.270 |   5.50   3.300 |   9.67   1.780 |  13.83   1.020
00094>              1.42   1.270 |   5.58   3.300 |   9.75   1.780 |  13.92   1.020
00095>              1.50   1.270 |   5.67   3.300 |   9.83   1.780 |  14.00   1.020
00096>              1.58   1.270 |   5.75   3.300 |   9.92   1.780 |  14.08   1.020
00097>              1.67   1.270 |   5.83   3.300 |  10.00   1.780 |  14.17   1.020
00098>              1.75   1.270 |   5.92   4.570 |  10.08   1.270 |  14.25    .760
00099>              1.83   1.270 |   6.00   4.570 |  10.17   1.270 |  14.33    .760
00100>              1.92   1.270 |   6.08   6.600 |  10.25   1.270 |  14.42    .760
00101>              2.00   1.270 |   6.17   6.600 |  10.33   1.270 |  14.50    .760
00102>              2.08   1.270 |   6.25  15.240 |  10.42   1.270 |  14.58    .760
00103>              2.17   1.270 |   6.33  15.240 |  10.50   1.270 |  14.67    .760
00104>              2.25   1.270 |   6.42  33.270 |  10.58   1.270 |  14.75    .760
00105>              2.33   1.270 |   6.50  33.270 |  10.67   1.270 |  14.83    .760
00106>              2.42   1.270 |   6.58  69.600 |  10.75   1.270 |  14.92    .760
00107>              2.50   1.270 |   6.67  69.600 |  10.83   1.270 |  15.00    .760
00108>              2.58   1.270 |   6.75  12.190 |  10.92   1.270 |  15.08    .760
00109>              2.67   1.270 |   6.83  12.190 |  11.00   1.270 |  15.17    .760
00110>              2.75   1.270 |   6.92   7.620 |  11.08   1.270 |  15.25    .760
00111>              2.83   1.270 |   7.00   7.620 |  11.17   1.270 |  15.33    .760
00112>              2.92   1.270 |   7.08   5.590 |  11.25   1.270 |  15.42    .760
00113>              3.00   1.270 |   7.17   5.590 |  11.33   1.270 |  15.50    .760
00114>              3.08   1.270 |   7.25   5.080 |  11.42   1.270 |  15.58    .760
00115>              3.17   1.270 |   7.33   5.080 |  11.50   1.270 |  15.67    .760
00116>              3.25   1.270 |   7.42   3.810 |  11.58   1.270 |  15.75    .760
00117>              3.33   1.270 |   7.50   3.810 |  11.67   1.270 |  15.83    .760
00118>              3.42   1.780 |   7.58   3.050 |  11.75   1.270 |  15.92    .760
00119>              3.50   1.780 |   7.67   3.050 |  11.83   1.270 |  16.00    .760
00120>              3.58   1.780 |   7.75   3.050 |  11.92   1.270 |  16.08    .760
00121>              3.67   1.780 |   7.83   3.050 |  12.00   1.270 |  16.17    .760
00122>              3.75   1.780 |   7.92   3.050 |  12.08   1.270 |  16.25    .760
00123>              3.83   1.780 |   8.00   3.050 |  12.17   1.270 |  16.33    .760
00124>              3.92   1.780 |   8.08   3.050 |  12.25   1.270 |  16.42    .760
00125>              4.00   1.780 |   8.17   3.050 |  12.33   1.270 |  16.50    .760
00126>              4.08   1.780 |   8.25   3.050 |  12.42   1.270 |  16.58    .760
00127>              4.17   1.780 |   8.33   3.050 |  12.50   1.270 |  16.67    .760
00128>
00129>      Unit Hyd Qpeak  (cms)=     .623
00130>
00131>      PEAK FLOW       (cms)=     .158 (i)
00132>      TIME TO PEAK    (hrs)=   10.667
00133>      RUNOFF VOLUME    (mm)=   23.192
00134>      TOTAL RAINFALL   (mm)=   52.035
00135>      RUNOFF COEFFICIENT   =     .446
00136>
00137>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00138>
00139>       *** WARNING: Time step is too large for value of TP.
00140>                    R.V. may be ok.  Peak flow could be off.
00141>  --------------------------------------------------------------------------------
00142>  001:0003----------------------------------------------------------------------
00143>  --------------------
00144>  | ROUTE PIPE culver|     PIPE Number     =    1.00
00145>  | IN= 1---> OUT= 8 |     Diameter    (mm)=  450.00
00146>  | DT=  5.0 min     |     Length       (m)=   45.00
00147>  --------------------     Slope      (m/m)= .01100
00148>                           Manning n        =   .025
00149>
00150>      *** WARNING: MINIMUM PIPE SIZE REQUIRED =   453.09   (mm)
00151>                   THIS SIZE WAS USED IN THE ROUTING.
00152>                   THE CAPACITY OF THIS PIPE  =      .16  (cms)
00153>
00154>      *** WARNING: New pipe size used for routing.
00155>      <------------------- TRAVEL TIME TABLE -------------------->
00156>        DEPTH       VOLUME     FLOW RATE     VELOCITY     TRAV.TIME
00157>          (m)      (cu.m.)       (cms)         (m/s)         min
00158>         .024     .146E+00       .001          .261         2.87
00159>         .048     .407E+00       .004          .407         1.84
00160>         .072     .735E+00       .009          .524         1.43
00161>         .095     .111E+01       .015          .623         1.20
00162>         .119     .152E+01       .024          .709         1.06
00163>         .143     .197E+01       .034          .784          .96
00164>         .167     .243E+01       .046          .851          .88
00165>         .191     .290E+01       .059          .909          .82
00166>         .215     .338E+01       .072          .960          .78
00167>         .238     .387E+01       .086         1.004          .75
00168>         .262     .435E+01       .101         1.041          .72
00169>         .286     .483E+01       .115         1.071          .70
00170>         .310     .529E+01       .129         1.095          .68
00171>         .334     .573E+01       .142         1.111          .67
00172>         .358     .614E+01       .153         1.120          .67
00173>         .382     .652E+01       .162         1.119          .67
00174>         .405     .685E+01       .168         1.107          .68
00175>         .429     .711E+01       .170         1.078          .70
00176>         .453     .726E+01       .158          .983          .76
00177>                                          <---- hydrograph ---->   <-pipe / channel->
00178>                                  AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
00179>                                  (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
00180>    INFLOW : ID= 1:300            2.06     .158   10.67 23.192       .372      1.119
00181>    OUTFLOW: ID= 8:culver         2.06     .154   10.67 23.192       .364      1.119
00182>
00183>
00184>  --------------------------------------------------------------------------------
00185>  001:0004----------------------------------------------------------------------
00186>  ---------------------
00187>  | DESIGN NASHYD     |   Area     (ha)=     .29   Curve Number   (CN)=81.00
00188>  | 02:301    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00189>  ---------------------   U.H. Tp(hrs)=    .063
00190>
00191>      Unit Hyd Qpeak  (cms)=     .174
00192>
00193>      PEAK FLOW       (cms)=     .029 (i)
00194>      TIME TO PEAK    (hrs)=   10.667
00195>      RUNOFF VOLUME    (mm)=   23.192
00196>      TOTAL RAINFALL   (mm)=   52.035
00197>      RUNOFF COEFFICIENT   =     .446
00198>
00199>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00200>
00201>       *** WARNING: Time step is too large for value of TP.
00202>                    R.V. may be ok.  Peak flow could be off.
00203>  --------------------------------------------------------------------------------
00204>  001:0005----------------------------------------------------------------------
00205>  ---------------------
00206>  | DESIGN NASHYD     |   Area     (ha)=    1.73   Curve Number   (CN)=81.00
00207>  | 03:302    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00208>  ---------------------   U.H. Tp(hrs)=    .115
00209>
00210>      Unit Hyd Qpeak  (cms)=     .575
00211>
00212>      PEAK FLOW       (cms)=     .141 (i)
00213>      TIME TO PEAK    (hrs)=   10.667
00214>      RUNOFF VOLUME    (mm)=   23.192
00215>      TOTAL RAINFALL   (mm)=   52.035
00216>      RUNOFF COEFFICIENT   =     .446
00217>
00218>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00219>
00220>       *** WARNING: Time step is too large for value of TP.
00221>                    R.V. may be ok.  Peak flow could be off.
00222>  --------------------------------------------------------------------------------
00223>  001:0006----------------------------------------------------------------------
00224>  ---------------------
00225>  | DESIGN NASHYD     |   Area     (ha)=    2.89   Curve Number   (CN)=81.00
00226>  | 04:303    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00227>  ---------------------   U.H. Tp(hrs)=    .109
00228>
00229>      Unit Hyd Qpeak  (cms)=    1.013
00230>
00231>      PEAK FLOW       (cms)=     .243 (i)
00232>      TIME TO PEAK    (hrs)=   10.667
00233>      RUNOFF VOLUME    (mm)=   23.192
00234>      TOTAL RAINFALL   (mm)=   52.035
00235>      RUNOFF COEFFICIENT   =     .446
00236>
00237>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00238>
00239>       *** WARNING: Time step is too large for value of TP.
00240>                    R.V. may be ok.  Peak flow could be off.
00241>  --------------------------------------------------------------------------------
00242>  001:0007----------------------------------------------------------------------
00243>  --------------------
00244>  | ADD HYD (outlet) | ID: NHYD     AREA     QPEAK   TPEAK   R.V.    DWF
00245>  --------------------              (ha)     (cms)   (hrs)   (mm)    (cms)
00246>                     ID1 03:302      1.73     .141   10.67  23.19    .000
00247>                    +ID2 04:303      2.89     .243   10.67  23.19    .000
00248>                     ================================================
00249>                     SUM 10:outlet    4.62     .384   10.67  23.19    .000
00250>
00251>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00252>
00253>  --------------------------------------------------------------------------------
00254>  001:0008----------------------------------------------------------------------
00255>        FINISH
00256>  --------------------------------------------------------------------------------
00257>  ********************************************************************************
00258>       WARNINGS / ERRORS / NOTES
00259>       -------------------------
00260>  001:0002 DESIGN NASHYD
00261>       *** WARNING: Time step is too large for value of TP.
00262>                    R.V. may be ok.  Peak flow could be off.
00263>  001:0003 ROUTE PIPE      ->
00264>       *** WARNING: New pipe size used for routing.
00265>  001:0004 DESIGN NASHYD
00266>       *** WARNING: Time step is too large for value of TP.
00267>                    R.V. may be ok.  Peak flow could be off.
00268>  001:0005 DESIGN NASHYD
00269>       *** WARNING: Time step is too large for value of TP.
00270>                    R.V. may be ok.  Peak flow could be off.
```

```
00271>  001:0006 DESIGN NASHYD
00272>       *** WARNING: Time step is too large for value of TP.
00273>                    R.V. may be ok.  Peak flow could be off.
00274>    Simulation ended on 2009-05-27    at 19:02:14
00275> ===============================================================================
00276>
00277>
```

```
00001> ================================================================================
00002>
00003>  SSSSS   W    W   M   M   H   H   Y   Y   H   H    OOO        999    999  =========
00004>  S       W W W   MM MM   H   H    Y Y    MM MM   O   O      9   9  9   9
00005>  SSSSS   W W W   M H M   HHHHH     Y     H M H   O   O  ##  9   9  9   9  Ver. 4.02
00006>      S    W W    M   M   H   H     Y     M   M   O   O       9999   9999  July 1999
00007>  SSSSS    W W    M   M   H   H     Y     M   M    OOO          9      9  =========
00008>                                                              9   9  9   9  # 4377549
00009>       StormWater Hanagement HYdrologic Model                  999    999  =========
00010>
00011>  ***************************************************************************
00012>  ***************************** SWMHYMO-99 Ver/4.02 ***************************
00013>  *******  A single event and continuous hydrologic simulation model  *******
00014>  *******       based on the principles of HYMO and its successors       *******
00015>  *******                    OTTHYMO-83 and OTTHYMO-89.                  *******
00016>  ***************************************************************************
00017>  ******* Distributed by:  J.F. Sabourin and Associates Inc.           *******
00018>  *******                  Ottawa,  Ontario: (613) 727-5199            *******
00019>  *******                  Gatineau, Quebec: (819) 243-6858            *******
00020>  *******                  E-Mail: swmhymo@jfsa.Com                    *******
00021>  ***************************************************************************
00022>
00023>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024>  +++++++ Licensed user: Condeland Engineering Limited                 +++++++
00025>  +++++++                Toronto                 SERIAL#:4377549      +++++++
00026>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028>  ***************************************************************************
00029>  *******          ++++++ PROGRAM ARRAY DIHENSIONS ++++++             *******
00030>  *******          Maximum value for ID numbers  :     10             *******
00031>  *******          Max. number of rainfall points:  15000             *******
00032>  *******          Max. number of flow points    :  15000             *******
00033>  ***************************************************************************
00034>
00035>
00036>  ********************   D E T A I L E D   O U T P U T   ********************
00037>  ***************************************************************************
00038>  *       DATE: 2009-05-27      TIME: 19:03:51      RUN COUNTER: 000037       *
00039>  ***************************************************************************
00040>  * Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE10YR.dat    *
00041>  * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE10YR.out    *
00042>  * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE10YR.sum    *
00043>  * User comments:                                                          *
00044>  * 1:_____________________________________________________________________*
00045>  * 2:_____________________________________________________________________*
00046>  * 3:_____________________________________________________________________*
00047>  ***************************************************************************
00048>
00049>  -------------------------------------------------------------------------------
00050> 001:0001-------------------------------------------------------------------------
00051> *#*************************************************************************
00052> *#  Project Name: [2147925 Ontario Limited]    Project Number: [09-015]
00053> *#  Date        : 05-20-2009
00054> *#  Modeller    : [ROBERT DE ANGELIS]
00055> *#  Company     : Condeland Engineering Limited
00056> *#  License #   :  4377549
00057> *#*************************************************************************
00058>  --------------------
00059>  | START            |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00060>  --------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00061>      TZERO =   .00 hrs on       0
00062>      METOUT=   2 (output = METRIC)
00063>      NRUN  = 001
00064>      NSTORM=
00065>             #  1=SCS10YR
00066>  -------------------------------------------------------------------------------
00067>  001:0002-------------------------------------------------------------------------
00068>  --------------------
00069>  | READ STORM       |     Filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00070>  | Ptotal=  97.05 mm|    Comments: SCS Storm
00071>  --------------------
00072>                TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00073>                 hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00074>                 .08   1.700 |   6.08   3.009 |  12.08   4.658 |  18.08   2.329
00075>                 .17   1.700 |   6.17   3.009 |  12.17   4.658 |  18.17   2.329
00076>                 .25   1.700 |   6.25   3.009 |  12.25   4.658 |  18.25   2.329
00077>                 .33   1.696 |   6.33   3.009 |  12.33   4.658 |  18.33   2.329
00078>                 .42   1.696 |   6.42   3.009 |  12.42   4.658 |  18.42   2.329
00079>                 .50   1.696 |   6.50   3.009 |  12.50   4.658 |  18.50   2.329
00080>                 .58   1.700 |   6.58   3.009 |  12.58   4.076 |  18.58   2.329
00081>                 .67   1.700 |   6.67   3.009 |  12.67   4.076 |  18.67   2.329
00082>                 .75   1.700 |   6.75   3.009 |  12.75   4.076 |  18.75   2.329
00083>                 .83   1.696 |   6.83   3.009 |  12.83   4.076 |  18.83   2.329
00084>                 .92   1.696 |   6.92   3.009 |  12.92   4.076 |  18.92   2.329
00085>                1.00   1.696 |   7.00   3.009 |  13.00   4.076 |  19.00   2.329
00086>                1.08   1.700 |   7.08   3.688 |  13.08   4.076 |  19.08   2.329
00087>                1.17   1.700 |   7.17   3.688 |  13.17   4.076 |  19.17   2.329
00088>                1.25   1.700 |   7.25   3.688 |  13.25   4.076 |  19.25   2.329
00089>                1.33   1.696 |   7.33   3.688 |  13.33   4.076 |  19.33   2.329
00090>                1.42   1.696 |   7.42   3.688 |  13.42   4.076 |  19.42   2.329
00091>                1.50   1.696 |   7.50   3.688 |  13.50   4.076 |  19.50   2.329
00092>                1.58   1.700 |   7.58   3.688 |  13.58   3.688 |  19.58   2.329
00093>                1.67   1.700 |   7.67   3.688 |  13.67   3.688 |  19.67   2.329
00094>                1.75   1.700 |   7.75   3.688 |  13.75   3.688 |  19.75   2.329
00095>                1.83   1.696 |   7.83   3.688 |  13.83   3.688 |  19.83   2.329
00096>                1.92   1.696 |   7.92   3.688 |  13.92   3.688 |  19.92   2.329
00097>                2.00   1.696 |   8.00   3.688 |  14.00   3.688 |  20.00   2.329
00098>                2.08   1.992 |   8.08   4.852 |  14.08   3.059 |  20.08   1.797
00099>                2.17   1.992 |   8.17   4.852 |  14.17   3.059 |  20.17   1.797
00100>                2.25   1.992 |   8.25   4.852 |  14.25   3.059 |  20.25   1.797
00101>                2.33   1.988 |   8.33   4.852 |  14.33   3.055 |  20.33   1.793
00102>                2.42   1.988 |   8.42   4.852 |  14.42   3.055 |  20.42   1.793
00103>                2.50   1.988 |   8.50   4.852 |  14.50   3.055 |  20.50   1.793
00104>                2.58   1.992 |   8.58   6.794 |  14.58   3.059 |  20.58   1.797
00105>                2.67   1.992 |   8.67   6.794 |  14.67   3.059 |  20.67   1.797
00106>                2.75   1.992 |   8.75   6.794 |  14.75   3.059 |  20.75   1.797
00107>                2.83   1.988 |   8.83   6.794 |  14.83   3.055 |  20.83   1.793
00108>                2.92   1.988 |   8.92   6.794 |  14.92   3.055 |  20.92   1.793
00109>                3.00   1.988 |   9.00   6.794 |  15.00   3.055 |  21.00   1.793
00110>                3.08   1.992 |   9.08   9.511 |  15.08   3.059 |  21.08   1.797
00111>                3.17   1.992 |   9.17   9.511 |  15.17   3.059 |  21.17   1.797
00112>                3.25   1.992 |   9.25   9.511 |  15.25   3.059 |  21.25   1.797
00113>                3.33   1.988 |   9.33   9.511 |  15.33   3.055 |  21.33   1.793
00114>                3.42   1.988 |   9.42   9.511 |  15.42   3.055 |  21.42   1.793
00115>                3.50   1.988 |   9.50   9.511 |  15.50   3.055 |  21.50   1.793
00116>                3.58   1.992 |   9.58  22.904 |  15.58   3.059 |  21.58   1.797
00117>                3.67   1.992 |   9.67  22.904 |  15.67   3.059 |  21.67   1.797
00118>                3.75   1.992 |   9.75  22.904 |  15.75   3.059 |  21.75   1.797
00119>                3.83   1.988 |   9.83  59.395 |  15.83   3.055 |  21.83   1.793
00120>                3.92   1.988 |   9.92  59.395 |  15.92   3.055 |  21.92   1.793
00121>                4.00   1.988 |  10.00  59.395 |  16.00   3.055 |  22.00   1.793
00122>                4.08   2.380 |  10.08  13.199 |  16.08   2.329 |  22.08   1.797
00123>                4.17   2.380 |  10.17  13.199 |  16.17   2.329 |  22.17   1.797
00124>                4.25   2.380 |  10.25  13.199 |  16.25   2.329 |  22.25   1.797
00125>                4.33   2.376 |  10.33  13.199 |  16.33   2.329 |  22.33   1.793
00126>                4.42   2.376 |  10.42  13.199 |  16.42   2.329 |  22.42   1.793
00127>                4.50   2.376 |  10.50  13.199 |  16.50   2.329 |  22.50   1.793
00128>                4.58   2.380 |  10.58   7.958 |  16.58   2.329 |  22.58   1.797
00129>                4.67   2.380 |  10.67   7.958 |  16.67   2.329 |  22.67   1.797
00130>                4.75   2.380 |  10.75   7.958 |  16.75   2.329 |  22.75   1.797
00131>                4.83   2.376 |  10.83   7.958 |  16.83   2.329 |  22.83   1.793
00132>                4.92   2.376 |  10.92   7.958 |  16.92   2.329 |  22.92   1.793
00133>                5.00   2.376 |  11.00   7.958 |  17.00   2.329 |  23.00   1.793
00134>                5.08   2.380 |  11.08   5.823 |  17.08   2.329 |  23.08   1.797
00135>                5.17   2.380 |  11.17   5.823 |  17.17   2.329 |  23.17   1.797
00136>                5.25   2.380 |  11.25   5.823 |  17.25   2.329 |  23.25   1.797
00137>                5.33   2.376 |  11.33   5.823 |  17.33   2.329 |  23.33   1.793
00138>                5.42   2.376 |  11.42   5.823 |  17.42   2.329 |  23.42   1.793
00139>                5.50   2.376 |  11.50   5.823 |  17.50   2.329 |  23.50   1.793
00140>                5.58   2.380 |  11.58   5.823 |  17.58   2.329 |  23.58   1.797
00141>                5.67   2.380 |  11.67   5.823 |  17.67   2.329 |  23.67   1.797
00142>                5.75   2.380 |  11.75   5.823 |  17.75   2.329 |  23.75   1.797
00143>                5.83   2.376 |  11.83   5.047 |  17.83   2.329 |  23.83   1.793
00144>                5.92   2.376 |  11.92   5.047 |  17.92   2.329 |  23.92   1.793
00145>                6.00   2.376 |  12.00   5.047 |  18.00   2.329 |  24.00   1.793
00146>
00147>  -------------------------------------------------------------------------------
00148>  001:0003-------------------------------------------------------------------------
00149>  --------------------
00150>  | DESIGN NASHYD      |   Area     (ha)=    2.06   Curve Number    (CN)=81.00
00151>  | 01:300     DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00152>  --------------------   U.H. Tp(hrs)=    .126
00153>
00154>       Unit Hyd Qpeak  (cms)=      .623
00155>
00156>       PEAK FLOW       (cms)=      .198 (i)
00157>       TIME TO PEAK    (hrs)=    10.000
00158>       RUNOFF VOLUME    (mm)=    58.853
00159>       TOTAL RAINFALL   (mm)=    97.050
00160>       RUNOFF COEFFICIENT   =      .606
00161>
00162>       (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00163>
00164>        *** WARNING: Time step is too large for value of TP.
00165>                     R.V. may be ok.  Peak flow could be off.
00166>  -------------------------------------------------------------------------------
00167>  001:0004-------------------------------------------------------------------------
00168>  --------------------
00169>  | ROUTE PIPE culver|      PIPE Number      =     1.00
00170>  | IN= 1---> OUT= 8 |      Diameter     (mm)=  450.00
00171>  | DT=  5.0 min     |      Length        (m)=   45.00
00172>  --------------------      Slope       (m/m)= .01100
00173>                            Manning n      =    .025
00174>
00175>       *** WARNING: MINIMUM PIPE SIZE REQUIRED =   492.68    (mm)
00176>                    THIS SIZE WAS USED IN THE ROUTING.
00177>                    THE CAPACITY OF THIS PIPE  =      .20   (cms)
00178>
00179>        *** WARNING: New pipe size used for routing.
00180>       <-------------------- TRAVEL TIME TABLE ------------------->
00181>         DEPTH      VOLUME     FLOW RATE     VELOCITY     TRAV.TIME
00182>           (m)     (cu.m.)       (cms)         (m/s)         min
00183>          .026    .173E+00       .001          .276         2.72
00184>          .052    .481E+00       .005          .431         1.74
00185>          .078    .869E+00       .011          .554         1.35
00186>          .104    .131E+01       .019          .659         1.14
00187>          .130    .180E+01       .030          .750         1.00
00188>          .156    .232E+01       .043          .829          .90
00189>          .182    .287E+01       .057          .900          .83
00190>          .207    .343E+01       .073          .961          .78
00191>          .233    .400E+01       .090         1.015          .74
00192>          .259    .458E+01       .108         1.062          .71
00193>          .285    .515E+01       .126         1.101          .68
00194>          .311    .571E+01       .144         1.133          .66
00195>          .337    .626E+01       .161         1.158          .65
00196>          .363    .678E+01       .177         1.175          .64
00197>          .389    .726E+01       .191         1.184          .63
00198>          .415    .771E+01       .203         1.183          .63
00199>          .441    .810E+01       .211         1.171          .64
00200>          .467    .841E+01       .213         1.140          .66
00201>          .493    .858E+01       .198         1.039          .72
00202>                                          <---- hydrograph ---->   <-pipe / channel->
00203>                                  AREA    QPEAK    TPEAK    R.V.   MAX DEPTH  MAX VEL
00204>                                  (ha)    (cms)    (hrs)    (mm)       (m)      (m/s)
00205>     INFLOW : ID= 1:300           2.06     .198    10.00  58.853       .404     1.183
00206>     OUTFLOW: ID= 8:culver        2.06     .194    10.00  58.852       .398     1.184
00207>
00208>
00209>  -------------------------------------------------------------------------------
00210>  001:0005-------------------------------------------------------------------------
00211>  --------------------
00212>  | DESIGN NASHYD      |   Area     (ha)=     .29   Curve Number    (CN)=81.00
00213>  | 02:301     DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00214>  --------------------   U.H. Tp(hrs)=    .063
00215>
00216>       Unit Hyd Qpeak  (cms)=      .174
00217>
00218>       PEAK FLOW       (cms)=      .032 (i)
00219>       TIME TO PEAK    (hrs)=    10.000
00220>       RUNOFF VOLUME    (mm)=    58.852
00221>       TOTAL RAINFALL   (mm)=    97.050
00222>       RUNOFF COEFFICIENT   =      .606
00223>
00224>       (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00225>
00226>        *** WARNING: Time step is too large for value of TP.
00227>                     R.V. may be ok.  Peak flow could be off.
00228>  -------------------------------------------------------------------------------
00229>  001:0006-------------------------------------------------------------------------
00230>  --------------------
00231>  | DESIGN NASHYD      |   Area     (ha)=    1.73   Curve Number    (CN)=81.00
00232>  | 03:302     DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00233>  --------------------   U.H. Tp(hrs)=    .115
00234>
00235>       Unit Hyd Qpeak  (cms)=      .575
00236>
00237>       PEAK FLOW       (cms)=      .172 (i)
00238>       TIME TO PEAK    (hrs)=    10.000
00239>       RUNOFF VOLUME    (mm)=    58.852
00240>       TOTAL RAINFALL   (mm)=    97.050
00241>       RUNOFF COEFFICIENT   =      .606
00242>
00243>       (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00244>
00245>        *** WARNING: Time step is too large for value of TP.
00246>                     R.V. may be ok.  Peak flow could be off.
00247>  -------------------------------------------------------------------------------
00248>  001:0007-------------------------------------------------------------------------
00249>  --------------------
00250>  | DESIGN NASHYD      |   Area     (ha)=    2.89   Curve Number    (CN)=81.00
00251>  | 04:303     DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00252>  --------------------   U.H. Tp(hrs)=    .109
00253>
00254>       Unit Hyd Qpeak  (cms)=     1.013
00255>
00256>       PEAK FLOW       (cms)=      .293 (i)
00257>       TIME TO PEAK    (hrs)=    10.000
00258>       RUNOFF VOLUME    (mm)=    58.853
00259>       TOTAL RAINFALL   (mm)=    97.050
00260>       RUNOFF COEFFICIENT   =      .606
00261>
00262>       (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00263>
00264>        *** WARNING: Time step is too large for value of TP.
00265>                     R.V. may be ok.  Peak flow could be off.
00266>  -------------------------------------------------------------------------------
00267>  001:0008-------------------------------------------------------------------------
00268>  --------------------
00269>  | ADD HYD (outlet) | ID: NHYD     AREA      QPEAK    TPEAK    R.V.     DWF
00270>  --------------------                (ha)      (cms)    (hrs)    (mm)     (cms)
```

