TOWN OF MINTO
CLAIR RIDGE ESTATES SUBDVSION DEVELOPMENT
(PALMERSTON), ONTARIO

FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT

JULY 2017

TRITON ENGINEERING SERVICES LIMITED
Consulting Engineers

CLAIR RIDGE ESTATES SUBDIVISION DEVELOPMENT

TOWN OF MINTO (PALMERSTON), ONTARIO

FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT

A6814A

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CLAIR RIDGE ESTATES SUBDIVISION DEVELOPMENT

TOWN OF MINTO (PALMERSTON), ONTARIO

FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT

1.0 INTRODUCTION

The following Functional Servicing Report is prepared in support of a submission for Draft Plan approval of Clair Ridge Estates Subdivision Development in the Town of Minto (Palmerston). This report is intended to demonstrate the functionality of the proposed services including water/sanitary layout and the Stormwater Management (SWM) strategy to mitigate potential impacts of the development on the receiving storm drainage system.

2.0 EXISTING CONDITIONS

The subject site, in the former Town of Palmerston, is located on the east side of Toronto Street and the north side of Grand Trunk Street. The subject property covers approximately 3.286 hectares and is currently zoned for agricultural use.

The overall site slopes from south at Grand Trunk Street to the site boundary east of Toronto Street. The site slopes overland from 1% to 2% and accepts external drainage from the east cropped field. This external area will be directed around the development so as to maintain existing drainage patterns. Figure 1 illustrates existing drainage patterns of the site.

3.0 PROPOSED LAND USE

3.1 General Site Layout

The proposed development consists of 28 detached style lots (2.118ha.), Stormwater Management (SWM) Block (0.263 ha.) and local streets (0.905 ha.). Streets will be an urban standard configuration complete with curb/gutter and storm sewers to collect and convey runoff. The development will be serviced using municipal sewage and water. The proposed subdivision configuration is shown in the plan drawings located in the pocket of this report. The rear yards of an additional three lots fronting Prospect Street (0.114 ha) will be serviced by the subject site's SWM block; refer to Section 5.0 for details.

3.2 Grading/Drainage

Preliminary grading design has been completed to direct as much of the developed site to the SWM block for treatment and peak flow attenuation as possible. Proposed drainage patterns for the site are illustrated on the General Grading Plan located in the pocket of this report.

The street pattern consists of a single looped roadway complete with one entrance. The roads will be sloped such that stormwater directed from the lots onto the street is conveyed to the SWM block located at the northwest corner of the site. Minor events (i.e. up to 5 Year event) will be accommodated by proposed storm sewers, major events up to the 100 Year event will be routed overland through the streets and rear yards swales. All developed road runoff will be directed to the SWM facility.

TOWN OF MINTO

PROPOSED CONSTRUCTION OF CLAIR RIDGE ESTATES (PALMERSTON)

LEGEND:

- 101 / 0.30 — CATCHMENT ID / AREA IN HECTARES
- MAJOR OVERLAND FLOW ROUTE
- 399.50 — EXISTING CONTOUR
- EXISTING STORM SEWER

Figure 1

PRE-DEVELOPMENT CATCHMENT PLAN

N.T.S.
MAY 2017
A6814

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Fergus, Ontario

TOWN OF MINTO

PROPOSED CONSTRUCTION OF CLAIR RIDGE ESTATES (PALMERSTON)

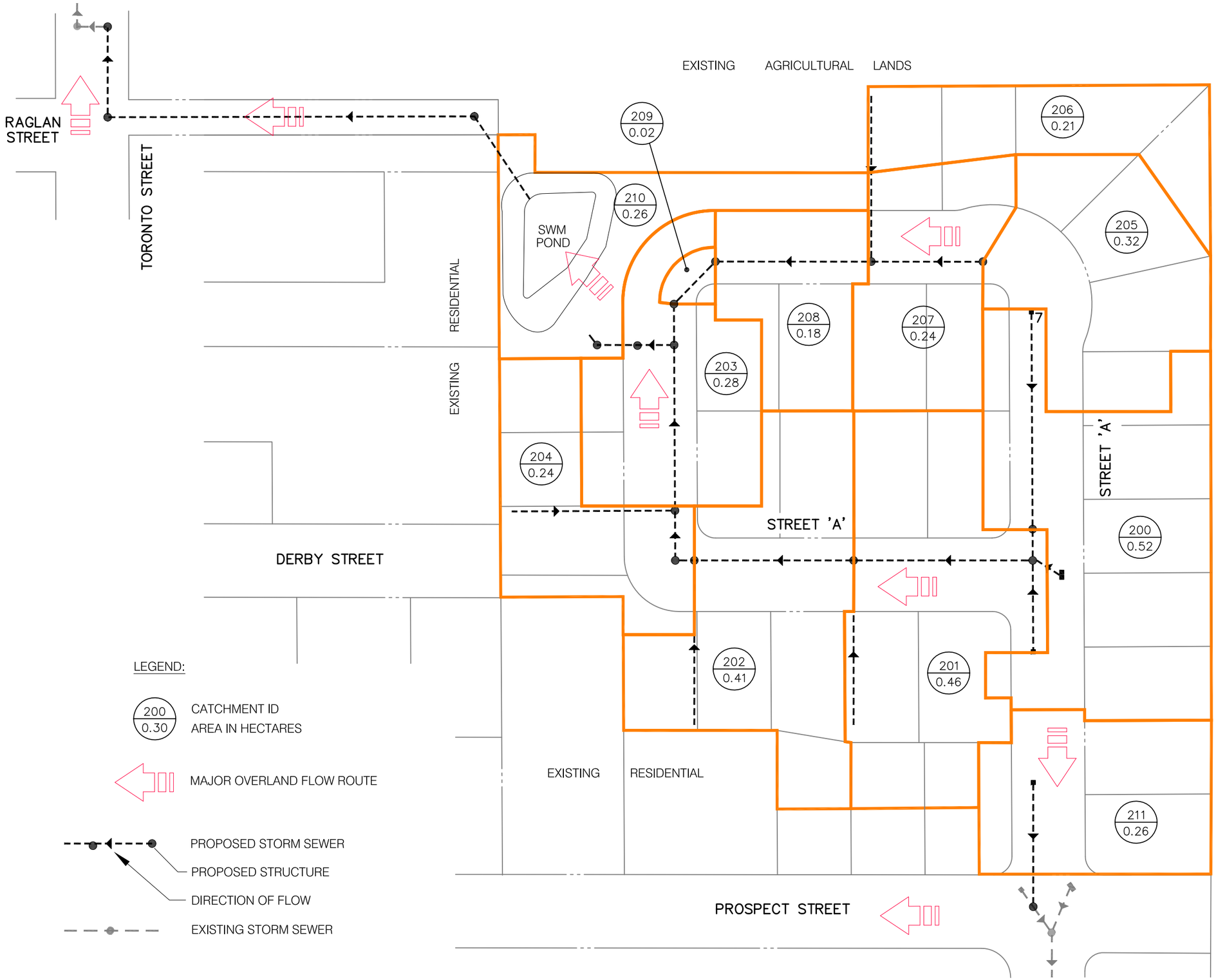

Figure 2

POST-DEVELOPMENT CATCHMENT PLAN

N.T.S.
MAY 2017
A6814

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The SWM facility will provide quantity and quality control of site runoff prior to releasing it to the existing storm sewer system located within the Toronto Street right-of-way.