```
                 ID1 03:302        1.73     .172   10.00  58.85    .000
                +ID2 04:303        2.89     .293   10.00  58.85    .000
                 ================================================================
                 SUM 10:outlet     4.62     .466   10.00  58.85    .000

   NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
001:0009--------------------------------------------------------------------------
      FINISH
--------------------------------------------------------------------------------
********************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
 001:0003 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
 001:0004 ROUTE PIPE     ->
      *** WARNING: New pipe size used for routing.
 001:0005 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
 001:0006 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
 001:0007 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
   Simulation ended on 2009-05-27     at 19:03:51
================================================================================
```

```
00001> ================================================================================
00002>
00003>  SSSSS   W    W  M    M  H    H  Y    Y  M    M    OOO         999    999  =========
00004>  S       W W W  MM MM  H    H   Y Y     MM MM   O   O       9   9  9   9
00005>  SSSSS   W W W  M M M  HHHHH    Y      M M M   O   O  ##   9   9  9   9 Ver. 4.02
00006>      S   W W W  M    M  H    H   Y      M    M  O   O        9999   9999 July 1999
00007>  SSSSS    W W   M    M  H    H   Y      M    M   OOO           9      9  =========
00008>                                                              9   9  9   9 # 4377549
00009>       StormWater Management HYdrologic Model                  999    999  =========
00010>
00011>  ****************************************************************************
00012>  ************************** SWMHYMO-99 Ver/4.02 *****************************
00013>  *******   A single event and continuous hydrologic simulation model  *******
00014>  *******        based on the principles of HYMO and its successors      *******
00015>  *******                OTTHYMO-83 and OTTHYMO-89.                      *******
00016>  ****************************************************************************
00017>  ******* Distributed by:  J.F. Sabourin and Associates Inc.           *******
00018>  *******                  Ottawa,  Ontario: (613) 727-5199           *******
00019>  *******                  Gatineau, Quebec: (819) 243-6858           *******
00020>  *******                  E-Mail: swmhymo@jfsa.com                   *******
00021>  ****************************************************************************
00022>
00023>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024>  +++++++ Licensed user: Condeland Engineering Limited                 +++++++
00025>  +++++++                Toronto                 SERIAL#:4377549     +++++++
00026>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028>  ****************************************************************************
00029>  *******          ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *******
00030>  *******          Maximum value for ID numbers  :     10             *******
00031>  *******          Max. number of rainfall points:  15000             *******
00032>  *******          Max. number of flow points    :  15000             *******
00033>  ****************************************************************************
00034>
00035>
00036>  ********************   D E T A I L E D   O U T P U T   ********************
00037>  ****************************************************************************
00038>  *      DATE: 2009-05-27       TIME: 19:11:36      RUN COUNTER: 000039      *
00039>  ****************************************************************************
00040>  * Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE25YR.dat    *
00041>  * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE25YR.out    *
00042>  * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE25YR.sum    *
00043>  * User comments:                                                          *
00044>  * 1:_____________________________________________________________________*
00045>  * 2:_____________________________________________________________________*
00046>  * 3:_____________________________________________________________________*
00047>  ****************************************************************************
00048>
00049>  --------------------------------------------------------------------------------
00050>  001:0001-----------------------------------------------------------------------
00051>  *#*************************************************************************
00052>  *#  Project Name: [2147925 Ontario Limited]    Project Number: [09-015]
00053>  *#  Date        : 05-20-2009
00054>  *#  Modeller    : [ROBERT DE ANGELIS]
00055>  *#  Company     : Condeland Engineering Limited
00056>  *#  License #   :  4377549
00057>  *#*************************************************************************
00058>  --------------------
00059>  | START            |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00060>  --------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00061>      TZERO =  4.00 hrs on       0
00062>      METOUT=  2 (output = METRIC)
00063>      NRUN  = 001
00064>      NSTORM=  0
00065>  --------------------------------------------------------------------------------
00066>  001:0002-----------------------------------------------------------------------
00067>  --------------------
00068>  | DESIGN NASHYD      |   Area     (ha)=    2.06   Curve Number    (CN)=81.00
00069>  | 01:300     DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00070>  --------------------   U.H. Tp(hrs)=    .126
00071>
00072>                              New rainfall entered directly by user.
00073>                              TIME STEP= 5.00 min   # of STEPS= 200
00074>                              DURATION =16.67 hrs   TOTAL RAIN=  79.95 mm
00075>
00076>                TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00077>                 hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00078>                 .08  42.680 |   4.25   2.790 |   8.42   2.790 |  12.58   1.520
00079>                 .17   2.030 |   4.33   2.790 |   8.50   2.790 |  12.67   1.520
00080>                 .25   2.030 |   4.42   2.790 |   8.58   2.790 |  12.75   1.520
00081>                 .33   2.030 |   4.50   2.790 |   8.67   2.790 |  12.83   1.520
00082>                 .42   2.030 |   4.58   2.790 |   8.75   2.790 |  12.92   1.520
00083>                 .50   2.030 |   4.67   2.790 |   8.83   2.790 |  13.00   1.520
00084>                 .58   2.030 |   4.75   2.790 |   8.92   2.790 |  13.08   1.520
00085>                 .67   2.030 |   4.83   2.790 |   9.00   2.790 |  13.17   1.520
00086>                 .75   2.030 |   4.92   2.790 |   9.08   2.790 |  13.25   1.520
00087>                 .83   2.030 |   5.00   2.790 |   9.17   2.790 |  13.33   1.520
00088>                 .92   2.030 |   5.08   5.080 |   9.25   2.790 |  13.42   1.520
00089>                1.00   2.030 |   5.17   5.080 |   9.33   2.790 |  13.50   1.520
00090>                1.08   2.030 |   5.25   5.080 |   9.42   2.790 |  13.58   1.520
00091>                1.17   2.030 |   5.33   5.080 |   9.50   2.790 |  13.67   1.520
00092>                1.25   2.030 |   5.42   5.080 |   9.58   2.790 |  13.75   1.520
00093>                1.33   2.030 |   5.50   5.080 |   9.67   2.790 |  13.83   1.520
00094>                1.42   2.030 |   5.58   5.080 |   9.75   2.790 |  13.92   1.520
00095>                1.50   2.030 |   5.67   5.080 |   9.83   2.790 |  14.00   1.520
00096>                1.58   2.030 |   5.75   5.080 |   9.92   2.790 |  14.08   1.520
00097>                1.67   2.030 |   5.83   5.080 |  10.00   2.790 |  14.17   1.520
00098>                1.75   2.030 |   5.92   7.110 |  10.08   2.030 |  14.25   1.020
00099>                1.83   2.030 |   6.00   7.110 |  10.17   2.030 |  14.33   1.020
00100>                1.92   2.030 |   6.08  10.410 |  10.25   2.030 |  14.42   1.020
00101>                2.00   2.030 |   6.17  10.410 |  10.33   2.030 |  14.50   1.020
00102>                2.08   2.030 |   6.25  23.370 |  10.42   2.030 |  14.58   1.020
00103>                2.17   2.030 |   6.33  23.370 |  10.50   2.030 |  14.67   1.020
00104>                2.25   2.030 |   6.42  51.560 |  10.58   2.030 |  14.75   1.020
00105>                2.33   2.030 |   6.50  51.560 |  10.67   2.030 |  14.83   1.020
00106>                2.42   2.030 |   6.58 107.440 |  10.75   2.030 |  14.92   1.020
00107>                2.50   2.030 |   6.67 107.440 |  10.83   2.030 |  15.00   1.020
00108>                2.58   2.030 |   6.75  18.800 |  10.92   2.030 |  15.08   1.020
00109>                2.67   2.030 |   6.83  18.800 |  11.00   2.030 |  15.17   1.020
00110>                2.75   2.030 |   6.92  11.680 |  11.08   2.030 |  15.25   1.020
00111>                2.83   2.030 |   7.00  11.680 |  11.17   2.030 |  15.33   1.020
00112>                2.92   2.030 |   7.08   8.380 |  11.25   2.030 |  15.42   1.020
00113>                3.00   2.030 |   7.17   8.380 |  11.33   2.030 |  15.50   1.020
00114>                3.08   2.030 |   7.25   8.130 |  11.42   2.030 |  15.58   1.020
00115>                3.17   2.030 |   7.33   8.130 |  11.50   2.030 |  15.67   1.020
00116>                3.25   2.030 |   7.42   5.590 |  11.58   2.030 |  15.75   1.020
00117>                3.33   2.030 |   7.50   5.590 |  11.67   2.030 |  15.83   1.020
00118>                3.42   2.790 |   7.58   4.830 |  11.75   2.030 |  15.92   1.020
00119>                3.50   2.790 |   7.67   4.830 |  11.83   2.030 |  16.00   1.020
00120>                3.58   2.790 |   7.75   4.830 |  11.92   2.030 |  16.08   1.020
00121>                3.67   2.790 |   7.83   4.830 |  12.00   2.030 |  16.17   1.020
00122>                3.75   2.790 |   7.92   4.830 |  12.08   2.030 |  16.25   1.020
00123>                3.83   2.790 |   8.00   4.830 |  12.17   2.030 |  16.33   1.020
00124>                3.92   2.790 |   8.08   4.830 |  12.25   2.030 |  16.42   1.020
00125>                4.00   2.790 |   8.17   4.830 |  12.33   2.030 |  16.50   1.020
00126>                4.08   2.790 |   8.25   4.830 |  12.42   2.030 |  16.58   1.020
00127>                4.17   2.790 |   8.33   4.830 |  12.50   2.030 |  16.67   1.020
00128>
00129>      Unit Hyd Qpeak  (cms)=     .623
00130>
00131>      PEAK FLOW       (cms)=     .309 (i)
00132>      TIME TO PEAK    (hrs)=   10.667
00133>      RUNOFF VOLUME    (mm)=   44.587
00134>      TOTAL RAINFALL   (mm)=   79.949
00135>      RUNOFF COEFFICIENT   =     .558
00136>
00137>       (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00138>
00139>        *** WARNING: Time step is too large for value of TP.
00140>                     R.V. may be ok.  Peak flow could be off.
00141>  --------------------------------------------------------------------------------
00142>  001:0003-----------------------------------------------------------------------
00143>  --------------------
00144>  | ROUTE PIPE culver|     PIPE Number     =    1.00
00145>  | IN= 1---> OUT= 8 |     Diameter     (mm)=  450.00
00146>  | DT=  5.0 min     |     Length        (m)=   45.00
00147>  --------------------     Slope       (m/m)= .01100
00148>                           Manning n         =   .025
00149>
00150>      *** WARNING: MINIMUM PIPE SIZE REQUIRED =   582.00    (mm)
00151>                   THIS SIZE WAS USED IN THE ROUTING.
00152>                   THE CAPACITY OF THIS PIPE  =      .31   (cms)
00153>
00154>       *** WARNING: New pipe size used for routing.
00155>      <------------------- TRAVEL TIME TABLE ------------------->
00156>        DEPTH      VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
00157>          (m)     (cu.m.)      (cms)        (m/s)         min
00158>         .031     .241E+00      .002         .308        2.43
00159>         .061     .672E+00      .007         .481        1.56
00160>         .092     .121E+01      .017         .619        1.21
00161>         .123     .183E+01      .030         .736        1.02
00162>         .153     .252E+01      .047         .838         .90
00163>         .184     .324E+01      .067         .927         .81
00164>         .214     .400E+01      .089        1.005         .75
00165>         .245     .479E+01      .114        1.074         .70
00166>         .276     .558E+01      .141        1.134         .66
00167>         .306     .639E+01      .168        1.186         .63
00168>         .337     .718E+01      .196        1.230         .61
00169>         .368     .797E+01      .224        1.266         .59
00170>         .398     .873E+01      .251        1.294         .58
00171>         .429     .946E+01      .276        1.313         .57
00172>         .459     .101E+02      .298        1.323         .57
00173>         .490     .108E+02      .316        1.322         .57
00174>         .521     .113E+02      .328        1.308         .57
00175>         .551     .117E+02      .332        1.274         .59
00176>         .582     .120E+02      .309        1.161         .65
00177>                                      <---- hydrograph ---->   <-pipe / channel->
00178>                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
00179>                                (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
00180>     INFLOW : ID= 1:300         2.06     .309   10.67 44.587       .478     1.322
00181>     OUTFLOW: ID= 8:culver      2.06     .304   10.67 44.587       .473     1.323
00182>
00183>
00184>  --------------------------------------------------------------------------------
00185>  001:0004-----------------------------------------------------------------------
00186>  --------------------
00187>  | DESIGN NASHYD      |   Area     (ha)=     .29   Curve Number    (CN)=81.00
00188>  | 02:301     DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00189>  --------------------   U.H. Tp(hrs)=    .063
00190>
00191>      Unit Hyd Qpeak  (cms)=     .174
00192>
00193>      PEAK FLOW       (cms)=     .056 (i)
00194>      TIME TO PEAK    (hrs)=   10.667
00195>      RUNOFF VOLUME    (mm)=   44.586
00196>      TOTAL RAINFALL   (mm)=   79.949
00197>      RUNOFF COEFFICIENT   =     .558
00198>
00199>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00200>
00201>       *** WARNING: Time step is too large for value of TP.
00202>                    R.V. may be ok.  Peak flow could be off.
00203>  --------------------------------------------------------------------------------
00204>  001:0005-----------------------------------------------------------------------
00205>  --------------------
00206>  | DESIGN NASHYD      |   Area     (ha)=    1.73   Curve Number    (CN)=81.00
00207>  | 03:302     DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00208>  --------------------   U.H. Tp(hrs)=    .115
00209>
00210>      Unit Hyd Qpeak  (cms)=     .575
00211>
00212>      PEAK FLOW       (cms)=     .275 (i)
00213>      TIME TO PEAK    (hrs)=   10.667
00214>      RUNOFF VOLUME    (mm)=   44.587
00215>      TOTAL RAINFALL   (mm)=   79.949
00216>      RUNOFF COEFFICIENT   =     .558
00217>
00218>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00219>
00220>       *** WARNING: Time step is too large for value of TP.
00221>                    R.V. may be ok.  Peak flow could be off.
00222>  --------------------------------------------------------------------------------
00223>  001:0006-----------------------------------------------------------------------
00224>  --------------------
00225>  | DESIGN NASHYD      |   Area     (ha)=    2.89   Curve Number    (CN)=81.00
00226>  | 04:303     DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00227>  --------------------   U.H. Tp(hrs)=    .109
00228>
00229>      Unit Hyd Qpeak  (cms)=    1.013
00230>
00231>      PEAK FLOW       (cms)=     .472 (i)
00232>      TIME TO PEAK    (hrs)=   10.667
00233>      RUNOFF VOLUME    (mm)=   44.587
00234>      TOTAL RAINFALL   (mm)=   79.949
00235>      RUNOFF COEFFICIENT   =     .558
00236>
00237>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00238>
00239>       *** WARNING: Time step is too large for value of TP.
00240>                    R.V. may be ok.  Peak flow could be off.
00241>  --------------------------------------------------------------------------------
00242>  001:0007-----------------------------------------------------------------------
00243>  --------------------
00244>  | ADD HYD (outlet) | ID: NHYD     AREA     QPEAK   TPEAK   R.V.    DWF
00245>  --------------------              (ha)     (cms)   (hrs)   (mm)    (cms)
00246>                     ID1 03:302      1.73     .275   10.67  44.59    .000
00247>                   +ID2 04:303      2.89     .472   10.67  44.59    .000
00248>                     ================================================
00249>                     SUM 10:outlet    4.62     .747   10.67  44.59    .000
00250>
00251>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00252>
00253>  --------------------------------------------------------------------------------
00254>  001:0008-----------------------------------------------------------------------
00255>        FINISH
00256>  --------------------------------------------------------------------------------
00257>  ********************************************************************************
00258>       WARNINGS / ERRORS / NOTES
00259>       -------------------------
00260>  001:0002 DESIGN NASHYD
00261>        *** WARNING: Time step is too large for value of TP.
00262>                     R.V. may be ok.  Peak flow could be off.
00263>  001:0003 ROUTE PIPE     ->
00264>        *** WARNING: New pipe size used for routing.
00265>  001:0004 DESIGN NASHYD
00266>        *** WARNING: Time step is too large for value of TP.
00267>                     R.V. may be ok.  Peak flow could be off.
00268>  001:0005 DESIGN NASHYD
00269>        *** WARNING: Time step is too large for value of TP.
00270>                     R.V. may be ok.  Peak flow could be off.
```