4.0 DESIGN CRITERIA

It is the intention of this development to have no net impact on the downstream storm drainage system, as such the following SWM criteria are proposed:

- Provide Quantity Control such that peak runoff rates are maintained to less than existing levels for storm events from 5 Year to 100 Year return periods.

- Provide Quality Control of site runoff to ensure that sediment and pollutants are removed to the extent feasible prior to release into the existing storm sewer system. Ministry of the Environment “Basic Protection” treatment level will be used for this in the design of this SWM facility.

- Ensure that SWM facility bottom elevation is set above the high water table within the designated SWM Block 29 in order to prevent groundwater intrusion.

- Provide measures during construction which will contain sediment on the site.

5.0 STORMWATER MANAGEMENT STRATEGY

The portion of the development which conveys run-off to the SWM facility is 3.14 hectares in size and includes all catchments with the exception of 211, as indicated on Figure 2. Roads complete with storm sewers and curb/gutter will collect and convey runoff to the SWM block located at the north-western corner of the development.

External drainage to the east will be intercepted by the development’s east rear lots and directed naturally to the north and south so as to maintain existing drainage patterns. As mentioned previous, the rear of three additional lots fronting Prospect Street (House numbers 685 , 695, and 705) will be included as part of the contributing area to the SWM facility. Drainage from these lots will be conveyed via rear yard swales to the storm sewer system.

A summary of the SWM strategy is provided below:

- Site grading will maintain runoff characteristics to the extent possible.

- Roof leaders will be directed to grass areas to promote infiltration and polishing.

- Quantity Control will be provided using an “end-of pipe” dry pond facility located in a Block 29 designated specifically for SWM purposes. This facility will be designed to provide “Post-to-Pre” hydrograph attenuation for storm events from 5 Year to 100 Year return periods.

- Quality Control requirement is assumed to be “Basic” Protection given that the receiver is an existing storm sewer system. Based on this, we propose to provide a SWM facility with a Dry Pond configuration, this facility will be incorporated into the Quantity Control facility. It should be noted that providing a Wet Pond or Wetland configuration is not recommended for this development as the contributing area is likely too small to support/maintain a permanent pool.

- Provide sediment and erosion controls which will contain sediment on site during construction.

The proposed SWM strategy will be implemented in conformance with the Ministry of Environment and Climate Change and the Maitland Valley Conservation Authority's SWM Guidelines.

5.1 Runoff Modelling

Preliminary design of the SWM facility is necessary as part of the Draft Plan submission to confirm that the size of the proposed SWM block is sufficient to accommodate the required SWM facilities. The MIDUSS computer model was used to generate runoff flows and assist in hydraulic design of sewers, channels and SWM facilities.

A pre-development model was prepared to establish original runoff flows from the site. This model reflects the land use prior to development.

A post development model was prepared to establish runoff flows for the proposed development. This model reflects the post development land use and grading, and includes provisions for the proposed Dry Pond.

The post development model has been discretized into smaller catchments to allow for detailed design of sewers, overland flow routes and the SWM facility. The difference in overall flows generated from the detailed model is shown in Table 1, below.

Appendix A provides rainfall data and catchment characteristic parameters. Hydrologic model output has been included in Appendix C.

Rainfall events were generated using rainfall data from the Mount Forest Weather Station and the 3.0 hour Chicago rainfall distribution.

5.2 Quantity Control

As discussed earlier, the increase in peak flows resulting from this development are expected to be significant due to the increase in imperviousness. However, as indicated by the modelling, the proposed SWM facility will provide sufficient storage such that peak flows from the 100 Year event can be attenuated to existing levels. In addition to controlling major events, the outlet structure will be configured such that infrequent and intermediate runoff events can also be attenuated to existing levels. The facility configuration is as follows:

- Dimensions at 100 Year level are irregular, approximately 38 m x 45 m.
- Maximum depth of 1.3 m.
- Three stage outlet utilizing an orifice control, CSP pipe and an overflow weir.
- Maximum Storage is approximately 963 m^3.

The General Grading Plan provides a layout of the proposed SWM facility within Block 29.

Results of the hydrologic modelling are summarized in Table 1. This demonstrates that the proposed facility can control peak flow rates to levels below existing, thereby, mitigating any potential impacts on the existing downstream storm system.

Table 1: Modelling Summary					
DESCRIPTION	RUNOFF (m^3/s)				
	5 YEAR	10 YEAR	25 YEAR	50 YEAR	100 YEAR
Site Runoff Peak: Pre-Development	0.062	0.082	0.136	0.177	0.216
Site Runoff Peak: Post Development	0.032	0.036	0.068	0.123	0.119
SWM Facility WSEL (m)	402.152	402.191	402.245	402.319	402.364
SWM Facility Storage Volume Utilized (m^3)	563.80	598.90	649.10	720.80	765.5

During major storm events exceeding the 100 year storm, flows will overtop the pond at an elevation of 402.45 metres via a 2.0 metre wide weir structure and conveyed overland to Toronto Street roadway via 0.30 metre deep ditch. The ditches capacity exceeds the 100 year storm event and ditch capacity calculations are found in Appendix B.

5.3 Quality Control

As indicated, Basic Level (as defined by the MOECC Guidelines) water quality treatment of storm runoff from the proposed development will be provided by a continuous flow Dry Pond SWM facility.

Although, other facility configurations (i.e. artificial wetland/wetpond) could provide similar or better treatment, the small size of the contributing area may not be sufficient to maintain the permanent pool of such a facility.

Based on the total contributing area of 3.40 ha and imperviousness of 41%, a storage volume requirement of 108 m^3/ha is applicable which equates to 367 m^3 of required storage volume. This storage requirement will be accommodated within the Quantity Control facility and the outlet structure configured to provide the minimum desired detention time based on the use of the minimum 75 millimetre orifice. For pond maintenance purposes, a forebay will be constructed just upstream of the pond inlet in order to remove larger sediment before entering the pond thus, lessening the impact on the pond facility and control structure. SWM design details are contained in Appendix B.

6.0 SEDIMENT AND EROSION CONTROL

Prior to stripping topsoil from the site, silt fence will be erected around the entire perimeter of the site to contain sediment laden runoff on-site. Following rough grading of the site and construction of the storm sewer system, additional controls will be installed to ensure that sediment is contained and erosion minimized. Controls will include the following:

- Cut-off swales
- Filter berms
- Silt fencing
- Straw bale checks
- Sedimentation basin

A detailed Sediment and Erosion Control Drawing/Design will be completed as part of detailed design once grading details for the development have been finalized.

It is intended to utilize the proposed SWM facility as a sediment basin until the site has been stabilized.

Controls will be monitored regularly by the resident inspector and maintained, or modified, as required.

7.0 SERVICING

At this time, 28 lots have been allocated to this development which is expected to generate 5,180 l/d. Therefore, a review of water and sewage servicing options is required as part of the provincial policy statement. Servicing options considered for this development will include extension of municipal services to the proposed area. All roads and services will meet the municipal standards criteria set out by the Town of Minto.

7.1 Municipal Water Services

The water services for the proposed development will be connected and looped to the existing 150 mm diameter watermain located at the intersection of Prospect Street and Street A and the Derby Street right-of-way and Toronto Street intersection. Based on a Reserve Capacity Calculation for Water Supply, determined by the Town of Minto, there is currently approximately 45,695 l/d available within Palmerston. Therefore, there is sufficient water capacity for the addition of the proposed development.

7.2 Municipal Sanitary Services

The sewer was configured through the proposed development so as to align with the proposed road configuration. Similar to the watermain extensions, sanitary services will connect at the intersection of Prospect Street and Street A and the Derby Street right-of-way and Toronto Street intersection. Based on a Reserve Capacity Calculation for Water Supply, determined by the Town of Minto, there is currently approximately 45,695 l/d available within Palmerston. Therefore, there is sufficient sewage treatment capacity for the addition of the proposed development.

8.0 CONCLUSIONS

Based on the information contained in this report, we conclude the following:

- Proposed quality treatment measures will provide adequate treatment of runoff from the development, thereby, mitigating any potential negative impacts to the existing downstream sewer and drainage system.
- Preliminary design indicates that the SWM facility footprint can be accommodated within Block 29.
- Erosion will be minimized and sediment contained on site through the installation of controls as outlined within this report.
- There is adequate Sanitary and Water Reserve Capacities to accommodate the proposed development.

TRITON ENGINEERING SERVICES LIMITED

Chris Clark, M.A.Sc, P.Eng.

Appendix A

Input Parameters

Hydrologic Modelling Parameters			
Catchment I.D.	Area	% Imp.	SCS CN
Pre - Development Conditions			
101	3.10	0	78
102	0.30	0	78
Post Development Conditions			
200	0.52	43	78
201	0.46	48	78
202	0.41	42	78
203	0.28	52	78
204	0.24	30	78
205	0.32	39	78
206	0.21	5	78
207	0.24	51	78
208	0.18	45	78
209	0.02	80	78
210	0.26	38	78
211	0.26	40	78

Design Storm Parameters				
Design Storm	a	b	c	Duration (hrs)
5 - Year	955.420	7.820	0.807	3
10 - Year	1122.53	9.189	0.817	3
25 - Year	1387.380	9.697	0.820	3
50 - Year	1644.39	11.085	0.829	3
100 - Year	1720.730	10.674	0.822	3

Appendix B

SWM Design Details

Clair Ridge Estates Subdivision

SWM Facility Design Calculations

Dry Pond SWM Facility Forebay Design

NOTE: Orange numbers can be adjusted. All other numbers update automatically

OUTFLOW DESIGN

Control Flow Rate @ (m)	1.2	Flow =	0.0132	m^3/s

DESIGN

To Solve	Distance	L:W Ratio	Qp (m^3/s)	Vs
Distance	*9.38083*	2.00	0.0132	0.0003
Ratio	9.3808	*2.00*	0.0132	0.0003
Flow Rate (Qp)	14.154	4.55	*0.013209*	0.0003

RESULTS:

Forebay Length	**9.3808**
Forebay Width	**4.6904**

CHECKS

Dist	Inlet Flow Rate (Q) (m/s	Depth of Forebay	Desired Velocity in Fore
14.1538	1.38	1.56	0.5

Deep Zone Bottom Widtl	Dist
1.77	14.1538

Clair Ridge Estates Subdivision

SWM Facility Design Calculations

Dry Pond SWM Facility Stage-Storage-Discharge Relationship

Rating Curve			Volume Estimation				Drawdown	
Elevation (m)	Discharge (m^3/s)	Act. Storage (m^3)	Elevation (m)	Depth (1) (m)	Volume (m^3) Increment	Volume (m^3) Accumulated	Increment	Accumulated hours
401.25	0.0000	0.00	401.25	0.000	0	0.00	0	0
401.35	0.0037	27.30	401.35	0.100	27	27.30	4.08	4.084
401.45	0.0053	76.40	401.45	0.200	49	76.40	3.04	7.127
401.55	0.0064	130.20	401.55	0.300	54	130.20	2.56	9.685
401.65	0.0074	188.90	401.65	0.400	59	188.90	2.35	12.038
401.75	0.0083	252.70	401.75	0.500	64	252.70	2.25	14.292
401.85	0.0091	321.70	401.85	0.600	69	321.70	2.20	16.495
401.95	0.0098	396.10	401.95	0.700	74	396.10	2.18	18.679
402.05	0.0105	476.10	402.05	0.800	80	476.10	2.19	20.866
402.15	0.0111	561.70	402.15	0.900	86	561.70	2.20	23.063
402.25	0.0650	653.20	402.25	1.000	92	653.20	0.67	23.731
402.35	0.1371	750.70	402.35	1.100	98	750.70	0.27	23.999
402.45	0.1433	854.30	402.45	1.200	104	854.30	0.21	24.204
402.55	0.4554	963.00	402.55	1.300	109	963.00	0.10	24.305

Calculation of Overflow Weir			Pipe and DICB Outlet Flow						
Elevation (m)	Weir (m^3/s)	Total Weir FLOW (m^3/s)	Elevation (m)	Orifice (m^3/s)	DICB (m^3/s)	Pipe (m^3/s)	Total (m^3/s)	Parameters	
401.25	0.000	0.000	401.25	0.0000	0.000	0.0000	0.0000	Bottom Pond	401.250
401.35	0.000	0.000	401.35	**0.0037**	0.000	0.0077	**0.0037**	Orifice Elev (m)	401.250
401.45	0.000	0.000	401.45	**0.0053**	0.000	0.0282	**0.0053**	Orifice dia (mm)	75.000
401.55	0.000	0.000	401.55	**0.0064**	0.000	0.0579	**0.0064**	Orifice Coef	0.600
401.65	0.000	0.000	401.65	**0.0074**	0.000	0.0857	**0.0074**		
401.75	0.000	0.000	401.75	**0.0083**	0.000	0.0933	**0.0083**	Pipe Invert Elev (m)	401.250
401.85	0.000	0.000	401.85	**0.0091**	0.000	0.1014	**0.0091**	Pipe dia. (mm)	300.000
401.95	0.000	0.000	401.95	**0.0098**	0.000	0.1093	**0.0098**		
402.05	0.000	0.000	402.05	**0.0105**	0.000	0.1167	**0.0105**	DICB Top Elev	402.350
402.15	0.000	0.000	402.15	**0.0111**	0.000	0.1238	**0.0111**	DICB Invert Elev (6:1)	402.200
402.25	0.000	0.000	402.25	**0.0117**	**0.053**	0.1306	**0.0650**	Weir Coeff.	0.601
402.35	0.000	0.000	402.35	0.0123	0.1597	**0.1371**	**0.1371**	Weir Width (m)	0.600
402.45	0.000	0.000	402.45	0.0129	0.2662	**0.1433**	**0.1433**		
402.55	0.306	**0.306**	402.55	0.0134	0.373	**0.1493**	**0.4554**	Overflow Weir Elev	402.450
								Weir Coeff.	1.670
								Weir Width (m)	2.000
								Weir Side Slope (x:1)	50.000
								* CONTROL STRUCTURE	

pipe rating curve from CVM

HW Elev.	Discharge (m³/s)
401.25	0
401.35	0.0077
401.45	0.0282
401.55	0.0579
401.65	0.0857
401.75	0.0933
401.85	0.1014
401.95	0.1093
402.05	0.1167
402.15	0.1238
402.25	0.1306
402.35	0.1371
402.45	0.1433
402.55	0.1493