```
00001> ================================================================================
00002>
00003>  SSSSS  W   W  H   H   M   M  H   H  Y   Y  M   M   OOO        999    999  =========
00004>  S      W W W  MM MM   H   H  H   H   Y Y   MM MM  O   O      9   9  9   9
00005>  SSSSS  W W W  H M H   HHHHH  H   H    Y    M M M  O   O  ##  9   9  9   9 Ver. 4.02
00006>      S  W W W  H   H   M   M  H   H    Y    M   M  O   O       9999   9999 July 1999
00007>  SSSSS   W W   H   H   M   M  H   H    Y    M   M   OOO          9      9 =========
00008>                                                                 9   9  9   9 # 4377549
00009>       StormWater Management HYdrologic Model                     999    999  =========
00010>
00011>  ********************************************************************************
00012>  ***************************** SWMHYMO-99 Ver/4.02 ******************************
00013>  *******  A single event and continuous hydrologic simulation model  *******
00014>  *******     based on the principles of HYMO and its successors      *******
00015>  *******                 OTTHYMO-83 and OTTHYMO-89.                  *******
00016>  ********************************************************************************
00017>  ******* Distributed by:  J.F. Sabourin and Associates Inc.           *******
00018>  *******                  Ottawa, Ontario: (613) 727-5199            *******
00019>  *******                  Gatineau, Quebec: (819) 243-6858           *******
00020>  *******                  E-Mail: swmhymo@jfsa.Com                   *******
00021>  ********************************************************************************
00022>
00023>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024>  +++++++ Licensed user: Condeland Engineering Limited                 +++++++
00025>  +++++++                Toronto                  SERIAL#:4377549     +++++++
00026>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028>  ********************************************************************************
00029>  *******           ++++++ PROGRAM ARRAY DIMENSIONS ++++++              *******
00030>  *******           Maximum value for ID numbers   :   10              *******
00031>  *******           Max. number of rainfall points:  15000             *******
00032>  *******           Max. number of flow points     :  15000            *******
00033>  ********************************************************************************
00034>
00035>
00036>  ********************   D E T A I L E D   O U T P U T   ********************
00037>  ********************************************************************************
00038>  *       DATE: 2009-05-27      TIME: 19:27:05      RUN COUNTER: 000041       *
00039>  ********************************************************************************
00040>  * Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE50YR.dat    *
00041>  * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE50YR.out    *
00042>  * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE50YR.sum    *
00043>  * User comments:                                                          *
00044>  * 1:_____________________________________________________________________*
00045>  * 2:_____________________________________________________________________*
00046>  * 3:_____________________________________________________________________*
00047>  ********************************************************************************
00048>
00049>  --------------------------------------------------------------------------------
00050> 001:0001--------------------------------------------------------------------------
00051> *#*****************************************************************************
00052> *#  Project Name: [2147925 Ontario Limited]     Project Number: [09-015]
00053> *#  Date        : 05-20-2009
00054> *#  Modeller    : [ROBERT DE ANGELIS]
00055> *#  Company     : Condeland Engineering Limited
00056> *#  License #   :  4377549
00057> *#*****************************************************************************
00058>  --------------------
00059>  | START            |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00060>  --------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00061>      TZERO =  4.00 hrs on        0
00062>      METOUT=   2 (output = METRIC)
00063>      NRUN  = 001
00064>      NSTORM=   0
00065>  --------------------------------------------------------------------------------
00066> 001:0002--------------------------------------------------------------------------
00067>  ----------------------
00068>  | DESIGN NASHYD      |   Area     (ha)=    2.06   Curve Number   (CN)=81.00
00069>  | 01:300     DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00070>  ----------------------   U.H. Tp(hrs)=    .126
00071>
00072>                               New rainfall entered directly by user.
00073>                               TIME STEP= 5.00 min   # of STEPS= 200
00074>                               DURATION =16.67 hrs   TOTAL RAIN=  86.44 mm
00075>
00076>                TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00077>                 hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00078>                 .08  49.100 |   4.25   3.050 |   8.42   3.050 |  12.58   1.650
00079>                 .17   2.120 |   4.33   3.050 |   8.50   3.050 |  12.67   1.650
00080>                 .25   2.120 |   4.42   3.050 |   8.58   3.050 |  12.75   1.650
00081>                 .33   2.120 |   4.50   3.050 |   8.67   3.050 |  12.83   1.650
00082>                 .42   2.120 |   4.58   3.050 |   8.75   3.050 |  12.92   1.650
00083>                 .50   2.120 |   4.67   3.050 |   8.83   3.050 |  13.00   1.650
00084>                 .58   2.120 |   4.75   3.050 |   8.92   3.050 |  13.08   1.650
00085>                 .67   2.120 |   4.83   3.050 |   9.00   3.050 |  13.17   1.650
00086>                 .75   2.120 |   4.92   3.050 |   9.08   3.050 |  13.25   1.650
00087>                 .83   2.120 |   5.00   3.050 |   9.17   3.050 |  13.33   1.650
00088>                 .92   2.120 |   5.08   5.640 |   9.25   3.050 |  13.42   1.650
00089>                1.00   2.120 |   5.17   5.640 |   9.33   3.050 |  13.50   1.650
00090>                1.08   2.120 |   5.25   5.640 |   9.42   3.050 |  13.58   1.650
00091>                1.17   2.120 |   5.33   5.640 |   9.50   3.050 |  13.67   1.650
00092>                1.25   2.120 |   5.42   5.640 |   9.58   3.050 |  13.75   1.650
00093>                1.33   2.120 |   5.50   5.640 |   9.67   3.050 |  13.83   1.650
00094>                1.42   2.120 |   5.58   5.640 |   9.75   3.050 |  13.92   1.650
00095>                1.50   2.120 |   5.67   5.640 |   9.83   3.050 |  14.00   1.650
00096>                1.58   2.120 |   5.75   5.640 |   9.92   3.050 |  14.08   1.650
00097>                1.67   2.120 |   5.83   5.640 |  10.00   3.050 |  14.17   1.650
00098>                1.75   2.120 |   5.92   7.520 |  10.08   2.120 |  14.25   1.170
00099>                1.83   2.120 |   6.00   7.520 |  10.17   2.120 |  14.33   1.170
00100>                1.92   2.120 |   6.08  11.040 |  10.25   2.120 |  14.42   1.170
00101>                2.00   2.120 |   6.17  11.020 |  10.33   2.120 |  14.50   1.170
00102>                2.08   2.120 |   6.25  25.370 |  10.42   2.120 |  14.58   1.170
00103>                2.17   2.120 |   6.33  25.370 |  10.50   2.120 |  14.67   1.170
00104>                2.25   2.120 |   6.42  55.440 |  10.58   2.120 |  14.75   1.170
00105>                2.33   2.120 |   6.50  55.440 |  10.67   2.120 |  14.83   1.170
00106>                2.42   2.120 |   6.58 116.060 |  10.75   2.120 |  14.92   1.170
00107>                2.50   2.120 |   6.67 116.060 |  10.83   2.120 |  15.00   1.170
00108>                2.58   2.120 |   6.75  19.870 |  10.92   2.120 |  15.08   1.170
00109>                2.67   2.120 |   6.83  19.870 |  11.00   2.120 |  15.17   1.170
00110>                2.75   2.120 |   6.92  12.690 |  11.08   2.120 |  15.25   1.170
00111>                2.83   2.120 |   7.00  12.690 |  11.17   2.120 |  15.33   1.170
00112>                2.92   2.120 |   7.08   9.170 |  11.25   2.120 |  15.42   1.170
00113>                3.00   2.120 |   7.17   9.170 |  11.33   2.120 |  15.50   1.170
00114>                3.08   2.120 |   7.25   8.690 |  11.42   2.120 |  15.58   1.170
00115>                3.17   2.120 |   7.33   8.690 |  11.50   2.120 |  15.67   1.170
00116>                3.25   2.120 |   7.42   6.100 |  11.58   2.120 |  15.75   1.170
00117>                3.33   2.120 |   7.50   6.100 |  11.67   2.120 |  15.83   1.170
00118>                3.42   3.050 |   7.58   5.170 |  11.75   2.120 |  15.92   1.170
00119>                3.50   3.050 |   7.67   5.170 |  11.83   2.120 |  16.00   1.170
00120>                3.58   3.050 |   7.75   5.170 |  11.92   2.120 |  16.08   1.170
00121>                3.67   3.050 |   7.83   5.170 |  12.00   2.120 |  16.17   1.170
00122>                3.75   3.050 |   7.92   5.170 |  12.08   2.120 |  16.25   1.170
00123>                3.83   3.050 |   8.00   5.170 |  12.17   2.120 |  16.33   1.170
00124>                3.92   3.050 |   8.08   5.170 |  12.25   2.120 |  16.42   1.170
00125>                4.00   3.050 |   8.17   5.170 |  12.33   2.120 |  16.50   1.170
00126>                4.08   3.050 |   8.25   5.170 |  12.42   2.120 |  16.58   1.170
00127>                4.17   3.050 |   8.33   5.170 |  12.50   2.120 |  16.67   1.000
00128>
00129>      Unit Hyd Qpeak  (cms)=     .623
00130>
00131>      PEAK FLOW       (cms)=     .346 (i)
00132>      TIME TO PEAK    (hrs)=   10.667
00133>      RUNOFF VOLUME    (mm)=   49.923
00134>      TOTAL RAINFALL   (mm)=   86.441
00135>      RUNOFF COEFFICIENT   =     .578
00136>
00137>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00138>
00139>       *** WARNING: Time step is too large for value of TP.
00140>                    R.V. may be ok.  Peak flow could be off.
00141> --------------------------------------------------------------------------------
00142> 001:0003--------------------------------------------------------------------------
00143>  --------------------
00144>  | ROUTE PIPE culver|     PIPE Number     =    1.00
00145>  | IN= 1---> OUT= 8 |     Diameter    (mm)=  450.00
00146>  | DT=  5.0 min     |     Length       (m)=   45.00
00147>  --------------------     Slope       (m/m)= .01100
00148>                           Manning n        =   .025
00149>
00150>      *** WARNING: MINIMUM PIPE SIZE REQUIRED =   607.23    (mm)
00151>                   THIS SIZE WAS USED IN THE ROUTING.
00152>                   THE CAPACITY OF THIS PIPE  =      .35   (cms)
00153>
00154>       *** WARNING: New pipe size used for routing.
00155>      <------------------ TRAVEL TIME TABLE ------------------->
00156>        DEPTH      VOLUME    FLOW RATE    VELOCITY    TRAV.TIME
00157>          (m)      (cu.m.)      (cms)        (m/s)        min
00158>         .032     .263E+00      .002         .317         2.36
00159>         .064     .731E+00      .008         .495         1.52
00160>         .096     .132E+01      .019         .637         1.18
00161>         .128     .200E+01      .034         .757          .99
00162>         .160     .274E+01      .052         .862          .87
00163>         .192     .353E+01      .075         .954          .79
00164>         .224     .436E+01      .100        1.034          .73
00165>         .256     .521E+01      .128        1.105          .68
00166>         .288     .608E+01      .158        1.167          .64
00167>         .320     .695E+01      .189        1.220          .61
00168>         .352     .782E+01      .220        1.265          .59
00169>         .384     .867E+01      .251        1.302          .58
00170>         .415     .950E+01      .281        1.331          .56
00171>         .447     .103E+02      .309        1.351          .56
00172>         .479     .110E+02      .334        1.361          .55
00173>         .511     .117E+02      .354        1.360          .55
00174>         .543     .123E+02      .368        1.346          .56
00175>         .575     .128E+02      .372        1.311          .57
00176>         .607     .130E+02      .346        1.195          .63
00177>                                <---- hydrograph ---->   <-pipe / channel->
00178>                                AREA    QPEAK    TPEAK    R.V.    MAX DEPTH   MAX VEL
00179>                                (ha)    (cms)    (hrs)    (mm)      (m)       (m/s)
00180>    INFLOW : ID= 1:300          2.06     .346   10.67  49.923       .498      1.360
00181>    OUTFLOW: ID= 8:culver       2.06     .340   10.67  49.923       .494      1.361
00182>
00183>
00184> --------------------------------------------------------------------------------
00185> 001:0004--------------------------------------------------------------------------
00186>  ----------------------
00187>  | DESIGN NASHYD      |   Area     (ha)=     .29   Curve Number   (CN)=81.00
00188>  | 02:301     DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00189>  ----------------------   U.H. Tp(hrs)=    .063
00190>
00191>      Unit Hyd Qpeak  (cms)=     .174
00192>
00193>      PEAK FLOW       (cms)=     .063 (i)
00194>      TIME TO PEAK    (hrs)=   10.667
00195>      RUNOFF VOLUME    (mm)=   49.923
00196>      TOTAL RAINFALL   (mm)=   86.441
00197>      RUNOFF COEFFICIENT   =     .578
00198>
00199>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00200>
00201>       *** WARNING: Time step is too large for value of TP.
00202>                    R.V. may be ok.  Peak flow could be off.
00203> --------------------------------------------------------------------------------
00204> 001:0005--------------------------------------------------------------------------
00205>  ----------------------
00206>  | DESIGN NASHYD      |   Area     (ha)=    1.73   Curve Number   (CN)=81.00
00207>  | 03:302     DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00208>  ----------------------   U.H. Tp(hrs)=    .115
00209>
00210>      Unit Hyd Qpeak  (cms)=     .575
00211>
00212>      PEAK FLOW       (cms)=     .307 (i)
00213>      TIME TO PEAK    (hrs)=   10.667
00214>      RUNOFF VOLUME    (mm)=   49.923
00215>      TOTAL RAINFALL   (mm)=   86.441
00216>      RUNOFF COEFFICIENT   =     .578
00217>
00218>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00219>
00220>       *** WARNING: Time step is too large for value of TP.
00221>                    R.V. may be ok.  Peak flow could be off.
00222> --------------------------------------------------------------------------------
00223> 001:0006--------------------------------------------------------------------------
00224>  ----------------------
00225>  | DESIGN NASHYD      |   Area     (ha)=    2.89   Curve Number   (CN)=81.00
00226>  | 04:303     DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00227>  ----------------------   U.H. Tp(hrs)=    .109
00228>
00229>      Unit Hyd Qpeak  (cms)=    1.013
00230>
00231>      PEAK FLOW       (cms)=     .529 (i)
00232>      TIME TO PEAK    (hrs)=   10.667
00233>      RUNOFF VOLUME    (mm)=   49.923
00234>      TOTAL RAINFALL   (mm)=   86.441
00235>      RUNOFF COEFFICIENT   =     .578
00236>
00237>      (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00238>
00239>       *** WARNING: Time step is too large for value of TP.
00240>                    R.V. may be ok.  Peak flow could be off.
00241> --------------------------------------------------------------------------------
00242> 001:0007--------------------------------------------------------------------------
00243>  --------------------
00244>  | ADD HYD (outlet) | ID: NHYD     AREA     QPEAK   TPEAK   R.V.    DWF
00245>  --------------------              (ha)     (cms)   (hrs)   (mm)    (cms)
00246>                     ID1 03:302      1.73     .307   10.67  49.92    .000
00247>                    +ID2 04:303      2.89     .529   10.67  49.92    .000
00248>                     ================================================
00249>                     SUM 10:outlet    4.62     .836   10.67  49.92    .000
00250>
00251>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00252>
00253> --------------------------------------------------------------------------------
00254> 001:0008--------------------------------------------------------------------------
00255>        FINISH
00256> --------------------------------------------------------------------------------
00257> ********************************************************************************
00258>      WARNINGS / ERRORS / NOTES
00259>      -------------------------
00260>   001:0002 DESIGN NASHYD
00261>       *** WARNING: Time step is too large for value of TP.
00262>                    R.V. may be ok.  Peak flow could be off.
00263>   001:0003 ROUTE PIPE     ->
00264>       *** WARNING: New pipe size used for routing.
00265>   001:0004 DESIGN NASHYD
00266>       *** WARNING: Time step is too large for value of TP.
00267>                    R.V. may be ok.  Peak flow could be off.
00268>   001:0005 DESIGN NASHYD
00269>       *** WARNING: Time step is too large for value of TP.
00270>                    R.V. may be ok.  Peak flow could be off.
```

```
00271>  001:0006 DESIGN NASHYD
00272>        *** WARNING: Time step is too large for value of TP.
00273>                     R.V. may be ok.  Peak flow could be off.
00274>    Simulation ended on 2009-05-27     at 19:27:05
00275> ===============================================================================
00276>
00277>
```

```
00001> ================================================================================
00002>
00003> SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO         999    999  =========
00004> S      W W W  MM MM  H   H   Y Y   MM MM  O   O       9   9  9   9
00005> SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##   9   9  9   9 Ver. 4.02
00006>     S   W W   M   M  H   H    Y    M   M  O   O        9999   9999 July 1999
00007> SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9  =========
00008>                                                       9   9  9   9 # 4377549
00009>       StormWater Management HYdrologic Model           999    999  =========
00010>
00011>  ********************************************************************************
00012>  ************************** SWMHYMO-99 Ver/4.02 ********************************
00013>  *******  A single event and continuous hydrologic simulation model  *******
00014>  *******       based on the principles of HYMO and its successors     *******
00015>  *******                 OTTHYMO-83 and OTTHYMO-89.                   *******
00016>  ********************************************************************************
00017>  ******* Distributed by:  J.F. Sabourin and Associates Inc.           *******
00018>  *******                  Ottawa,  Ontario: (613) 727-5199           *******
00019>  *******                  Gatineau, Quebec: (819) 243-6858           *******
00020>  *******                  E-Mail: swmhymo@jfsa.Com                   *******
00021>  ********************************************************************************
00022>
00023>  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024>  +++++++ Licensed user: Condeland Engineering Limited                 +++++++
00025>  +++++++                Toronto                 SERIAL#:4377549     +++++++
00026>  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028>  ********************************************************************************
00029>  *******          ++++++ PROGRAM ARRAY DIMENSIONS ++++++              *******
00030>  *******          Maximum value for ID numbers  :     10             *******
00031>  *******          Max. number of rainfall points:  15000             *******
00032>  *******          Max. number of flow points    :  15000             *******
00033>  ********************************************************************************
00034>
00035>
00036>  ********************   D E T A I L E D   O U T P U T   ********************
00037>  ********************************************************************************
00038>  *      DATE: 2009-05-27       TIME: 16:05:45       RUN COUNTER: 000030      *
00039>  ********************************************************************************
00040>  * Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE100YR.dat  *
00041>  * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE100YR.out  *
00042>  * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\PRE100YR.sum  *
00043>  * User comments:                                                          *
00044>  * 1:_____________________________________________________________________*
00045>  * 2:_____________________________________________________________________*
00046>  * 3:_____________________________________________________________________*
00047>  ********************************************************************************
00048>
00049> --------------------------------------------------------------------------------
00050> 001:0001--------------------------------------------------------------------------
00051> ********************************************************************************
00052> *#  Project Name: [2147925 Ontario Limited]    Project Number: [09-015]
00053> *#  Date        : 05-20-2009
00054> *#  Modeller    : [ROBERT DE ANGELIS]
00055> *#  Company     : Condeland Engineering Limited
00056> *#  License #   :  4377549
00057> *#*******************************************************************************
00058>  -------------------
00059> | START           |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00060>  -------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00061>     TZERO =  4.00 hrs on       0
00062>     METOUT=  2 (output = METRIC)
00063>     NRUN  = 001
00064>     NSTORM=  0
00065> --------------------------------------------------------------------------------
00066> 001:0002--------------------------------------------------------------------------
00067>  -------------------
00068> | DESIGN NASHYD      |   Area     (ha)=    2.06   Curve Number    (CN)=81.00
00069> | 01:300    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00070>  -------------------   U.H. Tp(hrs)=    .126
00071>
00072>                              New rainfall entered directly by user.
00073>                              TIME STEP= 5.00 min   # of STEPS= 200
00074>                              DURATION =16.67 hrs   TOTAL RAIN=  93.48 mm
00075>
00076>              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00077>               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00078>               .08  53.090 |   4.25   3.300 |   8.42   3.300 |  12.58   1.780
00079>               .17   2.290 |   4.33   3.300 |   8.50   3.300 |  12.67   1.780
00080>               .25   2.290 |   4.42   3.300 |   8.58   3.300 |  12.75   1.780
00081>               .33   2.290 |   4.50   3.300 |   8.67   3.300 |  12.83   1.780
00082>               .42   2.290 |   4.58   3.300 |   8.75   3.300 |  12.92   1.780
00083>               .50   2.290 |   4.67   3.300 |   8.83   3.300 |  13.00   1.780
00084>               .58   2.290 |   4.75   3.300 |   8.92   3.300 |  13.08   1.780
00085>               .67   2.290 |   4.83   3.300 |   9.00   3.300 |  13.17   1.780
00086>               .75   2.290 |   4.92   3.300 |   9.08   3.300 |  13.25   1.780
00087>               .83   2.290 |   5.00   3.300 |   9.17   3.300 |  13.33   1.780
00088>               .92   2.290 |   5.08   6.100 |   9.25   3.300 |  13.42   1.780
00089>              1.00   2.290 |   5.17   6.100 |   9.33   3.300 |  13.50   1.780
00090>              1.08   2.290 |   5.25   6.100 |   9.42   3.300 |  13.58   1.780
00091>              1.17   2.290 |   5.33   6.100 |   9.50   3.300 |  13.67   1.780
00092>              1.25   2.290 |   5.42   6.100 |   9.58   3.300 |  13.75   1.780
00093>              1.33   2.290 |   5.50   6.100 |   9.67   3.300 |  13.83   1.780
00094>              1.42   2.290 |   5.58   6.100 |   9.75   3.300 |  13.92   1.780
00095>              1.50   2.290 |   5.67   6.100 |   9.83   3.300 |  14.00   1.780
00096>              1.58   2.290 |   5.75   6.100 |   9.92   3.300 |  14.08   1.780
00097>              1.67   2.290 |   5.83   6.100 |  10.00   3.300 |  14.17   1.780
00098>              1.75   2.290 |   5.92   8.130 |  10.08   2.290 |  14.25   1.270
00099>              1.83   2.290 |   6.00   8.130 |  10.17   2.290 |  14.33   1.270
00100>              1.92   2.290 |   6.08  11.940 |  10.25   2.290 |  14.42   1.270
00101>              2.00   2.290 |   6.17  11.940 |  10.33   2.290 |  14.50   1.270
00102>              2.08   2.290 |   6.25  27.430 |  10.42   2.290 |  14.58   1.270
00103>              2.17   2.290 |   6.33  27.430 |  10.50   2.290 |  14.67   1.270
00104>              2.25   2.290 |   6.42  59.940 |  10.58   2.290 |  14.75   1.270
00105>              2.33   2.290 |   6.50  59.940 |  10.67   2.290 |  14.83   1.270
00106>              2.42   2.290 |   6.58 125.480 |  10.75   2.290 |  14.92   1.270
00107>              2.50   2.290 |   6.67 125.480 |  10.83   2.290 |  15.00   1.270
00108>              2.58   2.290 |   6.75  21.480 |  10.92   2.290 |  15.08   1.270
00109>              2.67   2.290 |   6.83  21.480 |  11.00   2.290 |  15.17   1.270
00110>              2.75   2.290 |   6.92  13.720 |  11.08   2.290 |  15.25   1.270
00111>              2.83   2.290 |   7.00  13.720 |  11.17   2.290 |  15.33   1.270
00112>              2.92   2.290 |   7.08   9.910 |  11.25   2.290 |  15.42   1.270
00113>              3.00   2.290 |   7.17   9.910 |  11.33   2.290 |  15.50   1.270
00114>              3.08   2.290 |   7.25   9.400 |  11.42   2.290 |  15.58   1.270
00115>              3.17   2.290 |   7.33   9.400 |  11.50   2.290 |  15.67   1.270
00116>              3.25   2.290 |   7.42   6.600 |  11.58   2.290 |  15.75   1.270
00117>              3.33   2.290 |   7.50   6.600 |  11.67   2.290 |  15.83   1.270
00118>              3.42   3.300 |   7.58   5.590 |  11.75   2.290 |  15.92   1.270
00119>              3.50   3.300 |   7.67   5.590 |  11.83   2.290 |  16.00   1.270
00120>              3.58   3.300 |   7.75   5.590 |  11.92   2.290 |  16.08   1.270
00121>              3.67   3.300 |   7.83   5.590 |  12.00   2.290 |  16.17   1.270
00122>              3.75   3.300 |   7.92   5.590 |  12.08   2.290 |  16.25   1.270
00123>              3.83   3.300 |   8.00   5.590 |  12.17   2.290 |  16.33   1.270
00124>              3.92   3.300 |   8.08   5.590 |  12.25   2.290 |  16.42   1.270
00125>              4.00   3.300 |   8.17   5.590 |  12.33   2.290 |  16.50   1.270
00126>              4.08   3.300 |   8.25   5.590 |  12.42   2.290 |  16.58   1.270
00127>              4.17   3.300 |   8.33   5.590 |  12.50   2.290 |  16.67   1.270
00128>
00129>     Unit Hyd Qpeak  (cms)=     .623
00130>
00131>     PEAK FLOW       (cms)=     .387 (i)
00132>     TIME TO PEAK    (hrs)=   10.667
00133>     RUNOFF VOLUME    (mm)=   55.821
00134>     TOTAL RAINFALL   (mm)=   93.480
00135>     RUNOFF COEFFICIENT   =     .597
00136>
00137>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00138>
00139>      *** WARNING: Time step is too large for value of TP.
00140>                   R.V. may be ok.  Peak flow could be off.
00141> --------------------------------------------------------------------------------
00142> 001:0003--------------------------------------------------------------------------
00143>  -------------------
00144> | ROUTE PIPE culver|     PIPE Number      =    1.00
00145> | IN= 1---> OUT= 8 |     Diameter    (mm)=  450.00
00146> | DT=  5.0 min     |     Length       (m)=   45.00
00147>  -------------------     Slope       (m/m)= .01100
00148>                          Manning n        =   .025
00149>
00150>     *** WARNING: MINIMUM PIPE SIZE REQUIRED =   633.24   (mm)
00151>                  THIS SIZE WAS USED IN THE ROUTING.
00152>                  THE CAPACITY OF THIS PIPE  =      .39  (cms)
00153>
00154>      *** WARNING: New pipe size used for routing.
00155>     <------------------- TRAVEL TIME TABLE ------------------->
00156>       DEPTH      VOLUME     FLOW RATE     VELOCITY     TRAV.TIME
00157>         (m)     (cu.m.)       (cms)         (m/s)         min
00158>        .033    .286E+00       .002          .326         2.30
00159>        .067    .795E+00       .009          .509         1.47
00160>        .100    .144E+01       .021          .655         1.14
00161>        .133    .217E+01       .038          .779          .96
00162>        .167    .298E+01       .059          .886          .85
00163>        .200    .384E+01       .084          .981          .76
00164>        .233    .474E+01       .112         1.063          .71
00165>        .267    .567E+01       .143         1.136          .66
00166>        .300    .661E+01       .176         1.200          .62
00167>        .333    .756E+01       .211         1.255          .60
00168>        .367    .850E+01       .246         1.301          .58
00169>        .400    .943E+01       .281         1.339          .56
00170>        .433    .103E+02       .314         1.369          .55
00171>        .467    .112E+02       .346         1.389          .54
00172>        .500    .120E+02       .373         1.399          .54
00173>        .533    .127E+02       .396         1.399          .54
00174>        .567    .134E+02       .411         1.384          .54
00175>        .600    .139E+02       .416         1.348          .56
00176>        .633    .142E+02       .387         1.229          .61
00177>                                          <---- hydrograph ---->   <-pipe / channel->
00178>                                AREA     QPEAK    TPEAK    R.V.    MAX DEPTH  MAX VEL
00179>                                (ha)     (cms)    (hrs)    (mm)       (m)       (m/s)
00180>    INFLOW : ID= 1:300          2.06      .387   10.67 55.821        .520      1.399
00181>    OUTFLOW: ID= 8:culver       2.06      .381   10.67 55.821        .516      1.399
00182>
00183>
00184> --------------------------------------------------------------------------------
00185> 001:0004--------------------------------------------------------------------------
00186>  -------------------
00187> | DESIGN NASHYD      |   Area     (ha)=     .29   Curve Number    (CN)=81.00
00188> | 02:301    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00189>  -------------------   U.H. Tp(hrs)=    .063
00190>
00191>     Unit Hyd Qpeak  (cms)=     .174
00192>
00193>     PEAK FLOW       (cms)=     .070 (i)
00194>     TIME TO PEAK    (hrs)=   10.667
00195>     RUNOFF VOLUME    (mm)=   55.821
00196>     TOTAL RAINFALL   (mm)=   93.480
00197>     RUNOFF COEFFICIENT   =     .597
00198>
00199>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00200>
00201>      *** WARNING: Time step is too large for value of TP.
00202>                   R.V. may be ok.  Peak flow could be off.
00203> --------------------------------------------------------------------------------
00204> 001:0005--------------------------------------------------------------------------
00205>  -------------------
00206> | DESIGN NASHYD      |   Area     (ha)=    1.73   Curve Number    (CN)=81.00
00207> | 03:302    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00208>  -------------------   U.H. Tp(hrs)=    .115
00209>
00210>     Unit Hyd Qpeak  (cms)=     .575
00211>
00212>     PEAK FLOW       (cms)=     .344 (i)
00213>     TIME TO PEAK    (hrs)=   10.667
00214>     RUNOFF VOLUME    (mm)=   55.821
00215>     TOTAL RAINFALL   (mm)=   93.480
00216>     RUNOFF COEFFICIENT   =     .597
00217>
00218>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00219>
00220>      *** WARNING: Time step is too large for value of TP.
00221>                   R.V. may be ok.  Peak flow could be off.
00222> --------------------------------------------------------------------------------
00223> 001:0006--------------------------------------------------------------------------
00224>  -------------------
00225> | DESIGN NASHYD      |   Area     (ha)=    2.89   Curve Number    (CN)=81.00
00226> | 04:303    DT= 5.00 |   Ia       (mm)=   1.500   # of Linear Res.(N)= 3.00
00227>  -------------------   U.H. Tp(hrs)=    .109
00228>
00229>     Unit Hyd Qpeak  (cms)=    1.013
00230>
00231>     PEAK FLOW       (cms)=     .591 (i)
00232>     TIME TO PEAK    (hrs)=   10.667
00233>     RUNOFF VOLUME    (mm)=   55.821
00234>     TOTAL RAINFALL   (mm)=   93.480
00235>     RUNOFF COEFFICIENT   =     .597
00236>
00237>     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00238>
00239>      *** WARNING: Time step is too large for value of TP.
00240>                   R.V. may be ok.  Peak flow could be off.
00241> --------------------------------------------------------------------------------
00242> 001:0007--------------------------------------------------------------------------
00243>  -------------------
00244> | ADD HYD (outlet) | ID: NHYD      AREA     QPEAK    TPEAK    R.V.     DWF
00245>  ------------------                (ha)     (cms)    (hrs)    (mm)     (cms)
00246>                     ID1 03:302      1.73      .344   10.67  55.82     .000
00247>                    +ID2 04:303      2.89      .591   10.67  55.82     .000
00248>                     ==========================================================
00249>                     SUM 10:outlet    4.62      .934   10.67  55.82     .000
00250>
00251>    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
00252>
00253> --------------------------------------------------------------------------------
00254> 001:0008--------------------------------------------------------------------------
00255>        FINISH
00256> --------------------------------------------------------------------------------
00257> ********************************************************************************
00258>      WARNINGS / ERRORS / NOTES
00259>      -------------------------
00260>  001:0002 DESIGN NASHYD
00261>       *** WARNING: Time step is too large for value of TP.
00262>                    R.V. may be ok.  Peak flow could be off.
00263>  001:0003 ROUTE PIPE      ->
00264>       *** WARNING: New pipe size used for routing.
00265>  001:0004 DESIGN NASHYD
00266>       *** WARNING: Time step is too large for value of TP.
00267>                    R.V. may be ok.  Peak flow could be off.
00268>  001:0005 DESIGN NASHYD
00269>       *** WARNING: Time step is too large for value of TP.
00270>                    R.V. may be ok.  Peak flow could be off.
```