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"        0.040   Manning 'n'"
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"        3.000   Left bank slope"
"        3.000   Right bank slope"
"        0.300   Channel depth    metre"
"        1.600   Gradient   %"
"             Depth of flow                0.299    metre"
"             Velocity                     0.859    m/sec"
"             Channel capacity             0.233    c.m/sec"
"             Critical depth               0.260    metre"
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Appendix C

Modelling Output

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"     180.000   Max. Storm length"
"    1500.000   Max. Hydrograph"
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"           1   Chicago storm"
"     955.420   Coefficient A"
"       7.820   Constant B"
"       0.807   Exponent C"
"       0.400   Fraction R"
"     180.000   Duration"
"       1.000   Time step multiplier"
"            Maximum intensity          121.935    mm/hr"
"            Total depth                 41.919    mm"
"           6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         101   No description"
"       0.000   % Impervious"
"       0.300   Total Area"
"      45.000   Flow length"
"       1.200   Overland Slope"
"       0.300   Pervious Area"
"      45.000   Pervious length"
"       1.200   Pervious slope"
"       0.000   Impervious Area"
"      45.000   Impervious length"
"       1.200   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.271   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.878   Impervious Runoff coefficient"
"       0.100   Impervious Ia/S coefficient"
"       0.518   Impervious Initial abstraction"
"                    0.008     0.000     0.000     0.000 c.m/sec"
"            Catchment 101          Pervious   Impervious Total Area "
"            Surface Area           0.300      0.000      0.300      hectare"
"            Time of concentration  29.229     3.118      29.229     minutes"
"            Time to Centroid       137.510    92.193     137.510    minutes"
"            Rainfall depth         41.919     41.919     41.919     mm"
"            Rainfall volume        125.76     0.00       125.76     c.m"
"            Rainfall losses        30.571     5.733      30.571     mm"
"            Runoff depth           11.347     36.185     11.347     mm"
"            Runoff volume          34.04      0.00       34.04      c.m"
"            Runoff coefficient     0.271      0.878      0.271      "
"            Maximum flow           0.008      0.000      0.008      c.m/sec"
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"        3.100   Total Area"
"       90.000   Flow length"
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"        0.518   Impervious Initial abstraction"
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"             Time of concentration  44.303     4.726      44.303     minutes"
"             Time to Centroid       156.604    94.585     156.604    minutes"
"             Rainfall depth         41.919     41.919     41.919     mm"
"             Rainfall volume        1299.47    0.00       1299.47    c.m"
"             Rainfall losses        30.572     5.436      30.572     mm"
"             Runoff depth           11.346     36.483     11.346     mm"
"             Runoff volume          351.74     0.00       351.74     c.m"
"             Runoff coefficient     0.271      0.878      0.271      "
"             Maximum flow           0.062      0.000      0.062      c.m/sec"
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"            1   Chicago storm"
"     1122.530   Coefficient A"
"        9.189   Constant B"
"        0.817   Exponent C"
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"        0.300   Total Area"
"       45.000   Flow length"
"        1.200   Overland Slope"
"        0.300   Pervious Area"
"       45.000   Pervious length"
"        1.200   Pervious slope"
"        0.000   Impervious Area"
"       45.000   Impervious length"
"        1.200   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.299   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.888   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.011     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.300      0.000      0.300      hectare"
"             Time of concentration  27.199     3.043      27.199     minutes"
"             Time to Centroid       134.058    91.764     134.058    minutes"
"             Rainfall depth         46.364     46.364     46.364     mm"
"             Rainfall volume        139.09     0.00       139.09     c.m"
"             Rainfall losses        32.506     5.878      32.506     mm"
"             Runoff depth           13.858     40.486     13.858     mm"
"             Runoff volume          41.58      0.00       41.58      c.m"
"             Runoff coefficient     0.299      0.888      0.299      "
"             Maximum flow           0.011      0.000      0.011      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
```

```
"            4   Add Runoff "
"                    0.011     0.011     0.000     0.000"
" 33          CATCHMENT 102"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          102   No description"
"        0.000   % Impervious"
"        3.100   Total Area"
"       90.000   Flow length"
"        1.200   Overland Slope"
"        3.100   Pervious Area"
"       90.000   Pervious length"
"        1.200   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.200   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.299   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.888   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.082     0.011     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           3.100      0.000      3.100      hectare"
"             Time of concentration  41.226     4.613      41.226     minutes"
"             Time to Centroid       151.750    94.049     151.750    minutes"
"             Rainfall depth         46.364     46.364     46.364     mm"
"             Rainfall volume        1437.29    0.00       1437.30    c.m"
"             Rainfall losses        32.509     5.523      32.509     mm"
"             Runoff depth           13.856     40.841     13.856     mm"
"             Runoff volume          429.52     0.00       429.53     c.m"
"             Runoff coefficient     0.299      0.888      0.299      "
"             Maximum flow           0.082      0.000      0.082      c.m/sec"
```

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"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                              Version 2.07  rev. 385"
"                MIDUSS created                                      August-08-05"
"           10   Units used:                                          ie METRIC"
"                Job folder:                                 O:\Private Development\"
"                A6814A - Sinclair Subdivision\Design\Storm\SWM\MIDUSS FEB 2016"
"                Output filename:                             A6814A_Pre_25yr_v2.out"
"                Licensee name:                                                CPC"
"                Company                          Triton Engineering Services Ltd."
"                Date & Time last used:                  11/07/2017 at 2:36:54 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1387.380   Coefficient A"
"        9.697   Constant B"
"        0.820   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          153.133    mm/hr"
"             Total depth                 56.404    mm"
"            6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          101   No description"
"        0.000   % Impervious"
"        0.300   Total Area"
"       45.000   Flow length"
"        1.200   Overland Slope"
"        0.300   Pervious Area"
"       45.000   Pervious length"
"        1.200   Pervious slope"
"        0.000   Impervious Area"
"       45.000   Impervious length"
"        1.200   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.356   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.907   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.017     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.300      0.000      0.300      hectare"
"             Time of concentration  23.201     2.821      23.201     minutes"
"             Time to Centroid       128.189    90.930     128.189    minutes"
"             Rainfall depth         56.404     56.404     56.404     mm"
"             Rainfall volume        169.21     0.00       169.21     c.m"
"             Rainfall losses        36.361     6.283      36.361     mm"
"             Runoff depth           20.042     50.120     20.042     mm"
"             Runoff volume          60.13      0.00       60.13      c.m"
"             Runoff coefficient     0.356      0.907      0.356      "
"             Maximum flow           0.017      0.000      0.017      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
```

```
"            4   Add Runoff "
"                    0.017     0.017     0.000     0.000"
" 33          CATCHMENT 102"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          102   No description"
"        0.000   % Impervious"
"        3.100   Total Area"
"       90.000   Flow length"
"        1.200   Overland Slope"
"        3.100   Pervious Area"
"       90.000   Pervious length"
"        1.200   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.200   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.356   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.907   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.136     0.017     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           3.100      0.000      3.100      hectare"
"             Time of concentration  35.166     4.276      35.166     minutes"
"             Time to Centroid       143.517    93.072     143.517    minutes"
"             Rainfall depth         56.404     56.404     56.404     mm"
"             Rainfall volume        1748.51    0.00       1748.51    c.m"
"             Rainfall losses        36.358     5.773      36.358     mm"
"             Runoff depth           20.045     50.631     20.045     mm"
"             Runoff volume          621.40     0.00       621.40     c.m"
"             Runoff coefficient     0.356      0.907      0.356      "
"             Maximum flow           0.136      0.000      0.136      c.m/sec"
```

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"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                              Version 2.07  rev. 385"
"                MIDUSS created                                      August-08-05"
"           10   Units used:                                          ie METRIC"
"                Job folder:                                 O:\Private Development\"
"                A6814A - Sinclair Subdivision\Design\Storm\SWM\MIDUSS FEB 2016"
"                Output filename:                             A6814A_50yr_Pre_v2.out"
"                Licensee name:                                                CPC"
"                Company                          Triton Engineering Services Ltd."
"                Date & Time last used:                  11/07/2017 at 2:49:39 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1644.390   Coefficient A"
"       11.085   Constant B"
"        0.829   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          164.255    mm/hr"
"             Total depth                 63.286    mm"
"            6   050hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          101   No description"
"        0.000   % Impervious"
"        0.300   Total Area"
"       45.000   Flow length"
"        1.200   Overland Slope"
"        0.300   Pervious Area"
"       45.000   Pervious length"
"        1.200   Pervious slope"
"        0.000   Impervious Area"
"       45.000   Impervious length"
"        1.200   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.390   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.916   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.023     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.300      0.000      0.300      hectare"
"             Time of concentration  21.565     2.736      21.564     minutes"
"             Time to Centroid       125.357    90.516     125.357    minutes"
"             Rainfall depth         63.286     63.286     63.286     mm"
"             Rainfall volume        189.86     0.00       189.86     c.m"
"             Rainfall losses        38.651     6.499      38.651     mm"
"             Runoff depth           24.635     56.787     24.635     mm"
"             Runoff volume          73.90      0.00       73.90      c.m"
"             Runoff coefficient     0.390      0.916      0.390      "
"             Maximum flow           0.023      0.000      0.023      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
```