```
00271>  001:0006 DESIGN NASHYD
00272>        *** WARNING: Time step is too large for value of TP.
00273>                     R.V. may be ok.  Peak flow could be off.
00274>    Simulation ended on 2009-05-27     at 16:05:46
00275> ================================================================================
00276>
00277>
```

```
00001> ================================================================================
00002>
00003>  SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999 =========
00004>  S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
00005>  SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9 Ver. 4.02
00006>      S   W W   M   M  H   H    Y    M   M  O   O       9999   9999 July 1999
00007>  SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9 =========
00008>                                                        9   9  9   9 # 4377549
00009>       StormWater Management HYdrologic Model           999    999 =========
00010>
00011>  ********************************************************************************
00012>  ***************************** SWMHYMO-99 Ver/4.02 ******************************
00013>  *******  A single event and continuous hydrologic simulation model  ********
00014>  *******       based on the principles of HYMO and its successors       ********
00015>  *******              OTTHYMO-83 and OTTHYMO-89.                        ********
00016>  ********************************************************************************
00017>  ******* Distributed by:  J.F. Sabourin and Associates Inc.            ********
00018>  *******                  Ottawa,  Ontario: (613) 727-5199             ********
00019>  *******                  Gatineau, Quebec: (819) 243-6858             ********
00020>  *******                  E-Mail: swmhymo@jfsa.Com                     ********
00021>  ********************************************************************************
00022>
00023>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024>  +++++++ Licensed user: Condeland Engineering Limited                  +++++++++
00025>  +++++++                Toronto                    SERIAL#:4377549   +++++++++
00026>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028>  ********************************************************************************
00029>  *******          ++++++ PROGRAM ARRAY DIMENSIONS ++++++              ********
00030>  *******          Maximum value for ID numbers  :     10              ********
00031>  *******          Max. number of rainfall points:  15000              ********
00032>  *******          Max. number of flow points    :  15000              ********
00033>  ********************************************************************************
00034>
00035>
00036>  ********************   D E T A I L E D   O U T P U T   ********************
00037>  ********************************************************************************
00038>  *       DATE: 2009-05-27       TIME: 18:52:11       RUN COUNTER: 000033       *
00039>  ********************************************************************************
00040>  * Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post2yr.dat    *
00041>  * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post2yr.out    *
00042>  * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post2yr.sum    *
00043>  * User comments:                                                          *
00044>  * 1:_____________________________________________________________________*
00045>  * 2:_____________________________________________________________________*
00046>  * 3:_____________________________________________________________________*
00047>  ********************************************************************************
00048>
00049>  --------------------------------------------------------------------------------
00050>  001:0001-----------------------------------------------------------------------
00051>  *********************************************************************************
00052>  *#  Project Name: [214925 ONTARIO LIMITED]    Project Number: [09-015]
00053>  *#  Date        : 11-08-2008
00054>  *#  Modeller    : [ROBERT DE ANGELIS]
00055>  *#  Company     : Condeland Engineering Limited
00056>  *#  License #   :  4377549
00057>  *#*******************************************************************************
00058>  --------------------
00059>  | START            |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00060>  --------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00061>      TZERO =  4.00 hrs on      0
00062>      METOUT=  2 (output = METRIC)
00063>      NRUN  = 001
00064>      NSTORM=  0
00065>  --------------------------------------------------------------------------------
00066>  001:0002-----------------------------------------------------------------------
00067>  ---------------------
00068>  | DESIGN STANDHYD    |   Area     (ha)=     .58
00069>  | 01:600    DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
00070>  ---------------------
00071>                                  IMPERVIOUS    PERVIOUS (i)
00072>       Surface Area      (ha)=          .12          .46
00073>       Dep. Storage      (mm)=          .80         1.50
00074>       Average Slope      (%)=        21.42        21.42
00075>       Length             (m)=        62.24        40.00
00076>       Mannings n             =         .013         .250
00077>
00078>                                  New rainfall entered directly by user.
00079>                                  TIME STEP= 5.00 min    # of STEPS= 199
00080>                                  DURATION =16.58 hrs    TOTAL RAIN=  42.09 mm
00081>
00082>                 TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00083>                  hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00084>                  .08   1.020 |   4.25   1.520 |   8.42   1.520 |  12.58    .760
00085>                  .17   1.020 |   4.33   1.520 |   8.50   1.520 |  12.67    .760
00086>                  .25   1.020 |   4.42   1.520 |   8.58   1.520 |  12.75    .760
00087>                  .33   1.020 |   4.50   1.520 |   8.67   1.520 |  12.83    .760
00088>                  .42   1.020 |   4.58   1.520 |   8.75   1.520 |  12.92    .760
00089>                  .50   1.020 |   4.67   1.520 |   8.83   1.520 |  13.00    .760
00090>                  .58   1.020 |   4.75   1.520 |   8.92   1.520 |  13.08    .760
00091>                  .67   1.020 |   4.83   1.520 |   9.00   1.520 |  13.17    .760
00092>                  .75   1.020 |   4.92   1.520 |   9.08   1.520 |  13.25    .760
00093>                  .83   1.020 |   5.00   3.050 |   9.17   1.520 |  13.33    .760
00094>                  .92   1.020 |   5.08   3.050 |   9.25   1.520 |  13.42    .760
00095>                 1.00   1.020 |   5.17   3.050 |   9.33   1.520 |  13.50    .760
00096>                 1.08   1.020 |   5.25   3.050 |   9.42   1.520 |  13.58    .760
00097>                 1.17   1.020 |   5.33   3.050 |   9.50   1.520 |  13.67    .760
00098>                 1.25   1.020 |   5.42   3.050 |   9.58   1.520 |  13.75    .760
00099>                 1.33   1.020 |   5.50   3.050 |   9.67   1.520 |  13.83    .760
00100>                 1.42   1.020 |   5.58   3.050 |   9.75   1.520 |  13.92    .760
00101>                 1.50   1.020 |   5.67   3.050 |   9.83   1.520 |  14.00    .760
00102>                 1.58   1.020 |   5.75   3.050 |   9.92   1.520 |  14.08    .760
00103>                 1.67   1.020 |   5.83   4.060 |  10.00   1.020 |  14.17    .510
00104>                 1.75   1.020 |   5.92   4.060 |  10.08   1.020 |  14.25    .510
00105>                 1.83   1.020 |   6.00   5.840 |  10.17   1.020 |  14.33    .510
00106>                 1.92   1.020 |   6.08   5.840 |  10.25   1.020 |  14.42    .510
00107>                 2.00   1.020 |   6.17  13.210 |  10.33   1.020 |  14.50    .510
00108>                 2.08   1.020 |   6.25  13.210 |  10.42   1.020 |  14.58    .510
00109>                 2.17   1.020 |   6.33  28.960 |  10.50   1.020 |  14.67    .510
00110>                 2.25   1.020 |   6.42  28.960 |  10.58   1.020 |  14.75    .510
00111>                 2.33   1.020 |   6.50  60.450 |  10.67   1.020 |  14.83    .510
00112>                 2.42   1.020 |   6.58  60.450 |  10.75   1.020 |  14.92    .510
00113>                 2.50   1.020 |   6.67  10.670 |  10.83   1.020 |  15.00    .510
00114>                 2.58   1.020 |   6.75  10.670 |  10.92   1.020 |  15.08    .510
00115>                 2.67   1.020 |   6.83   6.600 |  11.00   1.020 |  15.17    .510
00116>                 2.75   1.020 |   6.92   6.600 |  11.08   1.020 |  15.25    .510
00117>                 2.83   1.020 |   7.00   4.830 |  11.17   1.020 |  15.33    .510
00118>                 2.92   1.020 |   7.08   4.830 |  11.25   1.020 |  15.42    .510
00119>                 3.00   1.020 |   7.17   4.570 |  11.33   1.020 |  15.50    .510
00120>                 3.08   1.020 |   7.25   4.570 |  11.42   1.020 |  15.58    .510
00121>                 3.17   1.020 |   7.33   3.300 |  11.50   1.020 |  15.67    .510
00122>                 3.25   1.020 |   7.42   3.300 |  11.58   1.020 |  15.75    .510
00123>                 3.33   1.520 |   7.50   2.790 |  11.67   1.020 |  15.83    .510
00124>                 3.42   1.520 |   7.58   2.790 |  11.75   1.020 |  15.92    .510
00125>                 3.50   1.520 |   7.67   2.790 |  11.83   1.020 |  16.00    .510
00126>                 3.58   1.520 |   7.75   2.790 |  11.92   1.020 |  16.08    .510
00127>                 3.67   1.520 |   7.83   2.790 |  12.00   1.020 |  16.17    .510
00128>                 3.75   1.520 |   7.92   2.790 |  12.08   1.020 |  16.25    .510
00129>                 3.83   1.520 |   8.00   2.790 |  12.17   1.020 |  16.33    .510
00130>                 3.92   1.520 |   8.08   2.790 |  12.25   1.020 |  16.42    .510
00131>                 4.00   1.520 |   8.17   2.790 |  12.33   1.020 |  16.50    .510
00132>                 4.08   1.520 |   8.25   2.790 |  12.42   1.020 |  16.58    .510
00133>                 4.17   1.520 |   8.33   1.520 |  12.50    .760 |
00134>
00135>       Max.eff.Inten.(mm/hr)=      60.45         5.58
00136>                 over (min)        5.00        10.00
00137>       Storage Coeff.  (min)=        .94 (ii)   11.93 (ii)
00138>       Unit Hyd. Tpeak (min)=        5.00        10.00
00139>       Unit Hyd. peak  (cms)=         .34          .10
00140>                                                      *TOTALS*
00141>       PEAK FLOW       (cms)=         .02          .00          .023 (iii)
00142>       TIME TO PEAK    (hrs)=       10.58        10.67        10.583
00143>       RUNOFF VOLUME    (mm)=       41.29         3.62        11.154
00144>       TOTAL RAINFALL   (mm)=       42.09        42.09        42.088
00145>       RUNOFF COEFFICIENT   =         .98          .09          .265
00146>        *** WARNING: Storage Coefficient is smaller than DT!
00147>                    Use a smaller DT or a larger area.
00148>
00149>         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00150>             CN* =  38.0    Ia = Dep. Storage   (Above)
00151>        (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00152>             THAN THE STORAGE COEFFICIENT.
00153>       (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00154>
00155>  --------------------------------------------------------------------------------
00156>  001:0003-----------------------------------------------------------------------
00157>  --------------------
00158>  | ROUTE PIPE culver|     PIPE Number      =    1.00
00159>  | IN= 1---> OUT= 8 |     Diameter     (mm)=  450.00
00160>  | DT=  5.0 min     |     Length        (m)=   45.00
00161>  --------------------     Slope       (m/m)= .01100
00162>                           Manning n         =   .025
00163>
00164>       <------------------ TRAVEL TIME TABLE ------------------>
00165>         DEPTH      VOLUME    FLOW RATE     VELOCITY     TRAV.TIME
00166>          (m)     (cu.m.)       (cms)         (m/s)          min
00167>         .024    .144E+00       .001          .260          2.89
00168>         .047    .402E+00       .004          .405          1.85
00169>         .071    .725E+00       .008          .522          1.44
00170>         .095    .110E+01       .015          .620          1.21
00171>         .118    .150E+01       .024          .706          1.06
00172>         .142    .194E+01       .034          .781           .96
00173>         .166    .239E+01       .045          .847           .89
00174>         .189    .286E+01       .058          .905           .83
00175>         .213    .334E+01       .071          .956           .78
00176>         .237    .382E+01       .085          .999           .75
00177>         .261    .429E+01       .099         1.036           .72
00178>         .284    .476E+01       .113         1.067           .70
00179>         .308    .522E+01       .126         1.090           .69
00180>         .332    .565E+01       .139         1.106           .68
00181>         .355    .606E+01       .150         1.114           .67
00182>         .379    .643E+01       .159         1.114           .67
00183>         .403    .676E+01       .165         1.102           .68
00184>         .426    .701E+01       .167         1.073           .70
00185>         .450    .716E+01       .156          .979           .77
00186>                                      <---- hydrograph ---->   <-pipe / channel->
00187>                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
00188>                                (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
00189>     INFLOW : ID= 1:600          .58     .023   10.58  11.154       .118      .704
00190>     OUTFLOW: ID= 8:culver       .58     .025   10.58  11.154       .122      .715
00191>
00192>
00193>  --------------------------------------------------------------------------------
00194>  001:0004-----------------------------------------------------------------------
00195>  ---------------------
00196>  | DESIGN STANDHYD    |   Area     (ha)=     .38
00197>  | 02:601    DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
00198>  ---------------------
00199>                                  IMPERVIOUS    PERVIOUS (i)
00200>       Surface Area      (ha)=          .08          .30
00201>       Dep. Storage      (mm)=          .80         1.50
00202>       Average Slope      (%)=          .50          .50
00203>       Length             (m)=        50.20        40.00
00204>       Mannings n             =         .013         .250
00205>
00206>       Max.eff.Inten.(mm/hr)=       60.45        15.68
00207>                 over (min)         5.00        25.00
00208>       Storage Coeff.  (min)=        2.54 (ii)   24.99 (ii)
00209>       Unit Hyd. Tpeak (min)=        5.00        25.00
00210>       Unit Hyd. peak  (cms)=         .29          .05
00211>                                                      *TOTALS*
00212>       PEAK FLOW       (cms)=         .01          .01          .017 (iii)
00213>       TIME TO PEAK    (hrs)=       10.58        10.92        10.583
00214>       RUNOFF VOLUME    (mm)=       41.29        16.45        21.415
00215>       TOTAL RAINFALL   (mm)=       42.09        42.09        42.088
00216>       RUNOFF COEFFICIENT   =         .98          .39          .509
00217>        *** WARNING: Storage Coefficient is smaller than DT!
00218>                    Use a smaller DT or a larger area.
00219>
00220>         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00221>             CN* =  81.0    Ia = Dep. Storage   (Above)
00222>        (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00223>             THAN THE STORAGE COEFFICIENT.
00224>       (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00225>
00226>  --------------------------------------------------------------------------------
00227>  001:0005-----------------------------------------------------------------------
00228>  ---------------------
00229>  | DESIGN STANDHYD    |   Area     (ha)=    5.50
00230>  | 03:602    DT= 5.00 |   Total Imp(%)=   50.00   Dir. Conn.(%)=   50.00
00231>  ---------------------
00232>                                  IMPERVIOUS    PERVIOUS (i)
00233>       Surface Area      (ha)=         2.75         2.75
00234>       Dep. Storage      (mm)=          .80         1.50
00235>       Average Slope      (%)=          .50          .50
00236>       Length             (m)=       191.42        40.00
00237>       Mannings n             =         .013         .250
00238>
00239>       Max.eff.Inten.(mm/hr)=       60.45        14.00
00240>                 over (min)         5.00        30.00
00241>       Storage Coeff.  (min)=        5.68 (ii)   29.16 (ii)
00242>       Unit Hyd. Tpeak (min)=        5.00        30.00
00243>       Unit Hyd. peak  (cms)=         .20          .04
00244>                                                      *TOTALS*
00245>       PEAK FLOW       (cms)=         .42          .07          .446 (iii)
00246>       TIME TO PEAK    (hrs)=       10.58        11.00        10.583
00247>       RUNOFF VOLUME    (mm)=       41.29        16.45        28.867
00248>       TOTAL RAINFALL   (mm)=       42.09        42.09        42.088
00249>       RUNOFF COEFFICIENT   =         .98          .39          .686
00250>
00251>         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00252>             CN* =  81.0    Ia = Dep. Storage   (Above)
00253>        (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00254>             THAN THE STORAGE COEFFICIENT.
00255>       (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00256>
00257>  --------------------------------------------------------------------------------
00258>  001:0006-----------------------------------------------------------------------
00259>  --------------------
00260>  | COMPUTE VOLUME   |
00261>  | ID:03  (602   )  |          DISCHARGE       TIME
00262>  --------------------            (cms)         (hrs)
00263>       *** WARNING: No storage required, RelRate > Inflow Op.
00264>  --------------------------------------------------------------------------------
00265>  001:0007-----------------------------------------------------------------------
00266>       FINISH
00267>  --------------------------------------------------------------------------------
00268>  ********************************************************************************
00269>       WARNINGS / ERRORS / NOTES
00270>       -------------------------
```

```
00271>  001:0002 DESIGN STANDHYD
00272>       *** WARNING: Storage Coefficient is smaller than DT!
00273>                    Use a smaller DT or a larger area.
00274>  001:0004 DESIGN STANDHYD
00275>       *** WARNING: Storage Coefficient is smaller than DT!
00276>                    Use a smaller DT or a larger area.
00277>  001:0006 COMPUTE VOLUME
00278>       *** WARNING: No storage required, RelRate > Inflow Qp.
00279>    Simulation ended on 2009-05-27     at 18:52:12
00280> ===============================================================================
00281>
00282>
```