```
"            4   Add Runoff "
"                    0.023     0.023     0.000     0.000"
" 33          CATCHMENT 102"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          102   No description"
"        0.000   % Impervious"
"        3.100   Total Area"
"       90.000   Flow length"
"        1.200   Overland Slope"
"        3.100   Pervious Area"
"       90.000   Pervious length"
"        1.200   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.200   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.390   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.916   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.177     0.023     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           3.100      0.000      3.100      hectare"
"             Time of concentration  32.686     4.147      32.686     minutes"
"             Time to Centroid       139.551    92.552     139.551    minutes"
"             Rainfall depth         63.286     63.286     63.286     mm"
"             Rainfall volume        1961.85    0.00       1961.85    c.m"
"             Rainfall losses        38.645     5.921      38.645     mm"
"             Runoff depth           24.641     57.365     24.641     mm"
"             Runoff volume          763.86     0.00       763.86     c.m"
"             Runoff coefficient     0.390      0.916      0.390      "
"             Maximum flow           0.177      0.000      0.177      c.m/sec"
```

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"                MIDUSS version                              Version 2.07  rev. 385"
"                MIDUSS created                                      August-08-05"
"           10   Units used:                                          ie METRIC"
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"                A6814A - Sinclair Subdivision\Design\Storm\SWM\MIDUSS FEB 2016"
"                Output filename:                            A6814A_Pre_100yr_v2.out"
"                Licensee name:                                                CPC"
"                Company                          Triton Engineering Services Ltd."
"                Date & Time last used:                  11/07/2017 at 2:54:28 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1780.100   Coefficient A"
"       11.090   Constant B"
"        0.828   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          178.409    mm/hr"
"             Total depth                 68.976    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          101   No description"
"        0.000   % Impervious"
"        0.300   Total Area"
"       45.000   Flow length"
"        1.200   Overland Slope"
"        0.300   Pervious Area"
"       45.000   Pervious length"
"        1.200   Pervious slope"
"        0.000   Impervious Area"
"       45.000   Impervious length"
"        1.200   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.415   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.923   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.028     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.300      0.000      0.300      hectare"
"             Time of concentration  20.217     2.643      20.217     minutes"
"             Time to Centroid       123.325    90.197     123.325    minutes"
"             Rainfall depth         68.976     68.976     68.976     mm"
"             Rainfall volume        206.93     0.00       206.93     c.m"
"             Rainfall losses        40.371     6.635      40.371     mm"
"             Runoff depth           28.605     62.342     28.605     mm"
"             Runoff volume          85.82      0.00       85.82      c.m"
"             Runoff coefficient     0.415      0.923      0.415      "
"             Maximum flow           0.028      0.000      0.028      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
```

```
"            4   Add Runoff "
"                    0.028     0.028     0.000     0.000"
" 33          CATCHMENT 102"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          102   No description"
"        0.000   % Impervious"
"        3.100   Total Area"
"       90.000   Flow length"
"        1.200   Overland Slope"
"        3.100   Pervious Area"
"       90.000   Pervious length"
"        1.200   Pervious slope"
"        0.000   Impervious Area"
"       90.000   Impervious length"
"        1.200   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.415   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.923   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.216     0.028     0.000     0.000 c.m/sec"
"             Catchment 102          Pervious   Impervious Total Area "
"             Surface Area           3.100      0.000      3.100      hectare"
"             Time of concentration  30.644     4.006      30.644     minutes"
"             Time to Centroid       136.728    92.194     136.728    minutes"
"             Rainfall depth         68.976     68.976     68.976     mm"
"             Rainfall volume        2138.27    0.00       2138.27    c.m"
"             Rainfall losses        40.358     6.124      40.358     mm"
"             Runoff depth           28.618     62.852     28.618     mm"
"             Runoff volume          887.17     0.00       887.17     c.m"
"             Runoff coefficient     0.415      0.923      0.415      "
"             Maximum flow           0.216      0.000      0.216      c.m/sec"
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"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                              Version 2.07  rev. 385"
"                MIDUSS created                                      August-08-05"
"           10   Units used:                                          ie METRIC"
"                Job folder:                                 O:\Private Development\"
"               A6814A - Sinclair Subdivision\Design\Storm\SWM\MIDUSS JULY 2017"
"                Output filename:          A6814A_5yr_Pond_100mm orifice_v3a.out"
"                Licensee name:                                              CPC"
"                Company                        Triton Engineering Services Ltd."
"                Date & Time last used:                 20/07/2017 at 2:43:26 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"      955.420   Coefficient A"
"        7.820   Constant B"
"        0.807   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           121.935    mm/hr"
"             Total depth                  41.919    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 200"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          200   No description"
"       43.000   % Impervious"
"        0.520   Total Area"
"       55.000   Flow length"
"        1.000   Overland Slope"
"        0.296   Pervious Area"
"       55.000   Pervious length"
"        1.000   Pervious slope"
"        0.224   Impervious Area"
"       55.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.271   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.878   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.055     0.000     0.000     0.000 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           0.296      0.224      0.520      hectare"
"             Time of concentration  34.823     3.714      12.863     minutes"
"             Time to Centroid       144.598    93.157     108.286    minutes"
"             Rainfall depth         41.919     41.919     41.919     mm"
"             Rainfall volume        124.25     93.73      217.98     c.m"
"             Rainfall losses        30.573     5.821      19.930     mm"
"             Runoff depth           11.345     36.098     21.989     mm"
"             Runoff volume          33.63      80.71      114.34     c.m"
"             Runoff coefficient     0.271      0.878      0.532      "
"             Maximum flow           0.007      0.053      0.055      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
```

```
"             4   Add Runoff "
"                     0.055     0.055     0.000     0.000"
" 33           CATCHMENT 201"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           201   No description"
"        48.000   % Impervious"
"         0.460   Total Area"
"        56.000   Flow length"
"         0.600   Overland Slope"
"         0.239   Pervious Area"
"        56.000   Pervious length"
"         0.600   Pervious slope"
"         0.221   Impervious Area"
"        56.000   Impervious length"
"         0.600   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        78.000   Pervious SCS Curve No."
"         0.271   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         7.164   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
"        98.000   Impervious SCS Curve No."
"         0.878   Impervious Runoff coefficient"
"         0.100   Impervious Ia/S coefficient"
"         0.518   Impervious Initial abstraction"
"                     0.055     0.055     0.000     0.000 c.m/sec"
"              Catchment 201          Pervious   Impervious Total Area "
"              Surface Area           0.239      0.221      0.460      hectare"
"              Time of concentration  41.031     4.377      13.621     minutes"
"              Time to Centroid       152.462    94.072     108.798    minutes"
"              Rainfall depth         41.919     41.919     41.919     mm"
"              Rainfall volume        100.27     92.56      192.83     c.m"
"              Rainfall losses        30.573     5.474      18.526     mm"
"              Runoff depth           11.346     36.444     23.393     mm"
"              Runoff volume          27.14      80.47      107.61     c.m"
"              Runoff coefficient     0.271      0.878      0.562      "
"              Maximum flow           0.005      0.054      0.055      c.m/sec"
" 40           HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                     0.055     0.110     0.000     0.000"
" 33           CATCHMENT 202"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           202   No description"
"        42.000   % Impervious"
"         0.410   Total Area"
"        54.000   Flow length"
"         0.600   Overland Slope"
"         0.238   Pervious Area"
"        54.000   Pervious length"
"         0.600   Pervious slope"
"         0.172   Impervious Area"
"        54.000   Impervious length"
"         0.600   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        78.000   Pervious SCS Curve No."
"         0.271   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         7.164   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
```

```
"       98.000   Impervious SCS Curve No."
"        0.878   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.043     0.110     0.000     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.238      0.172      0.410      hectare"
"             Time of concentration  40.145     4.282      15.072     minutes"
"             Time to Centroid       151.336    93.929     111.201    minutes"
"             Rainfall depth         41.919     41.919     41.919     mm"
"             Rainfall volume        99.68      72.18      171.87     c.m"
"             Rainfall losses        30.568     5.495      20.038     mm"
"             Runoff depth           11.350     36.423     21.881     mm"
"             Runoff volume          26.99      62.72      89.71      c.m"
"             Runoff coefficient     0.271      0.878      0.526      "
"             Maximum flow           0.005      0.042      0.043      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.043     0.153     0.000     0.000"
" 33          CATCHMENT 204"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         204   No description"
"       30.000   % Impervious"
"        0.240   Total Area"
"       35.000   Flow length"
"        2.000   Overland Slope"
"        0.168   Pervious Area"
"       35.000   Pervious length"
"        2.000   Pervious slope"
"        0.072   Impervious Area"
"       35.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.271   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.878   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.019     0.153     0.000     0.000 c.m/sec"