```
00001> ================================================================================
00002>
00003>  SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999  =========
00004>  S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
00005>  SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9 Ver. 4.02
00006>      S   W W   M   M  H   H    Y    M   M  O   O      9999   9999 July 1999
00007>  SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9 =========
00008>                                                       9   9  9   9 # 4377549
00009>       StormWater Management HYdrologic Model          999    999  =========
00010>
00011>  ********************************************************************************
00012>  ************************** SWMHYMO-99 Ver/4.02 ********************************
00013>  *******  A single event and continuous hydrologic simulation model  *******
00014>  *******     based on the principles of HYMO and its successors      *******
00015>  *******                  OTTHYMO-83 and OTTHYMO-89.                  *******
00016>  ********************************************************************************
00017>  ******* Distributed by:  J.F. Sabourin and Associates Inc.           *******
00018>  *******                  Ottawa,  Ontario: (613) 727-5199           *******
00019>  *******                  Gatineau, Quebec: (819) 243-6858           *******
00020>  *******                  E-Mail: swmhymo@jfsa.Com                   *******
00021>  ********************************************************************************
00022>
00023>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024>  +++++++ Licensed user: Condeland Engineering Limited                 +++++++
00025>  +++++++                Toronto                  SERIAL#:4377549     +++++++
00026>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028>  ********************************************************************************
00029>  *******          ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *******
00030>  *******          Maximum value for ID numbers  :     10            *******
00031>  *******          Max. number of rainfall points:  15000            *******
00032>  *******          Max. number of flow points    :  15000            *******
00033>  ********************************************************************************
00034>
00035>
00036>  ******************  D E T A I L E D   O U T P U T  ******************
00037>  ********************************************************************
00038>  *      DATE: 2009-05-27       TIME: 19:02:01       RUN COUNTER: 000034  *
00039>  ********************************************************************
00040>  * Input  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post5yr.dat   *
00041>  * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post5yr.out   *
00042>  * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post5yr.sum   *
00043>  * User comments:                                                         *
00044>  * 1:_____________________________________________________________________*
00045>  * 2:_____________________________________________________________________*
00046>  * 3:_____________________________________________________________________*
00047>  ********************************************************************************
00048>
00049>  --------------------------------------------------------------------------------
00050> 001:0001-----------------------------------------------------------------------
00051> *#*******************************************************************************
00052> *#  Project Name: [214925 ONTARIO LIMITED]    Project Number: [09-015]
00053> *#  Date        : 11-08-2008
00054> *#  Modeller    : [ROBERT DE ANGELIS]
00055> *#  Company     : Condeland Engineering Limited
00056> *#  License #   :  4377549
00057> *#*******************************************************************************
00058>  ---------------------
00059>  | START            |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00060>  --------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00061>      TZERO =  4.00 hrs on        0
00062>      METOUT=  2 (output = METRIC)
00063>      NRUN  = 001
00064>      NSTORM=  0
00065>  --------------------------------------------------------------------------------
00066> 001:0002-----------------------------------------------------------------------
00067>  ---------------------
00068>  | DESIGN STANDHYD    |   Area     (ha)=     .58
00069>  | 01:600    DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
00070>  ---------------------
00071>                                IMPERVIOUS     PERVIOUS (i)
00072>       Surface Area      (ha)=         .12          .46
00073>       Dep. Storage      (mm)=         .80         1.50
00074>       Average Slope      (%)=       31.75        31.75
00075>       Length             (m)=       62.24        40.00
00076>       Mannings n            =         .013         .250
00077>
00078>                               New rainfall entered directly by user.
00079>                               TIME STEP= 5.00 min   # of STEPS= 199
00080>                               DURATION =16.58 hrs   TOTAL RAIN=  49.39 mm
00081>
00082>                 TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00083>                  hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00084>                  .08   1.270 |   4.25   1.780 |   8.42   1.780 |  12.58   1.020
00085>                  .17   1.270 |   4.33   1.780 |   8.50   1.780 |  12.67   1.020
00086>                  .25   1.270 |   4.42   1.780 |   8.58   1.780 |  12.75   1.020
00087>                  .33   1.270 |   4.50   1.780 |   8.67   1.780 |  12.83   1.020
00088>                  .42   1.270 |   4.58   1.780 |   8.75   1.780 |  12.92   1.020
00089>                  .50   1.270 |   4.67   1.780 |   8.83   1.780 |  13.00   1.020
00090>                  .58   1.270 |   4.75   1.780 |   8.92   1.780 |  13.08   1.020
00091>                  .67   1.270 |   4.83   1.780 |   9.00   1.780 |  13.17   1.020
00092>                  .75   1.270 |   4.92   1.780 |   9.08   1.780 |  13.25   1.020
00093>                  .83   1.270 |   5.00   3.300 |   9.17   1.780 |  13.33   1.020
00094>                  .92   1.270 |   5.08   3.300 |   9.25   1.780 |  13.42   1.020
00095>                 1.00   1.270 |   5.17   3.300 |   9.33   1.780 |  13.50   1.020
00096>                 1.08   1.270 |   5.25   3.300 |   9.42   1.780 |  13.58   1.020
00097>                 1.17   1.270 |   5.33   3.300 |   9.50   1.780 |  13.67   1.020
00098>                 1.25   1.270 |   5.42   3.300 |   9.58   1.780 |  13.75   1.020
00099>                 1.33   1.270 |   5.50   3.300 |   9.67   1.780 |  13.83   1.020
00100>                 1.42   1.270 |   5.58   3.300 |   9.75   1.780 |  13.92   1.020
00101>                 1.50   1.270 |   5.67   3.300 |   9.83   1.780 |  14.00   1.020
00102>                 1.58   1.270 |   5.75   3.300 |   9.92   1.780 |  14.08   1.020
00103>                 1.67   1.270 |   5.83   4.570 |  10.00   1.270 |  14.17    .760
00104>                 1.75   1.270 |   5.92   4.570 |  10.08   1.270 |  14.25    .760
00105>                 1.83   1.270 |   6.00   6.600 |  10.17   1.270 |  14.33    .760
00106>                 1.92   1.270 |   6.08   6.600 |  10.25   1.270 |  14.42    .760
00107>                 2.00   1.270 |   6.17  15.240 |  10.33   1.270 |  14.50    .760
00108>                 2.08   1.270 |   6.25  15.240 |  10.42   1.270 |  14.58    .760
00109>                 2.17   1.270 |   6.33  33.270 |  10.50   1.270 |  14.67    .760
00110>                 2.25   1.270 |   6.42  33.270 |  10.58   1.270 |  14.75    .760
00111>                 2.33   1.270 |   6.50  69.600 |  10.67   1.270 |  14.83    .760
00112>                 2.42   1.270 |   6.58  69.600 |  10.75   1.270 |  14.92    .760
00113>                 2.50   1.270 |   6.67  12.190 |  10.83   1.270 |  15.00    .760
00114>                 2.58   1.270 |   6.75  12.190 |  10.92   1.270 |  15.08    .760
00115>                 2.67   1.270 |   6.83   7.620 |  11.00   1.270 |  15.17    .760
00116>                 2.75   1.270 |   6.92   7.620 |  11.08   1.270 |  15.25    .760
00117>                 2.83   1.270 |   7.00   5.590 |  11.17   1.270 |  15.33    .760
00118>                 2.92   1.270 |   7.08   5.590 |  11.25   1.270 |  15.42    .760
00119>                 3.00   1.270 |   7.17   5.080 |  11.33   1.270 |  15.50    .760
00120>                 3.08   1.270 |   7.25   5.080 |  11.42   1.270 |  15.58    .760
00121>                 3.17   1.270 |   7.33   3.810 |  11.50   1.270 |  15.67    .760
00122>                 3.25   1.270 |   7.42   3.810 |  11.58   1.270 |  15.75    .760
00123>                 3.33   1.780 |   7.50   3.050 |  11.67   1.270 |  15.83    .760
00124>                 3.42   1.780 |   7.58   3.050 |  11.75   1.270 |  15.92    .760
00125>                 3.50   1.780 |   7.67   3.050 |  11.83   1.270 |  16.00    .760
00126>                 3.58   1.780 |   7.75   3.050 |  11.92   1.270 |  16.08    .760
00127>                 3.67   1.780 |   7.83   3.050 |  12.00   1.270 |  16.17    .760
00128>                 3.75   1.780 |   7.92   3.050 |  12.08   1.270 |  16.25    .760
00129>                 3.83   1.780 |   8.00   3.050 |  12.17   1.270 |  16.33    .760
00130>                 3.92   1.780 |   8.08   3.050 |  12.25   1.270 |  16.42    .760
00131>                 4.00   1.780 |   8.17   3.050 |  12.33   1.270 |  16.50    .760
00132>                 4.08   1.780 |   8.25   3.050 |  12.42   1.270 |  16.58    .760
00133>                 4.17   1.780 |   8.33   1.780 |  12.50   1.020 |
00134>
00135>       Max.eff.Inten.(mm/hr)=      69.60          7.43
00136>                 over (min)        5.00         10.00
00137>       Storage Coeff.  (min)=        .79 (ii)     9.50 (ii)
00138>       Unit Hyd. Tpeak (min)=       5.00         10.00
00139>       Unit Hyd. peak  (cms)=        .34           .12
00140>                                                          *TOTALS*
00141>       PEAK FLOW       (cms)=        .02           .01         .028 (iii)
00142>       TIME TO PEAK    (hrs)=      10.58         10.67       10.583
00143>       RUNOFF VOLUME    (mm)=      48.59          4.96       13.686
00144>       TOTAL RAINFALL   (mm)=      49.39         49.39       49.389
00145>       RUNOFF COEFFICIENT   =        .98           .10         .277
00146>        *** WARNING: Storage Coefficient is smaller than DT!
00147>                    Use a smaller DT or a larger area.
00148>
00149>         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00150>             CN* =  38.0    Ia = Dep. Storage  (Above)
00151>        (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00152>             THAN THE STORAGE COEFFICIENT.
00153>       (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00154>
00155> --------------------------------------------------------------------------------
00156> 001:0003-----------------------------------------------------------------------
00157>  --------------------
00158>  | ROUTE PIPE culver|     PIPE Number      =    1.00
00159>  | IN= 1---> OUT= 8 |     Diameter     (mm)=  450.00
00160>  | DT=  5.0 min     |     Length        (m)=   45.00
00161>  ------------------       Slope        (m/m)= .01100
00162>                           Manning n         =   .025
00163>
00164>       <------------------ TRAVEL TIME TABLE ------------------>
00165>         DEPTH      VOLUME    FLOW RATE     VELOCITY     TRAV.TIME
00166>          (m)      (cu.m.)      (cms)         (m/s)         min
00167>         .024     .144E+00       .001          .260          2.89
00168>         .047     .402E+00       .004          .405          1.85
00169>         .071     .725E+00       .008          .522          1.44
00170>         .095     .110E+01       .015          .620          1.21
00171>         .118     .150E+01       .024          .706          1.06
00172>         .142     .194E+01       .034          .781           .96
00173>         .166     .239E+01       .045          .847           .89
00174>         .189     .286E+01       .058          .905           .83
00175>         .213     .334E+01       .071          .956           .78
00176>         .237     .382E+01       .085          .999           .75
00177>         .261     .429E+01       .099         1.036           .72
00178>         .284     .476E+01       .113         1.067           .70
00179>         .308     .522E+01       .126         1.090           .69
00180>         .332     .565E+01       .139         1.106           .68
00181>         .355     .606E+01       .150         1.114           .67
00182>         .379     .643E+01       .159         1.114           .67
00183>         .403     .676E+01       .165         1.102           .68
00184>         .426     .701E+01       .167         1.073           .70
00185>         .450     .716E+01       .156          .979           .77
00186>                                <---- hydrograph ---->   <-pipe / channel->
00187>                          AREA    QPEAK    TPEAK   R.V.   MAX DEPTH  MAX VEL
00188>                          (ha)    (cms)    (hrs)   (mm)       (m)      (m/s)
00189>    INFLOW : ID= 1:600     .58     .028    10.58 13.686       .130      .739
00190>    OUTFLOW: ID= 8:culver  .58     .030    10.58 13.686       .133      .752
00191>
00192>
00193> --------------------------------------------------------------------------------
00194> 001:0004-----------------------------------------------------------------------
00195>  ---------------------
00196>  | DESIGN STANDHYD    |   Area     (ha)=     .38
00197>  | 02:601    DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
00198>  ---------------------
00199>                                IMPERVIOUS     PERVIOUS (i)
00200>       Surface Area      (ha)=         .08          .30
00201>       Dep. Storage      (mm)=         .80         1.50
00202>       Average Slope      (%)=         .50          .50
00203>       Length             (m)=       50.20        40.00
00204>       Mannings n            =         .013         .250
00205>
00206>       Max.eff.Inten.(mm/hr)=      69.60        23.22
00207>                 over (min)        5.00        20.00
00208>       Storage Coeff.  (min)=       2.40 (ii)   21.59 (ii)
00209>       Unit Hyd. Tpeak (min)=       5.00        20.00
00210>       Unit Hyd. peak  (cms)=        .30          .05
00211>                                                          *TOTALS*
00212>       PEAK FLOW       (cms)=        .01          .01         .022 (iii)
00213>       TIME TO PEAK    (hrs)=      10.58        10.83       10.583
00214>       RUNOFF VOLUME    (mm)=      48.59        21.34       26.790
00215>       TOTAL RAINFALL   (mm)=      49.39        49.39       49.389
00216>       RUNOFF COEFFICIENT   =        .98          .43         .542
00217>        *** WARNING: Storage Coefficient is smaller than DT!
00218>                    Use a smaller DT or a larger area.
00219>
00220>         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00221>             CN* =  81.0    Ia = Dep. Storage  (Above)
00222>        (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00223>             THAN THE STORAGE COEFFICIENT.
00224>       (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00225>
00226> --------------------------------------------------------------------------------
00227> 001:0005-----------------------------------------------------------------------
00228>  ---------------------
00229>  | DESIGN STANDHYD    |   Area     (ha)=    5.50
00230>  | 03:602    DT= 5.00 |   Total Imp(%)=   50.00   Dir. Conn.(%)=   50.00
00231>  ---------------------
00232>                                IMPERVIOUS     PERVIOUS (i)
00233>       Surface Area      (ha)=        2.75         2.75
00234>       Dep. Storage      (mm)=         .80         1.50
00235>       Average Slope      (%)=         .50          .50
00236>       Length             (m)=      191.42        40.00
00237>       Mannings n            =         .013         .250
00238>
00239>       Max.eff.Inten.(mm/hr)=      69.60        19.94
00240>                 over (min)        5.00        25.00
00241>       Storage Coeff.  (min)=       5.37 (ii)   25.75 (ii)
00242>       Unit Hyd. Tpeak (min)=       5.00        25.00
00243>       Unit Hyd. peak  (cms)=        .21          .04
00244>                                                          *TOTALS*
00245>       PEAK FLOW       (cms)=        .48          .10         .534 (iii)
00246>       TIME TO PEAK    (hrs)=      10.58        10.92       10.583
00247>       RUNOFF VOLUME    (mm)=      48.59        21.34       34.964
00248>       TOTAL RAINFALL   (mm)=      49.39        49.39       49.389
00249>       RUNOFF COEFFICIENT   =        .98          .43         .708
00250>
00251>         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00252>             CN* =  81.0    Ia = Dep. Storage  (Above)
00253>        (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00254>             THAN THE STORAGE COEFFICIENT.
00255>       (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00256>
00257> --------------------------------------------------------------------------------
00258> 001:0006-----------------------------------------------------------------------
00259>  ---------------------
00260>  | COMPUTE VOLUME     |
00261>  | ID:03  (602    )   |          DISCHARGE       TIME
00262>  ---------------------            (cms)          (hrs)
00263>       *** WARNING: No storage required, RelRate > Inflow Qp.
00264> --------------------------------------------------------------------------------
00265> 001:0007-----------------------------------------------------------------------
00266>       FINISH
00267> --------------------------------------------------------------------------------
00268> ********************************************************************************
00269>       WARNINGS / ERRORS / NOTES
00270>       -------------------------
```

```
00271>  001:0002 DESIGN STANDHYD
00272>       *** WARNING: Storage Coefficient is smaller than DT!
00273>                    Use a smaller DT or a larger area.
00274>  001:0004 DESIGN STANDHYD
00275>       *** WARNING: Storage Coefficient is smaller than DT!
00276>                    Use a smaller DT or a larger area.
00277>  001:0006 COMPUTE VOLUME
00278>       *** WARNING: No storage required, RelRate > Inflow Qp.
00279>    Simulation ended on 2009-05-27     at 19:02:01
00280> ================================================================================
00281>
00282>
```

```
00001> ================================================================================
00002>
00003> SSSSS  W    W  M    M  H    H  Y    Y  M    M   OOO        999    999  =========
00004> S      W W W  MM  MM  H    H   Y  Y   MM  MM  O   O      9   9  9   9
00005> SSSSS  W W W  M MM M  HHHHH    Y     M M M  O   O  ##  9   9  9   9 Ver. 4.02
00006>     S  W W W  M    M  H    H    Y     M    M  O   O      9999   9999 July 1999
00007> SSSSS   W W   M    M  H    H    Y     M    M   OOO           9      9 =========
00008>                                                          9   9  9   9 # 4377549
00009>       StormWater Management HYdrologic Model              999    999  =========
00010>
00011> ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00012> ************************** SWMHYMO-99 Ver/4.02 ***************************
00013> *******  A single event and continuous hydrologic simulation model  ********
00014> *******      based on the principles of HYMO and its successors      ********
00015> ********                  OTTHYMO-83 and OTTHYMO-89.                  ********
00016> ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00017> ******* Distributed by:  J.F. Sabourin and Associates Inc.            ********
00018> *******                  Ottawa,  Ontario: (613) 727-5199            ********
00019> *******                  Gatineau, Quebec: (819) 243-6858            ********
00020> *******                  E-Mail: swmhymo@jfsa.com                    ********
00021> ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00022>
00023> ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024> +++++++ Licensed user: Condeland Engineering Limited                 +++++++
00025> +++++++                  Toronto                 SERIAL#:4377549    +++++++
00026> ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028> ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00029> ********          ++++++ PROGRAM ARRAY DIMENSIONS ++++++              ********
00030> ********          Maximum value for ID numbers  :     10              ********
00031> ********          Max. number of rainfall points:  15000              ********
00032> ********          Max. number of flow points    :  15000              ********
00033> ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00034>
00035>
00036> ********************   D E T A I L E D   O U T P U T   ********************
00037> ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00038> *       DATE: 2009-05-27       TIME: 19:03:32      RUN COUNTER: 000036       *
00039> ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00040> * Input   filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post10yr.dat   *
00041> * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post10yr.out   *
00042> * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post10yr.sum   *
00043> * User comments:                                                          *
00044> * 1:_____________________________________________________________________*
00045> * 2:_____________________________________________________________________*
00046> * 3:_____________________________________________________________________*
00047> ********************************************************************************
00048>
00049> --------------------------------------------------------------------------------
00050> 001:0001--------------------------------------------------------------------------
00051> *#*******************************************************************************
00052> *#  Project Name: [214925 ONTARIO LIMITED]    Project Number: [09-015]
00053> *#  Date        : 11-08-2008
00054> *#  Modeller    : [ROBERT DE ANGELIS]
00055> *#  Company     : Condeland Engineering Limited
00056> *#  License #   :  4377549
00057> *#*******************************************************************************
00058> --------------------
00059> | START            |  Project dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00060> --------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00061>     TZERO =   .00 hrs on       0
00062>     METOUT=  2 (output = METRIC)
00063>     NRUN  = 001
00064>     NSTORM=  1
00065>              #  1=SCS10YR
00066> --------------------------------------------------------------------------------
00067> 001:0002--------------------------------------------------------------------------
00068> --------------------
00069> | READ STORM       |    Filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00070> | Ptotal=  97.05 mm|    Comments: SCS Storm
00071> --------------------
00072>               TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00073>               hrs    mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00074>               .08    1.700 |   6.08   3.009 |  12.08   4.658 |  18.08   2.329
00075>               .17    1.700 |   6.17   3.009 |  12.17   4.658 |  18.17   2.329
00076>               .25    1.700 |   6.25   3.009 |  12.25   4.658 |  18.25   2.329
00077>               .33    1.696 |   6.33   3.009 |  12.33   4.658 |  18.33   2.329
00078>               .42    1.696 |   6.42   3.009 |  12.42   4.658 |  18.42   2.329
00079>               .50    1.696 |   6.50   3.009 |  12.50   4.658 |  18.50   2.329
00080>               .58    1.700 |   6.58   3.009 |  12.58   4.076 |  18.58   2.329
00081>               .67    1.700 |   6.67   3.009 |  12.67   4.076 |  18.67   2.329
00082>               .75    1.700 |   6.75   3.009 |  12.75   4.076 |  18.75   2.329
00083>               .83    1.696 |   6.83   3.009 |  12.83   4.076 |  18.83   2.329
00084>               .92    1.696 |   6.92   3.009 |  12.92   4.076 |  18.92   2.329
00085>              1.00    1.696 |   7.00   3.009 |  13.00   4.076 |  19.00   2.329
00086>              1.08    1.700 |   7.08   3.688 |  13.08   4.076 |  19.08   2.329
00087>              1.17    1.700 |   7.17   3.688 |  13.17   4.076 |  19.17   2.329
00088>              1.25    1.700 |   7.25   3.688 |  13.25   4.076 |  19.25   2.329
00089>              1.33    1.696 |   7.33   3.688 |  13.33   4.076 |  19.33   2.329
00090>              1.42    1.696 |   7.42   3.688 |  13.42   4.076 |  19.42   2.329
00091>              1.50    1.696 |   7.50   3.688 |  13.50   4.076 |  19.50   2.329
00092>              1.58    1.700 |   7.58   3.688 |  13.58   3.688 |  19.58   2.329
00093>              1.67    1.700 |   7.67   3.688 |  13.67   3.688 |  19.67   2.329
00094>              1.75    1.700 |   7.75   3.688 |  13.75   3.688 |  19.75   2.329
00095>              1.83    1.696 |   7.83   3.688 |  13.83   3.688 |  19.83   2.329
00096>              1.92    1.696 |   7.92   3.688 |  13.92   3.688 |  19.92   2.329
00097>              2.00    1.696 |   8.00   3.688 |  14.00   3.688 |  20.00   2.329
00098>              2.08    1.992 |   8.08   4.852 |  14.08   3.059 |  20.08   1.797
00099>              2.17    1.992 |   8.17   4.852 |  14.17   3.059 |  20.17   1.797
00100>              2.25    1.992 |   8.25   4.852 |  14.25   3.059 |  20.25   1.797
00101>              2.33    1.988 |   8.33   4.852 |  14.33   3.055 |  20.33   1.793
00102>              2.42    1.988 |   8.42   4.852 |  14.42   3.055 |  20.42   1.793
00103>              2.50    1.988 |   8.50   4.852 |  14.50   3.055 |  20.50   1.793
00104>              2.58    1.992 |   8.58   6.794 |  14.58   3.059 |  20.58   1.797
00105>              2.67    1.992 |   8.67   6.794 |  14.67   3.059 |  20.67   1.797
00106>              2.75    1.992 |   8.75   6.794 |  14.75   3.059 |  20.75   1.797
00107>              2.83    1.988 |   8.83   6.794 |  14.83   3.055 |  20.83   1.793
00108>              2.92    1.988 |   8.92   6.794 |  14.92   3.055 |  20.92   1.793
00109>              3.00    1.988 |   9.00   6.794 |  15.00   3.055 |  21.00   1.793
00110>              3.08    1.992 |   9.08   9.511 |  15.08   3.059 |  21.08   1.797
00111>              3.17    1.992 |   9.17   9.511 |  15.17   3.059 |  21.17   1.797
00112>              3.25    1.992 |   9.25   9.511 |  15.25   3.059 |  21.25   1.797
00113>              3.33    1.988 |   9.33   9.511 |  15.33   3.055 |  21.33   1.793
00114>              3.42    1.988 |   9.42   9.511 |  15.42   3.055 |  21.42   1.793
00115>              3.50    1.988 |   9.50   9.511 |  15.50   3.055 |  21.50   1.793
00116>              3.58    1.992 |   9.58  22.904 |  15.58   3.059 |  21.58   1.797
00117>              3.67    1.992 |   9.67  22.904 |  15.67   3.059 |  21.67   1.797
00118>              3.75    1.992 |   9.75  22.904 |  15.75   3.059 |  21.75   1.797
00119>              3.83    1.988 |   9.83  59.395 |  15.83   3.055 |  21.83   1.793
00120>              3.92    1.988 |   9.92  59.395 |  15.92   3.055 |  21.92   1.793
00121>              4.00    1.988 |  10.00  59.395 |  16.00   3.055 |  22.00   1.793
00122>              4.08    2.380 |  10.08  13.199 |  16.08   2.329 |  22.08   1.797
00123>              4.17    2.380 |  10.17  13.199 |  16.17   2.329 |  22.17   1.797
00124>              4.25    2.380 |  10.25  13.199 |  16.25   2.329 |  22.25   1.797
00125>              4.33    2.376 |  10.33  13.199 |  16.33   2.329 |  22.33   1.793
00126>              4.42    2.376 |  10.42  13.199 |  16.42   2.329 |  22.42   1.793
00127>              4.50    2.376 |  10.50  13.199 |  16.50   2.329 |  22.50   1.793
00128>              4.58    2.380 |  10.58   7.958 |  16.58   2.329 |  22.58   1.797
00129>              4.67    2.380 |  10.67   7.958 |  16.67   2.329 |  22.67   1.797
00130>              4.75    2.380 |  10.75   7.958 |  16.75   2.329 |  22.75   1.797
00131>              4.83    2.376 |  10.83   7.958 |  16.83   2.329 |  22.83   1.793
00132>              4.92    2.376 |  10.92   7.958 |  16.92   2.329 |  22.92   1.793
00133>              5.00    2.376 |  11.00   7.958 |  17.00   2.329 |  23.00   1.793
00134>              5.08    2.380 |  11.08   5.823 |  17.08   2.329 |  23.08   1.797
00135>              5.17    2.380 |  11.17   5.823 |  17.17   2.329 |  23.17   1.797
00136>              5.25    2.380 |  11.25   5.823 |  17.25   2.329 |  23.25   1.797
00137>              5.33    2.376 |  11.33   5.823 |  17.33   2.329 |  23.33   1.793
00138>              5.42    2.376 |  11.42   5.823 |  17.42   2.329 |  23.42   1.793
00139>              5.50    2.376 |  11.50   5.823 |  17.50   2.329 |  23.50   1.793
00140>              5.58    2.380 |  11.58   5.823 |  17.58   2.329 |  23.58   1.797
00141>              5.67    2.380 |  11.67   5.823 |  17.67   2.329 |  23.67   1.797
00142>              5.75    2.380 |  11.75   5.823 |  17.75   2.329 |  23.75   1.797
00143>              5.83    2.376 |  11.83   5.047 |  17.83   2.329 |  23.83   1.793
00144>              5.92    2.376 |  11.92   5.047 |  17.92   2.329 |  23.92   1.793
00145>              6.00    2.376 |  12.00   5.047 |  18.00   2.329 |  24.00   1.793
00146>
00147> --------------------------------------------------------------------------------
00148> 001:0003--------------------------------------------------------------------------
00149> ----------------------
00150> | DESIGN STANDHYD    |   Area     (ha)=     .58
00151> | 01:600     DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
00152> ----------------------
00153>                                IMPERVIOUS     PERVIOUS (i)
00154>      Surface Area     (ha)=         .12           .46
00155>      Dep. Storage     (mm)=         .80          1.50
00156>      Average Slope     (%)=         .50           .50
00157>      Length            (m)=       62.24         40.00
00158>      Mannings n            =        .013          .250
00159>
00160>      Max.eff.Inten.(mm/hr)=       59.39          6.06
00161>                over (min)          5.00         35.00
00162>      Storage Coeff.  (min)=        2.91 (ii)    35.74 (ii)
00163>      Unit Hyd. Tpeak (min)=        5.00         35.00
00164>      Unit Hyd. peak  (cms)=         .28           .03
00165>                                                          *TOTALS*
00166>      PEAK FLOW       (cms)=         .02           .01          .022 (iii)
00167>      TIME TO PEAK    (hrs)=       10.00         10.50        10.000
00168>      RUNOFF VOLUME    (mm)=       96.25         17.90        33.572
00169>      TOTAL RAINFALL   (mm)=       97.05         97.05        97.050
00170>      RUNOFF COEFFICIENT   =         .99           .18          .346
00171>       *** WARNING: Storage Coefficient is smaller than DT!
00172>                   Use a smaller DT or a larger area.
00173>
00174>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00175>            CN* =  38.0    Ia = Dep. Storage    (Above)
00176>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00177>            THAN THE STORAGE COEFFICIENT.
00178>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00179>
00180> --------------------------------------------------------------------------------
00181> 001:0004--------------------------------------------------------------------------
00182> ----------------------
00183> | ROUTE PIPE culver|     PIPE Number     =    1.00
00184> | IN= 1---> OUT= 8 |     Diameter     (mm)=  450.00
00185> | DT=  5.0 min     |     Length        (m)=   45.00
00186> ----------------------     Slope       (m/m)= .01100
00187>                            Manning n     =    .025
00188>
00189>      <-------------------- TRAVEL TIME TABLE ---------------------->
00190>        DEPTH      VOLUME     FLOW RATE     VELOCITY     TRAV.TIME
00191>         (m)      (cu.m.)       (cms)         (m/s)          min
00192>        .024     .144E+00        .001          .260         2.89
00193>        .047     .402E+00        .004          .405         1.85
00194>        .071     .725E+00        .008          .522         1.44
00195>        .095     .110E+01        .015          .620         1.21
00196>        .118     .150E+01        .024          .706         1.06
00197>        .142     .194E+01        .034          .781          .96
00198>        .166     .239E+01        .045          .847          .89
00199>        .189     .286E+01        .058          .905          .83
00200>        .213     .334E+01        .071          .956          .78
00201>        .237     .382E+01        .085          .999          .75
00202>        .261     .429E+01        .099         1.036          .72
00203>        .284     .476E+01        .113         1.067          .70
00204>        .308     .522E+01        .126         1.090          .69
00205>        .332     .565E+01        .139         1.106          .68
00206>        .355     .606E+01        .150         1.114          .67
00207>        .379     .643E+01        .159         1.114          .67
00208>        .403     .676E+01        .165         1.102          .68
00209>        .426     .701E+01        .167         1.073          .70
00210>        .450     .716E+01        .156          .979          .77
00211>                                          <---- hydrograph ---->   <-pipe / channel->
00212>                              AREA    QPEAK    TPEAK    R.V.    MAX DEPTH  MAX VEL
00213>                               (ha)    (cms)    (hrs)    (mm)      (m)       (m/s)
00214>   INFLOW : ID= 1:600           .58     .022    10.00 33.572        .113       .685
00215>   OUTFLOW: ID= 8:culver        .58     .022     9.92 33.572        .114       .686
00216>
00217>
00218> --------------------------------------------------------------------------------
00219> 001:0005--------------------------------------------------------------------------
00220> ----------------------
00221> | DESIGN STANDHYD    |   Area     (ha)=     .38
00222> | 02:601     DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
00223> ----------------------
00224>                                IMPERVIOUS     PERVIOUS (i)
00225>      Surface Area     (ha)=         .08           .30
00226>      Dep. Storage     (mm)=         .80          1.50
00227>      Average Slope     (%)=         .50           .50
00228>      Length            (m)=       50.20         40.00
00229>      Mannings n            =        .013          .250
00230>
00231>      Max.eff.Inten.(mm/hr)=       59.39         32.18
00232>                over (min)          5.00         20.00
00233>      Storage Coeff.  (min)=        2.56 (ii)    19.40 (ii)
00234>      Unit Hyd. Tpeak (min)=        5.00         20.00
00235>      Unit Hyd. peak  (cms)=         .29           .06
00236>                                                          *TOTALS*
00237>      PEAK FLOW       (cms)=         .01           .02          .026 (iii)
00238>      TIME TO PEAK    (hrs)=       10.00         10.17        10.000
00239>      RUNOFF VOLUME    (mm)=       96.25         58.85        66.332
00240>      TOTAL RAINFALL   (mm)=       97.05         97.05        97.050
00241>      RUNOFF COEFFICIENT   =         .99           .61          .683
00242>       *** WARNING: Storage Coefficient is smaller than DT!
00243>                   Use a smaller DT or a larger area.
00244>
00245>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00246>            CN* =  81.0    Ia = Dep. Storage    (Above)
00247>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00248>            THAN THE STORAGE COEFFICIENT.
00249>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00250>
00251> --------------------------------------------------------------------------------
00252> 001:0006--------------------------------------------------------------------------
00253> ----------------------
00254> | DESIGN STANDHYD    |   Area     (ha)=    5.50
00255> | 03:602     DT= 5.00 |   Total Imp(%)=   50.00   Dir. Conn.(%)=   50.00
00256> ----------------------
00257>                                IMPERVIOUS     PERVIOUS (i)
00258>      Surface Area     (ha)=        2.75          2.75
00259>      Dep. Storage     (mm)=         .80          1.50
00260>      Average Slope     (%)=         .50           .50
00261>      Length            (m)=      191.42         40.00
00262>      Mannings n            =        .013          .250
00263>
00264>      Max.eff.Inten.(mm/hr)=       59.39         28.34
00265>                over (min)          5.00         25.00
00266>      Storage Coeff.  (min)=        5.72 (ii)    23.43 (ii)
00267>      Unit Hyd. Tpeak (min)=        5.00         25.00
00268>      Unit Hyd. peak  (cms)=         .20           .05
00269>                                                          *TOTALS*
00270>      PEAK FLOW       (cms)=         .43           .15          .532 (iii)
```

```
00271>      TIME TO PEAK     (hrs)=      10.00        10.25        10.000
00272>      RUNOFF VOLUME     (mm)=      96.25        58.85        77.551
00273>      TOTAL RAINFALL    (mm)=      97.05        97.05        97.050
00274>      RUNOFF COEFFICIENT   =        .99          .61          .799
00275>
00276>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00277>            CN* =  81.0    Ia = Dep. Storage  (Above)
00278>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00279>            THAN THE STORAGE COEFFICIENT.
00280>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00281>
00282> ---------------------------------------------------------------------------
00283> 001:0007----------------------------------------------------------------------
00284> --------------------
00285> | COMPUTE VOLUME   |
00286> | ID:03   (602    )  |              DISCHARGE       TIME
00287> --------------------                 (cms)         (hrs)
00288>       *** WARNING: No storage required, RelRate > Inflow Qp.
00289> ---------------------------------------------------------------------------
00290> 001:0008----------------------------------------------------------------------
00291>       FINISH
00292> ---------------------------------------------------------------------------
00293> ***************************************************************************
00294>      WARNINGS / ERRORS / NOTES
00295>      -------------------------
00296>  001:0003 DESIGN STANDHYD
00297>       *** WARNING: Storage Coefficient is smaller than DT!
00298>                    Use a smaller DT or a larger area.
00299>  001:0005 DESIGN STANDHYD
00300>       *** WARNING: Storage Coefficient is smaller than DT!
00301>                    Use a smaller DT or a larger area.
00302>  001:0007 COMPUTE VOLUME
00303>       *** WARNING: No storage required, RelRate > Inflow Qp.
00304>    Simulation ended on 2009-05-27     at 19:03:33
00305> ===========================================================================
00306>
00307>
```

```
00001> ================================================================================
00002>
00003>  SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999  =========
00004>  S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
00005>  SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9 Ver. 4.02
00006>      S  W W W  M   M  H   H    Y    M   M  O   O       9999   9999 July 1999
00007>  SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9  =========
00008>                                                        9   9  9   9 # 4377549
00009>       StormWater Management HYdrologic Model            999    999  =========
00010>
00011>  ********************************************************************************
00012>  ************************** SWMHYMO-99 Ver/4.02 ***************************
00013>  *******  A single event and continuous hydrologic simulation model  *******
00014>  *******       based on the principles of HYMO and its successors       *******
00015>  *******                 OTTHYMO-83 and OTTHYMO-89.                     *******
00016>  ********************************************************************************
00017>  ******* Distributed by:  J.F. Sabourin and Associates Inc.            *******
00018>  *******                  Ottawa,  Ontario: (613) 727-5199             *******
00019>  *******                  Gatineau, Quebec: (819) 243-6858             *******
00020>  *******                  E-Mail: swmhymo@jfsa.Com                     *******
00021>  ********************************************************************************
00022>
00023>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024>  +++++++ Licensed user: Condeland Engineering Limited                  +++++++
00025>  +++++++                Toronto                    SERIAL#:4377549    +++++++
00026>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028>  ********************************************************************************
00029>  *******           ++++++ PROGRAM ARRAY DIMENSIONS ++++++              *******
00030>  *******           Maximum value for ID numbers  :     10             *******
00031>  *******           Max. number of rainfall points:  15000             *******
00032>  *******           Max. number of flow points    :  15000             *******
00033>  ********************************************************************************
00034>
00035>
00036>  ******************   D E T A I L E D   O U T P U T   ********************
00037>  ********************************************************************************
00038>  *      DATE: 2009-05-27       TIME: 19:11:20      RUN COUNTER: 000038        *
00039>  ********************************************************************************
00040>  * Input   filename: U:\EXFILES\ENGINE-1\HYMO\Projects\09015\post25yr.dat  *
00041>  * Output  filename: U:\EXFILES\ENGINE-1\HYMO\Projects\09015\post25yr.out  *
00042>  * Summary filename: U:\EXFILES\ENGINE-1\HYMO\Projects\09015\post25yr.sum  *
00043>  * User comments:                                                          *
00044>  * 1:_____________________________________________________________________*
00045>  * 2:_____________________________________________________________________*
00046>  * 3:_____________________________________________________________________*
00047>  ********************************************************************************
00048>
00049>  --------------------------------------------------------------------------------
00050>  001:0001----------------------------------------------------------------------
00051>  *#*****************************************************************************
00052>  *#  Project Name: [214925 ONTARIO LIMITED]    Project Number: [09-015]
00053>  *#  Date        : 11-08-2008
00054>  *#  Modeller    : [ROBERT DE ANGELIS]
00055>  *#  Company     : Condeland Engineering Limited
00056>  *#  License #   :  4377549
00057>  *#*****************************************************************************
00058>  ---------------------
00059>  | START            |  Project  dir.: U:\EXFILES\ENGINE-1\HYMO\Projects\09015\
00060>  --------------------  Rainfall dir.: U:\EXFILES\ENGINE-1\HYMO\Projects\09015\
00061>      TZERO =  4.00 hrs on        0
00062>      METOUT=  2 (output = METRIC)
00063>      NRUN  = 001
00064>      NSTORM=  0
00065>  --------------------------------------------------------------------------------
00066>  001:0002----------------------------------------------------------------------
00067>  ---------------------
00068>  | DESIGN STANDHYD    |   Area     (ha)=     .58
00069>  | 01:600    DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
00070>  ---------------------
00071>                                  IMPERVIOUS    PERVIOUS (i)
00072>       Surface Area      (ha)=          .12          .46
00073>       Dep. Storage      (mm)=          .80         1.50
00074>       Average Slope     (%)=        42.68        42.68
00075>       Length            (m)=        62.24        40.00
00076>       Mannings n            =         .013         .250
00077>
00078>                                  New rainfall entered directly by user.
00079>                                  TIME STEP= 5.00 min   # of STEPS= 199
00080>                                  DURATION =16.58 hrs   TOTAL RAIN=  76.39 mm
00081>
00082>                 TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00083>                  hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00084>                  .08   2.030 |   4.25   2.790 |   8.42   2.790 |  12.58   1.520
00085>                  .17   2.030 |   4.33   2.790 |   8.50   2.790 |  12.67   1.520
00086>                  .25   2.030 |   4.42   2.790 |   8.58   2.790 |  12.75   1.520
00087>                  .33   2.030 |   4.50   2.790 |   8.67   2.790 |  12.83   1.520
00088>                  .42   2.030 |   4.58   2.790 |   8.75   2.790 |  12.92   1.520
00089>                  .50   2.030 |   4.67   2.790 |   8.83   2.790 |  13.00   1.520
00090>                  .58   2.030 |   4.75   2.790 |   8.92   2.790 |  13.08   1.520
00091>                  .67   2.030 |   4.83   2.790 |   9.00   2.790 |  13.17   1.520
00092>                  .75   2.030 |   4.92   2.790 |   9.08   2.790 |  13.25   1.520
00093>                  .83   2.030 |   5.00   5.080 |   9.17   2.790 |  13.33   1.520
00094>                  .92   2.030 |   5.08   5.080 |   9.25   2.790 |  13.42   1.520
00095>                 1.00   2.030 |   5.17   5.080 |   9.33   2.790 |  13.50   1.520
00096>                 1.08   2.030 |   5.25   5.080 |   9.42   2.790 |  13.58   1.520
00097>                 1.17   2.030 |   5.33   5.080 |   9.50   2.790 |  13.67   1.520
00098>                 1.25   2.030 |   5.42   5.080 |   9.58   2.790 |  13.75   1.520
00099>                 1.33   2.030 |   5.50   5.080 |   9.67   2.790 |  13.83   1.520
00100>                 1.42   2.030 |   5.58   5.080 |   9.75   2.790 |  13.92   1.520
00101>                 1.50   2.030 |   5.67   5.080 |   9.83   2.790 |  14.00   1.520
00102>                 1.58   2.030 |   5.75   5.080 |   9.92   2.790 |  14.08   1.520
00103>                 1.67   2.030 |   5.83   7.110 |  10.00   2.030 |  14.17   1.020
00104>                 1.75   2.030 |   5.92   7.110 |  10.08   2.030 |  14.25   1.020
00105>                 1.83   2.030 |   6.00  10.410 |  10.17   2.030 |  14.33   1.020
00106>                 1.92   2.030 |   6.08  10.410 |  10.25   2.030 |  14.42   1.020
00107>                 2.00   2.030 |   6.17  23.370 |  10.33   2.030 |  14.50   1.020
00108>                 2.08   2.030 |   6.25  23.370 |  10.42   2.030 |  14.58   1.020
00109>                 2.17   2.030 |   6.33  51.560 |  10.50   2.030 |  14.67   1.020
00110>                 2.25   2.030 |   6.42  51.560 |  10.58   2.030 |  14.75   1.020
00111>                 2.33   2.030 |   6.50 107.440 |  10.67   2.030 |  14.83   1.020
00112>                 2.42   2.030 |   6.58 107.440 |  10.75   2.030 |  14.92   1.020
00113>                 2.50   2.030 |   6.67  18.800 |  10.83   2.030 |  15.00   1.020
00114>                 2.58   2.030 |   6.75  18.800 |  10.92   2.030 |  15.08   1.020
00115>                 2.67   2.030 |   6.83  11.680 |  11.00   2.030 |  15.17   1.020
00116>                 2.75   2.030 |   6.92  11.680 |  11.08   2.030 |  15.25   1.020
00117>                 2.83   2.030 |   7.00   8.380 |  11.17   2.030 |  15.33   1.020
00118>                 2.92   2.030 |   7.08   8.380 |  11.25   2.030 |  15.42   1.020
00119>                 3.00   2.030 |   7.17   8.130 |  11.33   2.030 |  15.50   1.020
00120>                 3.08   2.030 |   7.25   8.130 |  11.42   2.030 |  15.58   1.020
00121>                 3.17   2.030 |   7.33   5.590 |  11.50   2.030 |  15.67   1.020
00122>                 3.25   2.030 |   7.42   5.590 |  11.58   2.030 |  15.75   1.020
00123>                 3.33   2.790 |   7.50   4.830 |  11.67   2.030 |  15.83   1.020
00124>                 3.42   2.790 |   7.58   4.830 |  11.75   2.030 |  15.92   1.020
00125>                 3.50   2.790 |   7.67   4.830 |  11.83   2.030 |  16.00   1.020
00126>                 3.58   2.790 |   7.75   4.830 |  11.92   2.030 |  16.08   1.020
00127>                 3.67   2.790 |   7.83   4.830 |  12.00   2.030 |  16.17   1.020
00128>                 3.75   2.790 |   7.92   4.830 |  12.08   2.030 |  16.25   1.020
00129>                 3.83   2.790 |   8.00   4.830 |  12.17   2.030 |  16.33   1.020
00130>                 3.92   2.790 |   8.08   4.830 |  12.25   2.030 |  16.42   1.020
00131>                 4.00   2.790 |   8.17   4.830 |  12.33   2.030 |  16.50   1.020
00132>                 4.08   2.790 |   8.25   4.830 |  12.42   2.030 |  16.58   1.020
00133>                 4.17   2.790 |   8.33   2.790 |  12.50   1.520 |
00134>
00135>      Max.eff.Inten.(mm/hr)=     107.44        19.17
00136>                  over (min)        5.00         5.00
00137>       Storage Coeff.  (min)=         .61 (ii)    6.06 (ii)
00138>       Unit Hyd. Tpeak (min)=        5.00         5.00
00139>       Unit Hyd. peak  (cms)=         .34          .19
00140>                                                          *TOTALS*
00141>       PEAK FLOW       (cms)=         .03          .02          .055 (iii)
00142>       TIME TO PEAK    (hrs)=       10.58        10.58        10.583
00143>       RUNOFF VOLUME    (mm)=       75.59        11.46        24.289
00144>       TOTAL RAINFALL   (mm)=       76.39        76.39        76.392
00145>       RUNOFF COEFFICIENT   =         .99          .15          .318
00146>        *** WARNING: Storage Coefficient is smaller than DT!
00147>                    Use a smaller DT or a larger area.
00148>
00149>         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00150>             CN* =  38.0    Ia = Dep. Storage  (Above)
00151>        (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00152>             THAN THE STORAGE COEFFICIENT.
00153>       (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00154>
00155>  --------------------------------------------------------------------------------
00156>  001:0003----------------------------------------------------------------------
00157>  --------------------
00158>  | ROUTE PIPE culver|     PIPE Number     =    1.00
00159>  | IN= 1---> OUT= 8 |     Diameter    (mm)=  450.00
00160>  | DT=  5.0 min     |     Length       (m)=   45.00
00161>  --------------------     Slope       (m/m)= .01100
00162>                           Manning n        =   .025
00163>
00164>       <------------------ TRAVEL TIME TABLE ------------------>
00165>         DEPTH      VOLUME    FLOW RATE     VELOCITY    TRAV.TIME
00166>          (m)     (cu.m.)       (cms)         (m/s)         min
00167>         .024     .144E+00       .001          .260         2.89
00168>         .047     .402E+00       .004          .405         1.85
00169>         .071     .725E+00       .008          .522         1.44
00170>         .095     .110E+01       .015          .620         1.21
00171>         .118     .150E+01       .024          .706         1.06
00172>         .142     .194E+01       .034          .781          .96
00173>         .166     .239E+01       .045          .847          .89
00174>         .189     .286E+01       .058          .905          .83
00175>         .213     .334E+01       .071          .956          .78
00176>         .237     .382E+01       .085          .999          .75
00177>         .261     .429E+01       .099         1.036          .72
00178>         .284     .476E+01       .113         1.067          .70
00179>         .308     .522E+01       .126         1.090          .69
00180>         .332     .565E+01       .139         1.106          .68
00181>         .355     .606E+01       .150         1.114          .67
00182>         .379     .643E+01       .159         1.114          .67
00183>         .403     .676E+01       .165         1.102          .68
00184>         .426     .701E+01       .167         1.073          .70
00185>         .450     .716E+01       .156          .979          .77
00186>                                      <---- hydrograph ---->   <-pipe / channel->
00187>                                 AREA    QPEAK    TPEAK   R.V.   MAX DEPTH  MAX VEL
00188>                                  (ha)    (cms)    (hrs)   (mm)       (m)      (m/s)
00189>     INFLOW : ID= 1:600           .58     .055    10.58 24.289       .184      .892
00190>     OUTFLOW: ID= 8:culver        .58     .058    10.58 24.289       .190      .907
00191>
00192>
00193>  --------------------------------------------------------------------------------
00194>  001:0004----------------------------------------------------------------------
00195>  ---------------------
00196>  | DESIGN STANDHYD    |   Area     (ha)=     .38
00197>  | 02:601    DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
00198>  ---------------------
00199>                                  IMPERVIOUS    PERVIOUS (i)
00200>       Surface Area      (ha)=          .08          .30
00201>       Dep. Storage      (mm)=          .80         1.50
00202>       Average Slope     (%)=           .50          .50
00203>       Length            (m)=         50.20        40.00
00204>       Mannings n            =         .013         .250
00205>
00206>       Max.eff.Inten.(mm/hr)=     107.44        53.97
00207>                  over (min)        5.00        15.00
00208>       Storage Coeff.  (min)=        2.02 (ii)   15.71 (ii)
00209>       Unit Hyd. Tpeak (min)=        5.00        15.00
00210>       Unit Hyd. peak  (cms)=         .31          .07
00211>                                                          *TOTALS*
00212>       PEAK FLOW       (cms)=         .02          .03          .045 (iii)
00213>       TIME TO PEAK    (hrs)=       10.58        10.75        10.583
00214>       RUNOFF VOLUME    (mm)=       75.59        41.71        48.487
00215>       TOTAL RAINFALL   (mm)=       76.39        76.39        76.392
00216>       RUNOFF COEFFICIENT   =         .99          .55          .635
00217>        *** WARNING: Storage Coefficient is smaller than DT!
00218>                    Use a smaller DT or a larger area.
00219>
00220>         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00221>             CN* =  81.0    Ia = Dep. Storage  (Above)
00222>        (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00223>             THAN THE STORAGE COEFFICIENT.
00224>       (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00225>
00226>  --------------------------------------------------------------------------------
00227>  001:0005----------------------------------------------------------------------
00228>  ---------------------
00229>  | DESIGN STANDHYD    |   Area     (ha)=    5.50
00230>  | 03:602    DT= 5.00 |   Total Imp(%)=   50.00   Dir. Conn.(%)=   50.00
00231>  ---------------------
00232>                                  IMPERVIOUS    PERVIOUS (i)
00233>       Surface Area      (ha)=         2.75         2.75
00234>       Dep. Storage      (mm)=          .80         1.50
00235>       Average Slope     (%)=           .50          .50
00236>       Length            (m)=       191.42        40.00
00237>       Mannings n            =         .013         .250
00238>
00239>       Max.eff.Inten.(mm/hr)=     107.44        46.65
00240>                  over (min)        5.00        20.00
00241>       Storage Coeff.  (min)=        4.51 (ii)   19.02 (ii)
00242>       Unit Hyd. Tpeak (min)=        5.00        20.00
00243>       Unit Hyd. peak  (cms)=         .23          .06
00244>                                                          *TOTALS*
00245>       PEAK FLOW       (cms)=         .77          .23          .920 (iii)
00246>       TIME TO PEAK    (hrs)=       10.58        10.83        10.583
00247>       RUNOFF VOLUME    (mm)=       75.59        41.71        58.651
00248>       TOTAL RAINFALL   (mm)=       76.39        76.39        76.392
00249>       RUNOFF COEFFICIENT   =         .99          .55          .768
00250>        *** WARNING: Storage Coefficient is smaller than DT!
00251>                    Use a smaller DT or a larger area.
00252>
00253>         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00254>             CN* =  81.0    Ia = Dep. Storage  (Above)
00255>        (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00256>             THAN THE STORAGE COEFFICIENT.
00257>       (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00258>
00259>  --------------------------------------------------------------------------------
00260>  001:0006----------------------------------------------------------------------
00261>  --------------------
00262>  | COMPUTE VOLUME   |
00263>  | ID:03  (602   )  |          DISCHARGE      TIME
00264>  --------------------            (cms)        (hrs)
00265>       *** WARNING: No storage required, RelRate > Inflow Qp.
00266>  --------------------------------------------------------------------------------
00267>  001:0007----------------------------------------------------------------------
00268>       FINISH
00269>  --------------------------------------------------------------------------------
00270>  ********************************************************************************
```

```
00271>      WARNINGS / ERRORS / NOTES
00272>      -------------------------
00273>  001:0002 DESIGN STANDHYD
00274>       *** WARNING: Storage Coefficient is smaller than DT!
00275>                    Use a smaller DT or a larger area.
00276>  001:0004 DESIGN STANDHYD
00277>       *** WARNING: Storage Coefficient is smaller than DT!
00278>                    Use a smaller DT or a larger area.
00279>  001:0005 DESIGN STANDHYD
00280>       *** WARNING: Storage Coefficient is smaller than DT!
00281>                    Use a smaller DT or a larger area.
00282>  001:0006 COMPUTE VOLUME
00283>       *** WARNING: No storage required, RelRate > Inflow Qp.
00284>    Simulation ended on 2009-05-27     at 19:11:21
00285> ================================================================================
00286>
00287>
```