"             Catchment 204          Pervious   Impervious Total Area "
"             Surface Area           0.168      0.072      0.240      hectare"
"             Time of concentration  21.566     2.300      10.436     minutes"
"             Time to Centroid       127.807    90.931     106.504    minutes"
"             Rainfall depth         41.919     41.919     41.919     mm"
"             Rainfall volume        70.42      30.18      100.60     c.m"
"             Rainfall losses        30.574     5.706      23.113     mm"
"             Runoff depth           11.345     36.212     18.805     mm"
"             Runoff volume          19.06      26.07      45.13      c.m"
"             Runoff coefficient     0.271      0.878      0.453      "
"             Maximum flow           0.006      0.018      0.019      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.019     0.170     0.000     0.000"
" 33          CATCHMENT 203"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
```

```
"          203   No description"
"       52.000   % Impervious"
"        0.280   Total Area"
"       47.000   Flow length"
"        0.800   Overland Slope"
"        0.134   Pervious Area"
"       47.000   Pervious length"
"        0.800   Pervious slope"
"        0.146   Impervious Area"
"       47.000   Impervious length"
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.271   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.878   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                0.035     0.170     0.000     0.000 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.134      0.146      0.280      hectare"
"             Time of concentration  33.883     3.614      10.430     minutes"
"             Time to Centroid       143.401    93.009     104.357    minutes"
"             Rainfall depth         41.919     41.919     41.919     mm"
"             Rainfall volume        56.34      61.03      117.37     c.m"
"             Rainfall losses        30.569     5.874      17.728     mm"
"             Runoff depth           11.349     36.045     24.191     mm"
"             Runoff volume          15.25      52.48      67.73      c.m"
"             Runoff coefficient     0.271      0.878      0.586      "
"             Maximum flow           0.003      0.035      0.035      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                0.035     0.205     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                0.035     0.205     0.205     0.000"
" 40          HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               "
"             Maximum flow                  0.205    c.m/sec"
"             Hydrograph volume           424.528    c.m"
"                0.035     0.205     0.205     0.205"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                0.035     0.000     0.205     0.205"
" 33          CATCHMENT 205"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         205   No description"
"       39.000   % Impervious"
"        0.320   Total Area"
"       74.000   Flow length"
"        0.800   Overland Slope"
"        0.195   Pervious Area"
"       74.000   Pervious length"
"        0.800   Pervious slope"
"        0.125   Impervious Area"
"       74.000   Impervious length"
```

```
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.271   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.878   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.031     0.000     0.205     0.205 c.m/sec"
"             Catchment 205          Pervious   Impervious Total Area "
"             Surface Area           0.195      0.125      0.320      hectare"
"             Time of concentration  44.489     4.745      17.752     minutes"
"             Time to Centroid       156.839    94.614     114.978    minutes"
"             Rainfall depth         41.919     41.919     41.919     mm"
"             Rainfall volume        81.82      52.31      134.14     c.m"
"             Rainfall losses        30.571     5.432      20.767     mm"
"             Runoff depth           11.348     36.487     21.152     mm"
"             Runoff volume          22.15      45.54      67.69      c.m"
"             Runoff coefficient     0.271      0.878      0.508      "
"             Maximum flow           0.004      0.031      0.031      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.031     0.031     0.205     0.205"
" 33          CATCHMENT 206"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          206   No description"
"        5.000   % Impervious"
"        0.210   Total Area"
"       12.000   Flow length"
"        2.000   Overland Slope"
"        0.199   Pervious Area"
"       12.000   Pervious length"
"        2.000   Pervious slope"
"        0.010   Impervious Area"
"       12.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.271   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.878   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.010     0.031     0.205     0.205 c.m/sec"
"             Catchment 206          Pervious   Impervious Total Area "
"             Surface Area           0.199      0.010      0.210      hectare"
"             Time of concentration  11.346     1.210      9.894      minutes"
"             Time to Centroid       114.856    89.236     111.185    minutes"
"             Rainfall depth         41.919     41.919     41.919     mm"
"             Rainfall volume        83.63      4.40       88.03      c.m"
"             Rainfall losses        30.602     5.952      29.369     mm"
"             Runoff depth           11.317     35.966     12.549     mm"
"             Runoff volume          22.58      3.78       26.35      c.m"
"             Runoff coefficient     0.271      0.878      0.301      "
"             Maximum flow           0.009      0.003      0.010      c.m/sec"
```

```
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.010     0.040     0.205     0.205"
" 33          CATCHMENT 207"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          207   No description"
"       51.000   % Impervious"
"        0.240   Total Area"
"       71.000   Flow length"
"        0.800   Overland Slope"
"        0.118   Pervious Area"
"       71.000   Pervious length"
"        0.800   Pervious slope"
"        0.122   Impervious Area"
"       71.000   Impervious length"
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.271   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.878   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.030     0.040     0.205     0.205 c.m/sec"
"             Catchment 207          Pervious   Impervious Total Area "
"             Surface Area           0.118      0.122      0.240      hectare"
"             Time of concentration  43.398     4.629      13.555     minutes"
"             Time to Centroid       155.455    94.447     108.493    minutes"
"             Rainfall depth         41.919     41.919     41.919     mm"
"             Rainfall volume        49.30      51.31      100.60     c.m"
"             Rainfall losses        30.569     5.460      17.763     mm"
"             Runoff depth           11.349     36.459     24.155     mm"
"             Runoff volume          13.35      44.63      57.97      c.m"
"             Runoff coefficient     0.271      0.878      0.580      "
"             Maximum flow           0.002      0.030      0.030      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.030     0.070     0.205     0.205"
" 33          CATCHMENT 208"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          208   No description"
"       45.000   % Impervious"
"        0.180   Total Area"
"       45.000   Flow length"
"        0.800   Overland Slope"
"        0.099   Pervious Area"
"       45.000   Pervious length"
"        0.800   Pervious slope"
"        0.081   Impervious Area"
"       45.000   Impervious length"
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.271   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
```

```
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.878   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.020     0.070     0.205     0.205 c.m/sec"
"             Catchment 208          Pervious   Impervious Total Area "
"             Surface Area           0.099      0.081      0.180      hectare"
"             Time of concentration  33.010     3.521      11.709     minutes"
"             Time to Centroid       142.299    92.850     106.581    minutes"
"             Rainfall depth         41.919     41.919     41.919     mm"
"             Rainfall volume        41.50      33.95      75.45      c.m"
"             Rainfall losses        30.571     5.840      19.442     mm"
"             Runoff depth           11.348     36.078     22.476     mm"
"             Runoff volume          11.23      29.22      40.46      c.m"
"             Runoff coefficient     0.271      0.878      0.544      "
"             Maximum flow           0.002      0.019      0.020      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.020     0.090     0.205     0.205"
" 33          CATCHMENT 209"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          209   No description"
"       80.000   % Impervious"
"        0.020   Total Area"
"       10.000   Flow length"
"        0.500   Overland Slope"
"        0.004   Pervious Area"
"       10.000   Pervious length"
"        0.500   Pervious slope"
"        0.016   Impervious Area"
"       10.000   Impervious length"
"        0.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.271   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.878   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.004     0.090     0.205     0.205 c.m/sec"
"             Catchment 209          Pervious   Impervious Total Area "
"             Surface Area           0.004      0.016      0.020      hectare"
"             Time of concentration  15.415     1.644      2.643      minutes"
"             Time to Centroid       120.021    89.838     92.027     minutes"
"             Rainfall depth         41.919     41.919     41.919     mm"
"             Rainfall volume        1.68       6.71       8.38       c.m"
"             Rainfall losses        30.578     5.665      10.647     mm"
"             Runoff depth           11.341     36.254     31.271     mm"
"             Runoff volume          0.45       5.80       6.25       c.m"
"             Runoff coefficient     0.271      0.878      0.756      "
"             Maximum flow           0.000      0.004      0.004      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.004     0.093     0.205     0.205"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.004     0.093     0.093     0.205"
```

```
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                "
"             Maximum flow                  0.298    c.m/sec"
"             Hydrograph volume           623.252    c.m"
"                     0.004     0.093     0.093     0.298"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.004     0.000     0.093     0.298"
" 33          CATCHMENT 210"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          210   No description"
"       38.000   % Impervious"
"        0.260   Total Area"
"       22.000   Flow length"
"        0.500   Overland Slope"
"        0.161   Pervious Area"
"       22.000   Pervious length"
"        0.500   Pervious slope"
"        0.099   Impervious Area"
"       22.000   Impervious length"
"        0.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.271   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.878   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.025     0.000     0.093     0.298 c.m/sec"
"             Catchment 210          Pervious   Impervious Total Area "
"             Surface Area           0.161      0.099      0.260      hectare"
"             Time of concentration  24.740     2.639      10.130     minutes"
"             Time to Centroid       131.832    91.459     105.142    minutes"
"             Rainfall depth         41.919     41.919     41.919     mm"
"             Rainfall volume        67.57      41.42      108.99     c.m"
"             Rainfall losses        30.575     5.819      21.168     mm"