```
00001> ================================================================================
00002>
00003>  SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999  =========
00004>  S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
00005>  SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9  Ver. 4.02
00006>      S  W W W  M   M  H   H    Y    M   M  O   O       9999   9999 July 1999
00007>  SSSSS   W W   M   M  H   H    Y    M   M   OOO            9      9  =========
00008>                                                        9   9  9   9  # 4377549
00009>       StormWater Management HYdrologic Model           999    999  =========
00010>
00011> ********************************************************************************
00012> ************************** SWMHYMO-99 Ver/4.02 ***********************************
00013> *******  A single event and continuous hydrologic simulation model  *******
00014> *******     based on the principles of HYMO and its successors      *******
00015> *******                 OTTHYMO-83 and OTTHYMO-89.                  *******
00016> ********************************************************************************
00017> ******* Distributed by:  J.F. Sabourin and Associates Inc.          *******
00018> *******                  Ottawa,  Ontario: (613) 727-5199           *******
00019> *******                  Gatineau, Quebec: (819) 243-6858           *******
00020> *******                  E-Mail: swmhymo@jfsa.Com                   *******
00021> ********************************************************************************
00022>
00023> +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024> +++++++ Licensed user: Condeland Engineering Limited                  +++++++
00025> +++++++                 Toronto                  SERIAL#:4377549    +++++++
00026> +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028> ********************************************************************************
00029> *******          ++++++ PROGRAM ARRAY DIMENSIONS ++++++                *******
00030> *******          Maximum value for ID numbers  :    10                *******
00031> *******          Max. number of rainfall points:  15000               *******
00032> *******          Max. number of flow points    :  15000               *******
00033> ********************************************************************************
00034>
00035>
00036> ********************   D E T A I L E D   O U T P U T   ********************
00037> ********************************************************************************
00038> *      DATE: 2009-05-27      TIME: 19:26:51     RUN COUNTER: 000040       *
00039> ********************************************************************************
00040> * Input  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post50yr.dat  *
00041> * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post50yr.out  *
00042> * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post50yr.sum  *
00043> * User comments:                                                         *
00044> * 1:_____________________________________________________________________*
00045> * 2:_____________________________________________________________________*
00046> * 3:_____________________________________________________________________*
00047> ********************************************************************************
00048>
00049> --------------------------------------------------------------------------------
00050> 001:0001--------------------------------------------------------------------------
00051> *#*****************************************************************************
00052> *#  Project Name: [214925 ONTARIO LIMITED]    Project Number: [09-015]
00053> *#  Date        : 11-08-2008
00054> *#  Modeller    : [ROBERT DE ANGELIS]
00055> *#  Company     : Condeland Engineering Limited
00056> *#  License #   :  4377549
00057> *#*****************************************************************************
00058> ---------------------
00059> | START            |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00060> ---------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00061>     TZERO =  4.00 hrs on        0
00062>     METOUT=   2 (output = METRIC)
00063>     NRUN  = 001
00064>     NSTORM=   0
00065> --------------------------------------------------------------------------------
00066> 001:0002--------------------------------------------------------------------------
00067> ---------------------
00068> | DESIGN STANDHYD    |   Area     (ha)=     .58
00069> | 01:600    DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
00070> ---------------------
00071>                              IMPERVIOUS    PERVIOUS (i)
00072>      Surface Area     (ha)=        .12          .46
00073>      Dep. Storage     (mm)=        .80         1.50
00074>      Average Slope     (%)=      49.10        49.10
00075>      Length            (m)=      62.24        40.00
00076>      Mannings n             =     .013         .250
00077>
00078>                                 New rainfall entered directly by user.
00079>                                 TIME STEP= 5.00 min   # of STEPS= 199
00080>                                 DURATION =16.58 hrs   TOTAL RAIN=  82.35 mm
00081>
00082>                TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
00083>                 hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
00084>                 .08   2.120 |   4.25   3.050 |   8.42   3.050 |  12.58   1.650
00085>                 .17   2.120 |   4.33   3.050 |   8.50   3.050 |  12.67   1.650
00086>                 .25   2.120 |   4.42   3.050 |   8.58   3.050 |  12.75   1.650
00087>                 .33   2.120 |   4.50   3.050 |   8.67   3.050 |  12.83   1.650
00088>                 .42   2.120 |   4.58   3.050 |   8.75   3.050 |  12.92   1.650
00089>                 .50   2.120 |   4.67   3.050 |   8.83   3.050 |  13.00   1.650
00090>                 .58   2.120 |   4.75   3.050 |   8.92   3.050 |  13.08   1.650
00091>                 .67   2.120 |   4.83   3.050 |   9.00   3.050 |  13.17   1.650
00092>                 .75   2.120 |   4.92   3.050 |   9.08   3.050 |  13.25   1.650
00093>                 .83   2.120 |   5.00   5.640 |   9.17   3.050 |  13.33   1.650
00094>                 .92   2.120 |   5.08   5.640 |   9.25   3.050 |  13.42   1.650
00095>                1.00   2.120 |   5.17   5.640 |   9.33   3.050 |  13.50   1.650
00096>                1.08   2.120 |   5.25   5.640 |   9.42   3.050 |  13.58   1.650
00097>                1.17   2.120 |   5.33   5.640 |   9.50   3.050 |  13.67   1.650
00098>                1.25   2.120 |   5.42   5.640 |   9.58   3.050 |  13.75   1.650
00099>                1.33   2.120 |   5.50   5.640 |   9.67   3.050 |  13.83   1.650
00100>                1.42   2.120 |   5.58   5.640 |   9.75   3.050 |  13.92   1.650
00101>                1.50   2.120 |   5.67   5.640 |   9.83   3.050 |  14.00   1.650
00102>                1.58   2.120 |   5.75   5.640 |   9.92   3.050 |  14.08   1.650
00103>                1.67   2.120 |   5.83   7.520 |  10.00   2.120 |  14.17   1.170
00104>                1.75   2.120 |   5.92   7.520 |  10.08   2.120 |  14.25   1.170
00105>                1.83   2.120 |   6.00  11.040 |  10.17   2.120 |  14.33   1.170
00106>                1.92   2.120 |   6.08  11.020 |  10.25   2.120 |  14.42   1.170
00107>                2.00   2.120 |   6.17  25.370 |  10.33   2.120 |  14.50   1.170
00108>                2.08   2.120 |   6.25  25.370 |  10.42   2.120 |  14.58   1.170
00109>                2.17   2.120 |   6.33  55.440 |  10.50   2.120 |  14.67   1.170
00110>                2.25   2.120 |   6.42  55.440 |  10.58   2.120 |  14.75   1.170
00111>                2.33   2.120 |   6.50 116.060 |  10.67   2.120 |  14.83   1.170
00112>                2.42   2.120 |   6.58 116.060 |  10.75   2.120 |  14.92   1.170
00113>                2.50   2.120 |   6.67  19.870 |  10.83   2.120 |  15.00   1.170
00114>                2.58   2.120 |   6.75  19.870 |  10.92   2.120 |  15.08   1.170
00115>                2.67   2.120 |   6.83  12.690 |  11.00   2.120 |  15.17   1.170
00116>                2.75   2.120 |   6.92  12.690 |  11.08   2.120 |  15.25   1.170
00117>                2.83   2.120 |   7.00   9.170 |  11.17   2.120 |  15.33   1.170
00118>                2.92   2.120 |   7.08   9.170 |  11.25   2.120 |  15.42   1.170
00119>                3.00   2.120 |   7.17   8.690 |  11.33   2.120 |  15.50   1.170
00120>                3.08   2.120 |   7.25   8.690 |  11.42   2.120 |  15.58   1.170
00121>                3.17   2.120 |   7.33   6.100 |  11.50   2.120 |  15.67   1.170
00122>                3.25   2.120 |   7.42   6.100 |  11.58   2.120 |  15.75   1.170
00123>                3.33   3.050 |   7.50   5.170 |  11.67   2.120 |  15.83   1.170
00124>                3.42   3.050 |   7.58   5.170 |  11.75   2.120 |  15.92   1.170
00125>                3.50   3.050 |   7.67   5.170 |  11.83   2.120 |  16.00   1.170
00126>                3.58   3.050 |   7.75   5.170 |  11.92   2.120 |  16.08   1.170
00127>                3.67   3.050 |   7.83   5.170 |  12.00   2.120 |  16.17   1.170
00128>                3.75   3.050 |   7.92   5.170 |  12.08   2.120 |  16.25   1.170
00129>                3.83   3.050 |   8.00   5.170 |  12.17   2.120 |  16.33   1.170
00130>                3.92   3.050 |   8.08   5.170 |  12.25   2.120 |  16.42   1.170
00131>                4.00   3.050 |   8.17   5.170 |  12.33   2.120 |  16.50   1.170
00132>                4.08   3.050 |   8.25   5.170 |  12.42   2.120 |  16.58   1.000
00133>                4.17   3.050 |   8.33   3.050 |  12.50   1.650 |
00134>
00135>      Max.eff.Inten.(mm/hr)=     116.06        22.12
00136>                 over (min)        5.00         5.00
00137>      Storage Coeff.  (min)=        .56 (ii)     5.50 (ii)
00138>      Unit Hyd. Tpeak (min)=       5.00         5.00
00139>      Unit Hyd. peak  (cms)=        .34          .20
00140>                                                          *TOTALS*
00141>      PEAK FLOW       (cms)=        .04          .02          .061 (iii)
00142>      TIME TO PEAK    (hrs)=      10.58        10.58        10.583
00143>      RUNOFF VOLUME    (mm)=      81.55        13.20        26.868
00144>      TOTAL RAINFALL   (mm)=      82.35        82.35        82.349
00145>      RUNOFF COEFFICIENT   =        .99          .16          .326
00146>       *** WARNING: Storage Coefficient is smaller than DT!
00147>                   Use a smaller DT or a larger area.
00148>
00149>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00150>            CN* =  38.0    Ia = Dep. Storage  (Above)
00151>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00152>            THAN THE STORAGE COEFFICIENT.
00153>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00154>
00155> --------------------------------------------------------------------------------
00156> 001:0003--------------------------------------------------------------------------
00157> --------------------
00158> | ROUTE PIPE culver|     PIPE Number      =    1.00
00159> | IN= 1---> OUT= 8 |     Diameter     (mm)=  450.00
00160> | DT=  5.0 min     |     Length        (m)=   45.00
00161> --------------------     Slope        (m/m)= .01100
00162>                          Manning n         =   .025
00163>
00164>      <------------------ TRAVEL TIME TABLE ------------------>
00165>        DEPTH      VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
00166>         (m)     (cu.m.)       (cms)         (m/s)         min
00167>        .024     .144E+00       .001          .260         2.89
00168>        .047     .402E+00       .004          .405         1.85
00169>        .071     .725E+00       .008          .522         1.44
00170>        .095     .110E+01       .015          .620         1.21
00171>        .118     .150E+01       .024          .706         1.06
00172>        .142     .194E+01       .034          .781          .96
00173>        .166     .239E+01       .045          .847          .89
00174>        .189     .286E+01       .058          .905          .83
00175>        .213     .334E+01       .071          .956          .78
00176>        .237     .382E+01       .085          .999          .75
00177>        .261     .429E+01       .099         1.036          .72
00178>        .284     .476E+01       .113         1.067          .70
00179>        .308     .522E+01       .126         1.090          .69
00180>        .332     .565E+01       .139         1.106          .68
00181>        .355     .606E+01       .150         1.114          .67
00182>        .379     .643E+01       .159         1.114          .67
00183>        .403     .676E+01       .165         1.102          .68
00184>        .426     .701E+01       .167         1.073          .70
00185>        .450     .716E+01       .156          .979          .77
00186>                                          <---- hydrograph ---->   <-pipe / channel->
00187>                                 AREA     QPEAK    TPEAK    R.V.    MAX DEPTH  MAX VEL
00188>                                 (ha)     (cms)    (hrs)    (mm)       (m)       (m/s)
00189>   INFLOW : ID= 1:600             .58      .061    10.58  26.868       .196       .919
00190>   OUTFLOW: ID= 8:culver          .58      .065    10.58  26.868       .203       .933
00191>
00192>
00193> --------------------------------------------------------------------------------
00194> 001:0004--------------------------------------------------------------------------
00195> ---------------------
00196> | DESIGN STANDHYD    |   Area     (ha)=     .38
00197> | 02:601    DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
00198> ---------------------
00199>                              IMPERVIOUS    PERVIOUS (i)
00200>      Surface Area     (ha)=        .08          .30
00201>      Dep. Storage     (mm)=        .80         1.50
00202>      Average Slope     (%)=        .50          .50
00203>      Length            (m)=      50.20        40.00
00204>      Mannings n             =     .013         .250
00205>
00206>      Max.eff.Inten.(mm/hr)=     116.06        60.38
00207>                 over (min)        5.00        15.00
00208>      Storage Coeff.  (min)=       1.96 (ii)    15.05 (ii)
00209>      Unit Hyd. Tpeak (min)=       5.00        15.00
00210>      Unit Hyd. peak  (cms)=        .31          .07
00211>                                                          *TOTALS*
00212>      PEAK FLOW       (cms)=        .02          .03          .050 (iii)
00213>      TIME TO PEAK    (hrs)=      10.58        10.75        10.583
00214>      RUNOFF VOLUME    (mm)=      81.55        46.55        53.548
00215>      TOTAL RAINFALL   (mm)=      82.35        82.35        82.349
00216>      RUNOFF COEFFICIENT   =        .99          .57          .650
00217>       *** WARNING: Storage Coefficient is smaller than DT!
00218>                   Use a smaller DT or a larger area.
00219>
00220>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00221>            CN* =  81.0    Ia = Dep. Storage  (Above)
00222>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00223>            THAN THE STORAGE COEFFICIENT.
00224>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00225>
00226> --------------------------------------------------------------------------------
00227> 001:0005--------------------------------------------------------------------------
00228> ---------------------
00229> | DESIGN STANDHYD    |   Area     (ha)=    5.50
00230> | 03:602    DT= 5.00 |   Total Imp(%)=   50.00   Dir. Conn.(%)=   50.00
00231> ---------------------
00232>                              IMPERVIOUS    PERVIOUS (i)
00233>      Surface Area     (ha)=       2.75         2.75
00234>      Dep. Storage     (mm)=        .80         1.50
00235>      Average Slope     (%)=        .50          .50
00236>      Length            (m)=     191.42        40.00
00237>      Mannings n             =     .013         .250
00238>
00239>      Max.eff.Inten.(mm/hr)=     116.06        52.23
00240>                 over (min)        5.00        20.00
00241>      Storage Coeff.  (min)=       4.37 (ii)    18.25 (ii)
00242>      Unit Hyd. Tpeak (min)=       5.00        20.00
00243>      Unit Hyd. peak  (cms)=        .23          .06
00244>                                                          *TOTALS*
00245>      PEAK FLOW       (cms)=        .84          .26         1.008 (iii)
00246>      TIME TO PEAK    (hrs)=      10.58        10.75        10.583
00247>      RUNOFF VOLUME    (mm)=      81.55        46.55        64.048
00248>      TOTAL RAINFALL   (mm)=      82.35        82.35        82.349
00249>      RUNOFF COEFFICIENT   =        .99          .57          .778
00250>       *** WARNING: Storage Coefficient is smaller than DT!
00251>                   Use a smaller DT or a larger area.
00252>
00253>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00254>            CN* =  81.0    Ia = Dep. Storage  (Above)
00255>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00256>            THAN THE STORAGE COEFFICIENT.
00257>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00258>
00259> --------------------------------------------------------------------------------
00260> 001:0006--------------------------------------------------------------------------
00261> --------------------
00262> | COMPUTE VOLUME   |
00263> | ID:03  (602   ) |              DISCHARGE      TIME
00264> --------------------               (cms)        (hrs)
00265>            START CONTROLLING AT      .467        10.416
00266>            INFLOW HYD. PEAKS AT     1.008        10.583
00267>            STOP  CONTROLLING AT      .934        10.598
00268>
00269>            REQUIRED STORAGE VOLUME (ha.m.)=      .0081
00270>            TOTAL HYDROGRAPH VOLUME (ha.m.)=      .3520
```

```
00271>            % OF HYDROGRAPH TO STORE       =   2.2931
00272>
00273>            NOTE:  Storage was computed to reduce the Inflow
00274>                   peak to     .934  (cms).
00275>
00276> ------------------------------------------------------------------------------
00277> 001:0007----------------------------------------------------------------------
00278>       FINISH
00279> ------------------------------------------------------------------------------
00280> ******************************************************************************
00281>      WARNINGS / ERRORS / NOTES
00282>      -------------------------
00283>  001:0002 DESIGN STANDHYD
00284>       *** WARNING: Storage Coefficient is smaller than DT!
00285>                    Use a smaller DT or a larger area.
00286>  001:0004 DESIGN STANDHYD
00287>       *** WARNING: Storage Coefficient is smaller than DT!
00288>                    Use a smaller DT or a larger area.
00289>  001:0005 DESIGN STANDHYD
00290>       *** WARNING: Storage Coefficient is smaller than DT!
00291>                    Use a smaller DT or a larger area.
00292>    Simulation ended on 2009-05-27     at 19:26:51
00293> ==============================================================================
00294>
00295>
```

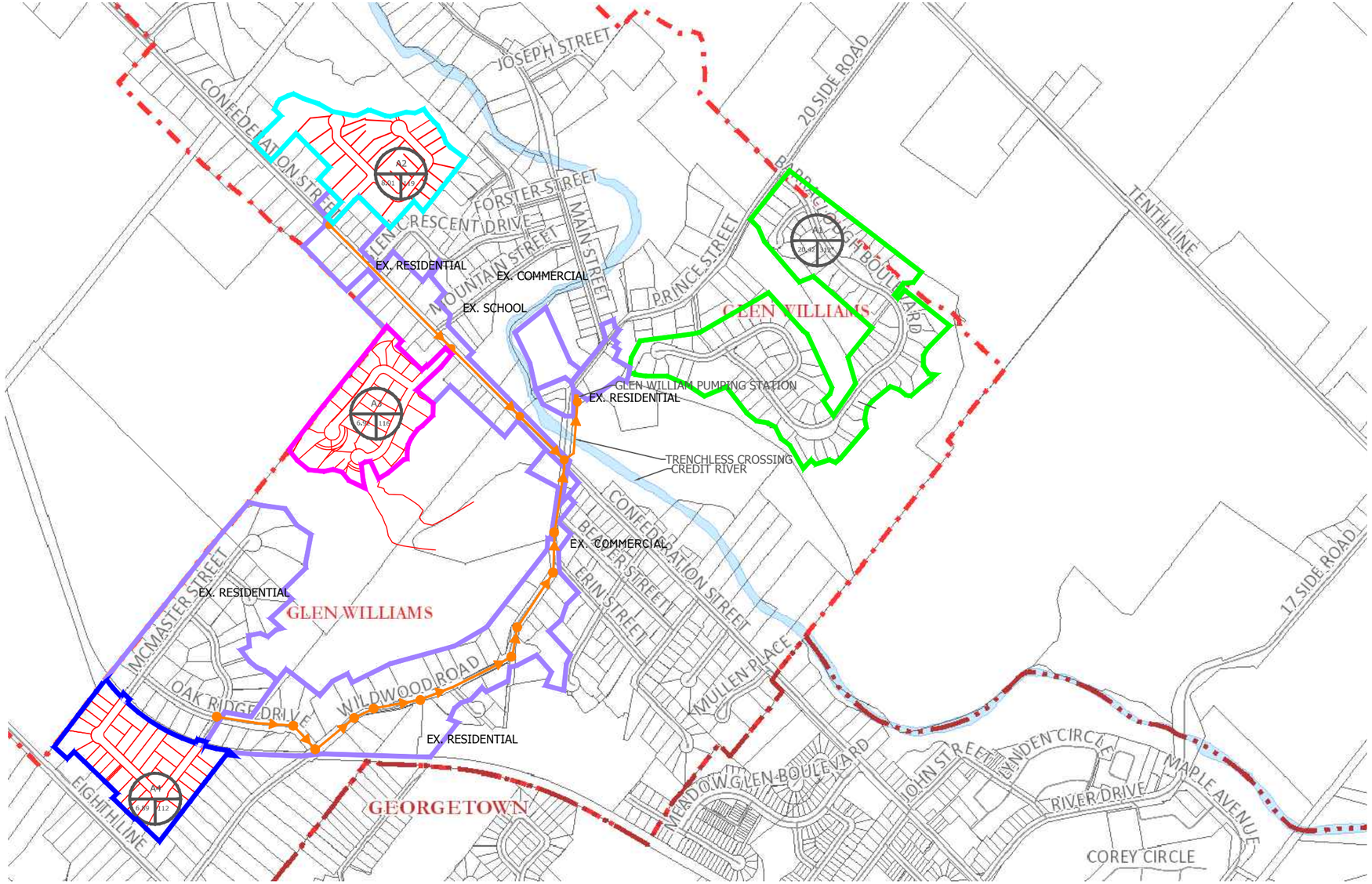
```
00001> ================================================================================
00002>
00003>  SSSSS   W    W  M    M  H    H  Y    Y  M    M    OOO        999    999  =========
00004>  S       W W W  MM  MM  H    H   Y Y     MM MM   O   O      9   9  9   9
00005>  SSSSS   W W W  M M M  HHHHH     Y      M M M   O   O  ##  9   9  9   9 Ver. 4.02
00006>      S   W W W  M    M  H    H     Y      M  M   O   O       9999   9999 July 1999
00007>  SSSSS    W W   M    M  H    H     Y      M  M    OOO          9      9 =========
00008>                                                              9   9  9   9 # 4377549
00009>       StormWater Management HYdrologic Model                  999    999  =========
00010>
00011>  ***************************************************************************
00012>  *************************** SWMHYMO-99 Ver/4.02 ***************************
00013>  *******  A single event and continuous hydrologic simulation model  *******
00014>  *******      based on the principles of HYMO and its successors      *******
00015>  *******                  OTTHYMO-83 and OTTHYMO-89.                  *******
00016>  ***************************************************************************
00017>  ******* Distributed by:  J.F. Sabourin and Associates Inc.           *******
00018>  *******                  Ottawa,  Ontario: (613) 727-5199           *******
00019>  *******                  Gatineau, Quebec: (819) 243-6858           *******
00020>  *******                  E-Mail: swmhymo@jfsa.Com                   *******
00021>  ***************************************************************************
00022>
00023>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00024>  +++++++ Licensed user: Condeland Engineering Limited                 +++++++
00025>  +++++++                Toronto                  SERIAL#:4377549     +++++++
00026>  +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
00027>
00028>  ***************************************************************************
00029>  *******          ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *******
00030>  *******          Maximum value for ID numbers  :     10             *******
00031>  *******          Max. number of rainfall points:  15000             *******
00032>  *******          Max. number of flow points    :  15000             *******
00033>  ***************************************************************************
00034>
00035>
00036>  ********************   D E T A I L E D   O U T P U T   ********************
00037>  ***************************************************************************
00038>  *       DATE: 2009-05-27       TIME: 16:06:18       RUN COUNTER: 000031    *
00039>  ***************************************************************************
00040>  * Input  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post100y.dat  *
00041>  * Output  filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post100y.out  *
00042>  * Summary filename: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\post100y.sum  *
00043>  * User comments:                                                         *
00044>  * 1:_____________________________________________________________________*
00045>  * 2:_____________________________________________________________________*
00046>  * 3:_____________________________________________________________________*
00047>  ***************************************************************************
00048>
00049>  ---------------------------------------------------------------------------
00050>  001:0001-----------------------------------------------------------------
00051>  *#*************************************************************************
00052>  *#  Project Name: [214925 ONTARIO LIMITED]    Project Number: [09-015]
00053>  *#  Date        : 11-08-2008
00054>  *#  Modeller    : [ROBERT DE ANGELIS]
00055>  *#  Company     : Condeland Engineering Limited
00056>  *#  License #   :  4377549
00057>  *#*************************************************************************
00058>  --------------------
00059>  | START            |  Project  dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00060>  --------------------  Rainfall dir.: U:\EXFILES\ENGINE~1\HYMO\Projects\09015\
00061>      TZERO =  4.00 hrs on        0
00062>      METOUT=   2 (output = METRIC)
00063>      NRUN  = 001
00064>      NSTORM=   0
00065>  ---------------------------------------------------------------------------
00066>  001:0002-----------------------------------------------------------------
00067>  ----------------------
00068>  | DESIGN STANDHYD    |   Area     (ha)=     .58
00069>  | 01:600     DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
00070>  ----------------------
00071>                                 IMPERVIOUS     PERVIOUS (i)
00072>       Surface Area      (ha)=         .12           .46
00073>       Dep. Storage      (mm)=         .80          1.50
00074>       Average Slope      (%)=       53.09         53.09
00075>       Length             (m)=       62.24         40.00
00076>       Mannings n            =        .013          .250
00077>
00078>                                 New rainfall entered directly by user.
00079>                                 TIME STEP= 5.00 min   # of STEPS= 199
00080>                                 DURATION =16.58 hrs   TOTAL RAIN=  89.06 mm
00081>
00082>                 TIME     RAIN |   TIME     RAIN |   TIME     RAIN |   TIME     RAIN
00083>                  hrs    mm/hr |    hrs    mm/hr |    hrs    mm/hr |    hrs    mm/hr
00084>                  .08    2.290 |   4.25    3.300 |   8.42    3.300 |  12.58    1.780
00085>                  .17    2.290 |   4.33    3.300 |   8.50    3.300 |  12.67    1.780
00086>                  .25    2.290 |   4.42    3.300 |   8.58    3.300 |  12.75    1.780
00087>                  .33    2.290 |   4.50    3.300 |   8.67    3.300 |  12.83    1.780
00088>                  .42    2.290 |   4.58    3.300 |   8.75    3.300 |  12.92    1.780
00089>                  .50    2.290 |   4.67    3.300 |   8.83    3.300 |  13.00    1.780
00090>                  .58    2.290 |   4.75    3.300 |   8.92    3.300 |  13.08    1.780
00091>                  .67    2.290 |   4.83    3.300 |   9.00    3.300 |  13.17    1.780
00092>                  .75    2.290 |   4.92    3.300 |   9.08    3.300 |  13.25    1.780
00093>                  .83    2.290 |   5.00    6.100 |   9.17    3.300 |  13.33    1.780
00094>                  .92    2.290 |   5.08    6.100 |   9.25    3.300 |  13.42    1.780
00095>                 1.00    2.290 |   5.17    6.100 |   9.33    3.300 |  13.50    1.780
00096>                 1.08    2.290 |   5.25    6.100 |   9.42    3.300 |  13.58    1.780
00097>                 1.17    2.290 |   5.33    6.100 |   9.50    3.300 |  13.67    1.780
00098>                 1.25    2.290 |   5.42    6.100 |   9.58    3.300 |  13.75    1.780
00099>                 1.33    2.290 |   5.50    6.100 |   9.67    3.300 |  13.83    1.780
00100>                 1.42    2.290 |   5.58    6.100 |   9.75    3.300 |  13.92    1.780
00101>                 1.50    2.290 |   5.67    6.100 |   9.83    3.300 |  14.00    1.780
00102>                 1.58    2.290 |   5.75    6.100 |   9.92    3.300 |  14.08    1.780
00103>                 1.67    2.290 |   5.83    8.130 |  10.00    2.290 |  14.17    1.270
00104>                 1.75    2.290 |   5.92    8.130 |  10.08    2.290 |  14.25    1.270
00105>                 1.83    2.290 |   6.00   11.940 |  10.17    2.290 |  14.33    1.270
00106>                 1.92    2.290 |   6.08   11.940 |  10.25    2.290 |  14.42    1.270
00107>                 2.00    2.290 |   6.17   27.430 |  10.33    2.290 |  14.50    1.270
00108>                 2.08    2.290 |   6.25   27.430 |  10.42    2.290 |  14.58    1.270
00109>                 2.17    2.290 |   6.33   59.940 |  10.50    2.290 |  14.67    1.270
00110>                 2.25    2.290 |   6.42   59.940 |  10.58    2.290 |  14.75    1.270
00111>                 2.33    2.290 |   6.50  125.480 |  10.67    2.290 |  14.83    1.270
00112>                 2.42    2.290 |   6.58  125.480 |  10.75    2.290 |  14.92    1.270
00113>                 2.50    2.290 |   6.67   21.480 |  10.83    2.290 |  15.00    1.270
00114>                 2.58    2.290 |   6.75   21.480 |  10.92    2.290 |  15.08    1.270
00115>                 2.67    2.290 |   6.83   13.720 |  11.00    2.290 |  15.17    1.270
00116>                 2.75    2.290 |   6.92   13.720 |  11.08    2.290 |  15.25    1.270
00117>                 2.83    2.290 |   7.00    9.910 |  11.17    2.290 |  15.33    1.270
00118>                 2.92    2.290 |   7.08    9.910 |  11.25    2.290 |  15.42    1.270
00119>                 3.00    2.290 |   7.17    9.400 |  11.33    2.290 |  15.50    1.270
00120>                 3.08    2.290 |   7.25    9.400 |  11.42    2.290 |  15.58    1.270
00121>                 3.17    2.290 |   7.33    6.600 |  11.50    2.290 |  15.67    1.270
00122>                 3.25    2.290 |   7.42    6.600 |  11.58    2.290 |  15.75    1.270
00123>                 3.33    3.300 |   7.50    5.590 |  11.67    2.290 |  15.83    1.270
00124>                 3.42    3.300 |   7.58    5.590 |  11.75    2.290 |  15.92    1.270
00125>                 3.50    3.300 |   7.67    5.590 |  11.83    2.290 |  16.00    1.270
00126>                 3.58    3.300 |   7.75    5.590 |  11.92    2.290 |  16.08    1.270
00127>                 3.67    3.300 |   7.83    5.590 |  12.00    2.290 |  16.17    1.270
00128>                 3.75    3.300 |   7.92    5.590 |  12.08    2.290 |  16.25    1.270
00129>                 3.83    3.300 |   8.00    5.590 |  12.17    2.290 |  16.33    1.270
00130>                 3.92    3.300 |   8.08    5.590 |  12.25    2.290 |  16.42    1.270
00131>                 4.00    3.300 |   8.17    5.590 |  12.33    2.290 |  16.50    1.270
00132>                 4.08    3.300 |   8.25    5.590 |  12.42    2.290 |  16.58    1.270
00133>                 4.17    3.300 |   8.33    3.300 |  12.50    1.780 |
00134>
00135>      Max.eff.Inten.(mm/hr)=     125.48        25.60
00136>                 over (min)        5.00          5.00
00137>      Storage Coeff.  (min)=         .53 (ii)      5.08 (ii)
00138>      Unit Hyd. Tpeak (min)=        5.00          5.00
00139>      Unit Hyd. peak  (cms)=         .34           .21
00140>                                                          *TOTALS*
00141>      PEAK FLOW       (cms)=         .04           .03          .069 (iii)
00142>      TIME TO PEAK    (hrs)=       10.58         10.58        10.583
00143>      RUNOFF VOLUME    (mm)=       88.26         15.27        29.868
00144>      TOTAL RAINFALL   (mm)=       89.06         89.06        89.056
00145>      RUNOFF COEFFICIENT   =         .99           .17          .335
00146>       *** WARNING: Storage Coefficient is smaller than DT!
00147>                   Use a smaller DT or a larger area.
00148>
00149>        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00150>            CN* =  38.0    Ia = Dep. Storage  (Above)
00151>       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00152>            THAN THE STORAGE COEFFICIENT.
00153>      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00154>
00155>  ---------------------------------------------------------------------------
00156>  001:0003-----------------------------------------------------------------
00157>  --------------------
00158>  | ROUTE PIPE culver|     PIPE Number      =    1.00
00159>  | IN= 1---> OUT= 8 |     Diameter    (mm)=  450.00
00160>  | DT=  5.0 min     |     Length       (m)=   45.00
00161>  --------------------     Slope       (m/m)= .01100
00162>                           Manning n        =   .025
00163>
00164>      <------------------ TRAVEL TIME TABLE ------------------->
00165>        DEPTH      VOLUME     FLOW RATE     VELOCITY     TRAV.TIME
00166>         (m)      (cu.m.)       (cms)         (m/s)         min
00167>        .024     .144E+00       .001          .260         2.89
00168>        .047     .402E+00       .004          .405         1.85
00169>        .071     .725E+00       .008          .522         1.44
00170>        .095     .110E+01       .015          .620         1.21
00171>        .118     .150E+01       .024          .706         1.06
00172>        .142     .194E+01       .034          .781          .96
00173>        .166     .239E+01       .045          .847          .89
00174>        .189     .286E+01       .058          .905          .83
00175>        .213     .334E+01       .071          .956          .78
00176>        .237     .382E+01       .085          .999          .75
00177>        .261     .429E+01       .099         1.036          .72
00178>        .284     .476E+01       .113         1.067          .70
00179>        .308     .522E+01       .126         1.090          .69
00180>        .332     .565E+01       .139         1.106          .68
00181>        .355     .606E+01       .150         1.114          .67
00182>        .379     .643E+01       .159         1.114          .67
00183>        .403     .676E+01       .165         1.102          .68
00184>        .426     .701E+01       .167         1.073          .70
00185>        .450     .716E+01       .156          .979          .77
00186>                                      <---- hydrograph ---->   <-pipe / channel->
00187>                                AREA    QPEAK    TPEAK   R.V.   MAX DEPTH  MAX VEL
00188>                                (ha)    (cms)    (hrs)   (mm)       (m)      (m/s)
00189>     INFLOW : ID= 1:600          .58     .069    10.58 29.868       .209      .947
00190>     OUTFLOW: ID= 8:culver       .58     .073    10.58 29.868       .217      .962
00191>
00192>
00193>  ---------------------------------------------------------------------------
00194>  001:0004-----------------------------------------------------------------
00195>  ----------------------
00196>  | DESIGN STANDHYD    |   Area     (ha)=     .38
00197>  | 02:601     DT= 5.00 |   Total Imp(%)=   20.00   Dir. Conn.(%)=   20.00
00198>  ----------------------
00199>                                 IMPERVIOUS     PERVIOUS (i)
00200>       Surface Area      (ha)=         .08           .30
00201>       Dep. Storage      (mm)=         .80          1.50
00202>       Average Slope      (%)=         .50           .50
00203>       Length             (m)=       50.20         40.00
00204>       Mannings n            =        .013          .250
00205>
00206>       Max.eff.Inten.(mm/hr)=      125.48         67.67
00207>                  over (min)         5.00         15.00
00208>       Storage Coeff.  (min)=        1.90 (ii)     14.41 (ii)
00209>       Unit Hyd. Tpeak (min)=        5.00         15.00
00210>       Unit Hyd. peak  (cms)=         .32           .08
00211>                                                          *TOTALS*
00212>       PEAK FLOW       (cms)=         .03           .04          .056 (iii)
00213>       TIME TO PEAK    (hrs)=       10.58         10.75        10.583
00214>       RUNOFF VOLUME    (mm)=       88.26         52.10        59.332
00215>       TOTAL RAINFALL   (mm)=       89.06         89.06        89.056
00216>       RUNOFF COEFFICIENT   =         .99           .59          .666
00217>        *** WARNING: Storage Coefficient is smaller than DT!
00218>                    Use a smaller DT or a larger area.
00219>
00220>         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00221>             CN* =  81.0    Ia = Dep. Storage  (Above)
00222>        (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00223>             THAN THE STORAGE COEFFICIENT.
00224>       (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00225>
00226>  ---------------------------------------------------------------------------
00227>  001:0005-----------------------------------------------------------------
00228>  ----------------------
00229>  | DESIGN STANDHYD    |   Area     (ha)=    5.50
00230>  | 03:602     DT= 5.00 |   Total Imp(%)=   50.00   Dir. Conn.(%)=   50.00
00231>  ----------------------
00232>                                 IMPERVIOUS     PERVIOUS (i)
00233>       Surface Area      (ha)=        2.75          2.75
00234>       Dep. Storage      (mm)=         .80          1.50
00235>       Average Slope      (%)=         .50           .50
00236>       Length             (m)=      191.42         40.00
00237>       Mannings n            =        .013          .250
00238>
00239>       Max.eff.Inten.(mm/hr)=      125.48         67.67
00240>                  over (min)         5.00         15.00
00241>       Storage Coeff.  (min)=        4.24 (ii)     16.75 (ii)
00242>       Unit Hyd. Tpeak (min)=        5.00         15.00
00243>       Unit Hyd. peak  (cms)=         .24           .07
00244>                                                          *TOTALS*
00245>       PEAK FLOW       (cms)=         .91           .32         1.155 (iii)
00246>       TIME TO PEAK    (hrs)=       10.58         10.75        10.583
00247>       RUNOFF VOLUME    (mm)=       88.26         52.10        70.179
00248>       TOTAL RAINFALL   (mm)=       89.06         89.06        89.056
00249>       RUNOFF COEFFICIENT   =         .99           .59          .788
00250>        *** WARNING: Storage Coefficient is smaller than DT!
00251>                    Use a smaller DT or a larger area.
00252>
00253>         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
00254>             CN* =  81.0    Ia = Dep. Storage  (Above)
00255>        (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
00256>             THAN THE STORAGE COEFFICIENT.
00257>       (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
00258>
00259>  ---------------------------------------------------------------------------
00260>  001:0006-----------------------------------------------------------------
00261>  --------------------
00262>  | COMPUTE VOLUME   |
00263>  | ID:03  (602    ) |              DISCHARGE       TIME
00264>  --------------------                (cms)         (hrs)
00265>            START CONTROLLING AT       .243        10.251
00266>            INFLOW HYD. PEAKS AT      1.155        10.583
00267>            STOP  CONTROLLING AT       .934        10.624
00268>
00269>            REQUIRED STORAGE VOLUME (ha.m.)=       .0180
00270>            TOTAL HYDROGRAPH VOLUME (ha.m.)=       .3857
```

```
00271>            % OF HYDROGRAPH TO STORE       =   4.6703
00272>
00273>            NOTE:  Storage was computed to reduce the Inflow
00274>                   peak to     .934  (cms).
00275>
00276> --------------------------------------------------------------------------------
00277> 001:0007--------------------------------------------------------------------------
00278>       FINISH
00279> --------------------------------------------------------------------------------
00280> ********************************************************************************
00281>      WARNINGS / ERRORS / NOTES
00282>      -------------------------
00283>  001:0002 DESIGN STANDHYD
00284>       *** WARNING: Storage Coefficient is smaller than DT!
00285>                    Use a smaller DT or a larger area.
00286>  001:0004 DESIGN STANDHYD
00287>       *** WARNING: Storage Coefficient is smaller than DT!
00288>                    Use a smaller DT or a larger area.
00289>  001:0005 DESIGN STANDHYD
00290>       *** WARNING: Storage Coefficient is smaller than DT!
00291>                    Use a smaller DT or a larger area.
00292>    Simulation ended on 2009-05-27     at 16:06:18
00293> ================================================================================
00294>
00295>
```

APPENDIX 'D'

Conceptual Design Figures

- Fig. 1, Glen Williams Pump Station Sanitary Tributary Plan
- Fig. 2, Sanitary Drainage Area Plan
- Fig. 3, General Servicing Plan
- Fig. 4, Proposed Grading Plan
- Fig. 5, Pre-development Storm Drainage Area Plan
- Fig. 6, Post-development Storm Drainage Area Plan



N

LEGEND:

- CONSTRUCTED SHERIDAN DEVELOPMENT
- PROPOSED BAYFIELD DEVELOPMENT
- PROPOSED RINALDI DEVELOPMENT
- PROPOSED DEVINS DEVELOPMENT
- EXISTING DEVELOPMENT

A1 — TRIB. ID
12.33 | 12 — POPULATION / AREA (HA)

- 1200mm DIA. SANITARY MANHOLE
- SANITARY SEWER 200mm DIA. PVC @ 0.50%

REVISION BLOCK		DATE	APPR. BY
1.	SANITARY CAPACITY MEMO	15/06/16	S.N.

PROPOSED BAYFIELD, RINALDI, AND DEVINS RESIDENTIAL SUBDIVISION DEVELOPMENT

Halton — The Regional Municipality of Halton

REGION OF HALTON FILE NO.

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CONDELAND ENGINEERING LIMITED AS TO DESIGN AND SPECIFICATION

DIRECTOR OF DEVELOPMENT/ TRANSPORTATION ENGINEERING
DATE:

CONDELAND ENGINEERING LTD.
Consulting Engineers and Project Managers
85 IRONDALE DRIVE, SUITE 100
NORTH YORK, ON., M9L 2S6
PHONE: (416) 745-0833
FAX: (416) 745-0179

TOWN OF HALTON HILLS
ENGINEERING DEPARTMENT

GLEN WILLIAM PUMP STATION SANITARY TRIBUTARY PLAN

DESIGNED BY: S.N.	DATE: JUNE 2017	CHECKED BY: R.P.D.
DRAWN BY: A.G.	CE FILE	
SCALES 1:5000	FIGURE 1 Sheet: 1 of 1	TOWN FILE

KEY PLAN

Town of Halton Hills
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CONCEPTUAL

0.522 HA / 8 — SANITARY TRIBUTARY AREA (HA) / POPULATION

TRIBUTARY AREA BOUNDARY

REVISION	BLOCK	DATE	APPR. BY

TOWN OF HALTON HILLS

ENGINEERING DEPARTMENT

Halton — The Regional Municipality of Halton

REGION OF HALTON FILE NO.

M.E.HALL — LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO — 7-Sep-17

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DIRECTOR OF DEVELOPMENT/TRANSPORTATION ENGINEERING

DATE: ____________

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Consulting Engineers and Project Managers
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PHONE: (416) 745-0833
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2147925 ONTARIO INC.

SANITARY DRAINAGE AREA PLAN

DESIGNED BY: M.K.N.	DATE: September 2017	CHECKED BY: M.E.H.
DRAWN BY: M.K.N.	FIGURE 2	
SCALES HOR 1:750	Sheet: 1 of 1	TOWN FILE

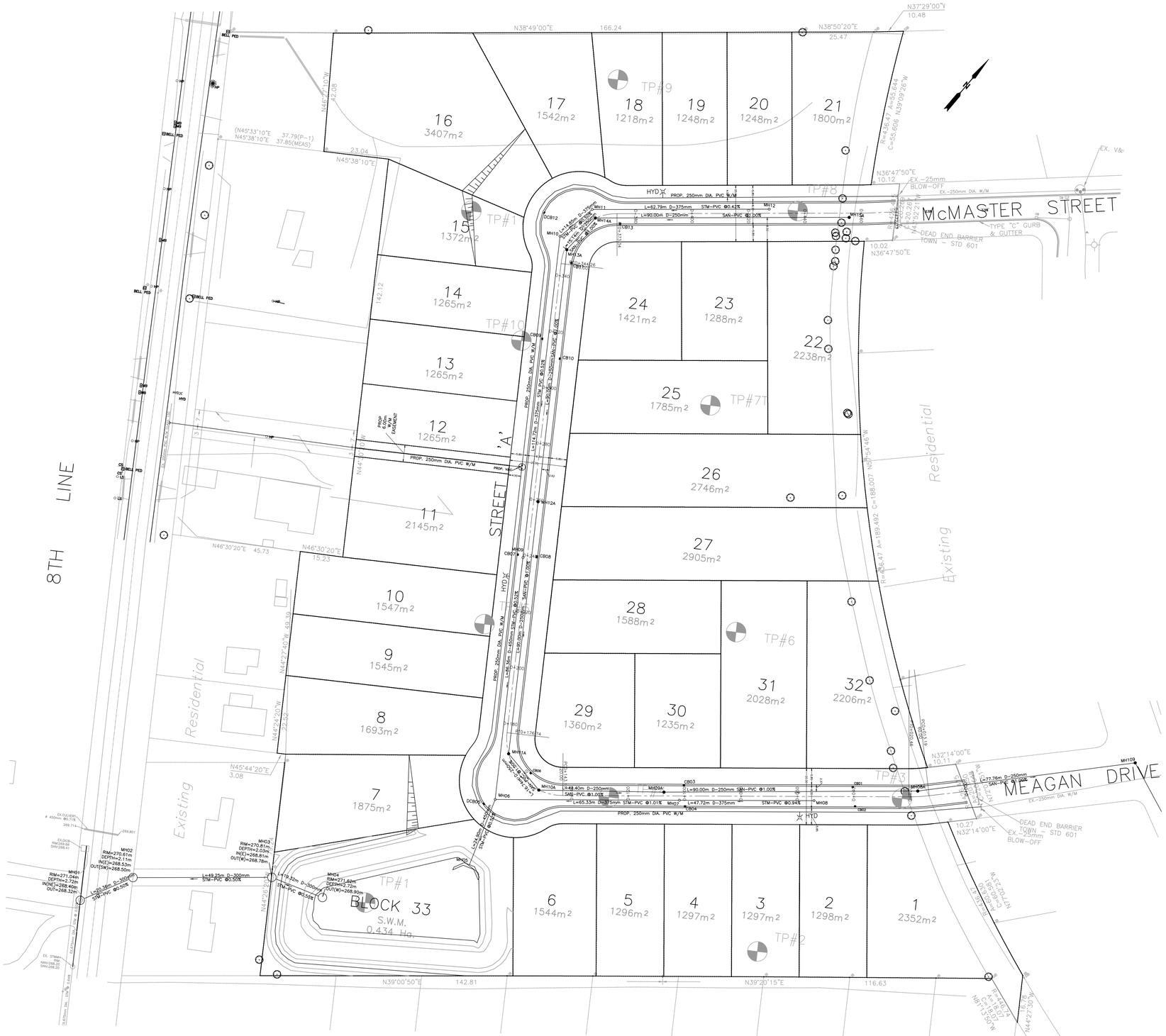
STREET	FROM MH #	TO MH #	NO. OF UNITS	SECTION AREA (ha)	ACCUMULATED AREA (ha)	POPULATION	ACCUMULATED POPULATION	PEAKING FACTOR	PEAK DAY FLOW = (8)(0.003183)(9) (L/s)	INFILTRATION (L/s)	TOTAL FLOW = (10) + (11) (L/s)	PIPE DIAMETER (mm)	TYPE OF PIPE	PIPE LENGTH (m)	SLOPE (%)	FULL FLOW CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	ACTUAL FLOW VELOCITY (m/s)	UPPER END INVERT (m)	UPPER END MH LOSSES (m)	LOWER END INVERT (m)	REMARKS %FULL
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
2147925 ONTARIO INC.																						
STREET "A"	MH15A	MH14A	7	1.241	1.241	25	25	4.37	0.341	0.35	0.696	250	PVC	90.00	1.00%	59.41	1.21		271.900		271.000	1.2%
STREET "A"	MH14A	MH13A	2	0.553	1.794	7	32	4.35	0.436	0.51	0.949	250	PVC	15.14	1.00%	59.41	1.21		270.970	0.03	270.819	1.6%
STREET "A"	MH13A	MH12A	6	1.150	2.944	21	53	4.31	0.720	0.84	1.562	250	PVC	90.00	1.00%	59.41	1.21		270.789	0.03	269.889	2.6%
STREET "A"	MH12A	MH11A	6	1.328	4.272	21	74	4.28	1.001	1.22	2.223	250	PVC	90.00	1.00%	59.41	1.21		269.859	0.03	268.959	3.7%
STREET "A"	MH11A	MH10A	1	0.239	4.511	4	77	4.27	1.047	1.29	2.337	250	PVC	16.74	1.00%	59.41	1.21		268.929	0.03	268.761	3.9%
STREET "A"	MH10A	MH09A	4	0.668	5.179	14	91	4.25	1.232	1.48	2.714	250	PVC	44.40	1.00%	59.41	1.21		268.731	0.03	268.287	4.6%
STREET "A"	MH09A	MH08A	6	1.235	6.414	21	112	4.23	1.508	1.83	3.342	250	PVC	90.00	1.00%	59.41	1.21		268.257	0.03	267.357	5.6%
MEAGAN DRIVE																						
MEAGAN DRIVE	MH08A/MH110A	MH109A	0	0.000	6.414	0	112	4.23	1.508	1.83	3.342	250	PVC	77.76	1.00%	59.41	1.21		267.332	0.025	266.555	5.6%

NOTES:

POPULATION DENSITY (Single Family Residential): New develop.= 55 persons / hectare or 3.5 persons per unit
DESIGN FLOW = 3.183x 10^-3 L/sec per person equivalent to 275 L per day per person
PEAKING FACTOR = $1 + 14/(4+P^{(1/2)})$
WHERE P = POP. IN 1000's
WET WEATHER INFILTRATION 0.286 L/s/ha

Designed by: S.N.
Checked by: M.E.H.
Date: 6-Sep-17

REGION MUNICIPALITY OF HALTON
ENGINEERING AND PUBLIC WORKS DEPARTMENT
SANITARY SEWER DESIGN SHEET
SHEET 1 OF 1



KEY PLAN

Town of Halton Hills

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CONCEPTUAL

REVISION	BLOCK	DATE	APPR. BY

TOWN OF HALTON HILLS

ENGINEERING DEPARTMENT

Halton — The Regional Municipality of Halton

REGION OF HALTON FILE NO.

LICENSED PROFESSIONAL ENGINEER — M.E.HALL — 7-Sep-17 — PROVINCE OF ONTARIO

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CONDELAND ENGINEERING LIMITED AS TO DESIGN AND SPECIFICATION

DIRECTOR OF DEVELOPMENT/ TRANSPORTATION ENGINEERING

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2147925 ONTARIO INC.

GENERAL SERVICING PLAN

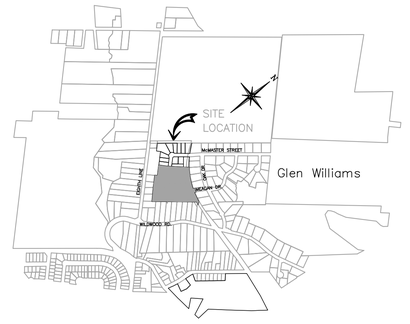
DESIGNED BY: M.K.N.	DATE: September 2017	CHECKED BY: M.E.H.
DRAWN BY: M.K.N.	FIGURE 3	
SCALES HOR 1:750	Sheet: 1 of 1	TOWN FILE

Y:\09015\CAD\SCSW\DRAWINGS\09015 GAU-FIGURE 3.DWG

7 September 2017

09-015-FIG 3

KEY PLAN



Town of Halton Hills

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DIRECTOR OF DEVELOPMENT/ TRANSPORTATION ENGINEERING

DATE: _____

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2147925 ONTARIO INC.

PROPOSED GRADING PLAN

DESIGNED BY: M.K.N.	DATE: September 2017	CHECKED BY: M.E.H.
DRAWN BY: M.K.N.	FIGURE 4	
SCALES HOR 1:750	Sheet: 1 of 1	TOWN FILE

H:\09015\CARLSON\DRAWINGS\09015 GRADING-FIGURE 4.DWG

7 September 2017

09-015-FIG 4

OUTLET 2		OUTLET 1		EXTERNAL
300	301	302	303	304
0.2640 HA	0.2870 HA	1.7310 HA	2.8920 HA	0.2000 HA
1.5390 HA				
0.0530 HA				
1.8560 HA	0.2870 HA	1.7310 HA	2.8920 HA	0.2000 HA

KEY PLAN

Town of Halton Hills
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1.000HA 0.25 STORM TRIBUTARY AREA HA RUNOFF COEFFICIENT
300 SUB CATCHMENT AREA ID.
TRIBUTARY AREA BOUNDARY

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LICENSED PROFESSIONAL ENGINEER M.E.HALL 7-Sep-17 PROVINCE OF ONTARIO

DIRECTOR OF DEVELOPMENT/ TRANSPORTATION ENGINEERING
DATE:

CE CONDELAND ENGINEERING LTD.
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85 IRONDALE DRIVE, SUITE 100 NORTH YORK, ON., M9L 2S6
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2147925 ONTARIO INC.

PRE DEVELOPMENT STORM DRAINAGE AREA PLAN

DESIGNED BY: M.K.N.	DATE: September 2017	CHECKED BY: M.E.H.
DRAWN BY: M.K.N.	FIGURE 5	
SCALES HOR 1:750	Sheet: 1 of 1	TOWN FILE

09-015-FIG 5   7 September 2017

KEY PLAN

Town of Halton Hills

NOT TO SCALE

CONCEPTUAL

TRIBUTARY AREA BOUNDARY

(1.050 HA / 0.5) STORM TRIBUTARY AREA (HA) RUNOFF COEFFICIENT

(600) SUB CATCHMENT AREA ID.

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REGION OF HALTON FILE NO.

LICENSED PROFESSIONAL ENGINEER M.E.HALL 7-Sep-17 PROVINCE OF ONTARIO

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF CONDELAND ENGINEERING LIMITED AS TO DESIGN AND SPECIFICATION

DIRECTOR OF DEVELOPMENT/TRANSPORTATION ENGINEERING

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PHONE: (416) 745-0833
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2147925 ONTARIO INC.

POST DEVELOPMENT STORM DRAINAGE AREA PLAN

DESIGNED BY: M.K.N.	DATE: September 2017	CHECKED BY: M.E.H.
DRAWN BY: M.K.N.	FIGURE 6	TOWN FILE
SCALES HOR 1:750	Sheet: 1 of 1	

Y:\09015\CARLSON\DRAWINGS\09-015-PROP TRIB PLAN-FIGURE 6.DWG 7 September 2017

09-015-FIG 6