"             Runoff depth           11.343     36.099     20.750     mm"
"             Runoff volume          18.29      35.67      53.95      c.m"
"             Runoff coefficient     0.271      0.878      0.501      "
"             Maximum flow           0.005      0.024      0.025      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.025     0.025     0.093     0.298"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.025     0.025     0.025     0.298"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                "
"             Maximum flow                  0.321    c.m/sec"
"             Hydrograph volume           677.203    c.m"
"                     0.025     0.025     0.025     0.321"
" 40          HYDROGRAPH   Confluence    1"
"            7   Confluence "
"            1   Node #"
```

```
"               "
"             Maximum flow                  0.321    c.m/sec"
"             Hydrograph volume           677.203    c.m"
"                    0.025     0.321     0.025     0.000"
" 54          POND DESIGN"
"        0.321   Current peak flow    c.m/sec"
"        0.233   Target outflow    c.m/sec"
"        678.0   Hydrograph volume    c.m"
"          14.   Number of stages"
"      401.250   Minimum water level    metre"
"      402.550   Maximum water level    metre"
"      401.250   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                401.250     0.000       0.0"
"                401.350     0.004      27.3"
"                401.450     0.005      76.4"
"                401.550     0.006     130.2"
"                401.650     0.007     188.9"
"                401.750     0.008     252.7"
"                401.850     0.009     321.7"
"                401.950     0.010     396.1"
"                402.050     0.010     476.1"
"                402.150     0.011     561.7"
"                402.250     0.065     653.2"
"                402.350     0.137     750.7"
"                402.450     0.143     854.3"
"                402.550     0.455     963.0"
"             Peak outflow                  0.012    c.m/sec"
"             Maximum level               402.152    metre"
"             Maximum storage             563.758    c.m"
"             Centroidal lag               11.048   hours"
"                  0.025     0.321     0.012     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               "
"             Maximum flow                  0.012    c.m/sec"
"             Hydrograph volume           666.129    c.m"
"                    0.025     0.321     0.012     0.012"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.025     0.000     0.012     0.012"
" 33          CATCHMENT 211"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         211   No description"
"       40.000   % Impervious"
"        0.260   Total Area"
"       47.000   Flow length"
"        2.500   Overland Slope"
"        0.156   Pervious Area"
"       47.000   Pervious length"
"        2.500   Pervious slope"
"        0.104   Impervious Area"
"       47.000   Impervious length"
"        2.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.271   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
```

```
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.878   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.026     0.000     0.012     0.012 c.m/sec"
"             Catchment 211          Pervious   Impervious Total Area "
"             Surface Area           0.156      0.104      0.260      hectare"
"             Time of concentration  24.072     2.568      9.457      minutes"
"             Time to Centroid       130.977    91.344     104.041    minutes"
"             Rainfall depth         41.919     41.919     41.919     mm"
"             Rainfall volume        65.39      43.60      108.99     c.m"
"             Rainfall losses        30.570     5.807      20.665     mm"
"             Runoff depth           11.348     36.112     21.254     mm"
"             Runoff volume          17.70      37.56      55.26      c.m"
"             Runoff coefficient     0.271      0.878      0.514      "
"             Maximum flow           0.005      0.026      0.026      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.026     0.026     0.012     0.012"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.026     0.026     0.026     0.012"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                "
"             Maximum flow                 0.032    c.m/sec"
"             Hydrograph volume          721.389    c.m"
"                    0.026     0.026     0.026     0.032"
" 40          HYDROGRAPH   Confluence    2"
"            7   Confluence "
"            2   Node #"
"                "
"             Maximum flow                 0.032    c.m/sec"
"             Hydrograph volume          721.389    c.m"
"                    0.026     0.032     0.026     0.000"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                              Version 2.07  rev. 385"
"                MIDUSS created                                      August-08-05"
"           10   Units used:                                          ie METRIC"
"                Job folder:                                 O:\Private Development\"
"               A6814A - Sinclair Subdivision\Design\Storm\SWM\MIDUSS JULY 2017"
"                Output filename:        A6814A_10yr_Pond_100mm orifice_v3a.out"
"                Licensee name:                                              CPC"
"                Company                        Triton Engineering Services Ltd."
"                Date & Time last used:                 20/07/2017 at 3:06:43 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1122.530   Coefficient A"
"        9.189   Constant B"
"        0.817   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           128.544    mm/hr"
"             Total depth                  46.462    mm"
"            6   010hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 200"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          200   No description"
"       43.000   % Impervious"
"        0.520   Total Area"
"       55.000   Flow length"
"        1.000   Overland Slope"
"        0.296   Pervious Area"
"       55.000   Pervious length"
"        1.000   Pervious slope"
"        0.224   Impervious Area"
"       55.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.300   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.889   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.059     0.000     0.000     0.000 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           0.296      0.224      0.520      hectare"
"             Time of concentration  32.357     3.624      12.624     minutes"
"             Time to Centroid       140.584    92.683     107.687    minutes"
"             Rainfall depth         46.462     46.462     46.462     mm"
"             Rainfall volume        137.71     103.89     241.60     c.m"
"             Rainfall losses        32.549     6.024      21.143     mm"
"             Runoff depth           13.913     40.438     25.319     mm"
"             Runoff volume          41.24      90.42      131.66     c.m"
"             Runoff coefficient     0.300      0.889      0.553      "
"             Maximum flow           0.009      0.057      0.059      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
```

```
"             4   Add Runoff "
"                     0.059     0.059     0.000     0.000"
" 33           CATCHMENT 201"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           201   No description"
"        48.000   % Impervious"
"         0.460   Total Area"
"        56.000   Flow length"
"         0.600   Overland Slope"
"         0.239   Pervious Area"
"        56.000   Pervious length"
"         0.600   Pervious slope"
"         0.221   Impervious Area"
"        56.000   Impervious length"
"         0.600   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        78.000   Pervious SCS Curve No."
"         0.300   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         7.164   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
"        98.000   Impervious SCS Curve No."
"         0.889   Impervious Runoff coefficient"
"         0.100   Impervious Ia/S coefficient"
"         0.518   Impervious Initial abstraction"
"                     0.060     0.059     0.000     0.000 c.m/sec"
"              Catchment 201          Pervious   Impervious Total Area "
"              Surface Area           0.239      0.221      0.460      hectare"
"              Time of concentration  38.126     4.270      13.390     minutes"
"              Time to Centroid       147.852    93.563     108.188    minutes"
"              Rainfall depth         46.462     46.462     46.462     mm"
"              Rainfall volume        111.14     102.59     213.72     c.m"
"              Rainfall losses        32.549     5.585      19.606     mm"
"              Runoff depth           13.913     40.876     26.855     mm"
"              Runoff volume          33.28      90.26      123.53     c.m"
"              Runoff coefficient     0.300      0.889      0.582      "
"              Maximum flow           0.007      0.058      0.060      c.m/sec"
" 40           HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                     0.060     0.119     0.000     0.000"
" 33           CATCHMENT 202"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           202   No description"
"        42.000   % Impervious"
"         0.410   Total Area"
"        54.000   Flow length"
"         0.600   Overland Slope"
"         0.238   Pervious Area"
"        54.000   Pervious length"
"         0.600   Pervious slope"
"         0.172   Impervious Area"
"        54.000   Impervious length"
"         0.600   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        78.000   Pervious SCS Curve No."
"         0.300   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         7.164   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
```

```
"       98.000   Impervious SCS Curve No."
"        0.889   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.047     0.119     0.000     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.238      0.172      0.410      hectare"
"             Time of concentration  37.303     4.178      14.781     minutes"
"             Time to Centroid       146.812    93.440     110.523    minutes"
"             Rainfall depth         46.462     46.462     46.462     mm"
"             Rainfall volume        110.49     80.01      190.49     c.m"
"             Rainfall losses        32.546     5.642      21.246     mm"
"             Runoff depth           13.916     40.819     25.215     mm"
"             Runoff volume          33.09      70.29      103.38     c.m"
"             Runoff coefficient     0.300      0.889      0.547      "
"             Maximum flow           0.007      0.045      0.047      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.047     0.166     0.000     0.000"
" 33          CATCHMENT 204"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         204   No description"
"       30.000   % Impervious"
"        0.240   Total Area"
"       35.000   Flow length"
"        2.000   Overland Slope"
"        0.168   Pervious Area"
"       35.000   Pervious length"
"        2.000   Pervious slope"
"        0.072   Impervious Area"
"       35.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.300   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.889   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.021     0.166     0.000     0.000 c.m/sec"
"             Catchment 204          Pervious   Impervious Total Area "
"             Surface Area           0.168      0.072      0.240      hectare"
"             Time of concentration  20.040     2.244      10.145     minutes"
"             Time to Centroid       125.053    90.534     105.859    minutes"
"             Rainfall depth         46.462     46.462     46.462     mm"
"             Rainfall volume        78.06      33.45      111.51     c.m"
"             Rainfall losses        32.557     5.824      24.537     mm"
"             Runoff depth           13.905     40.637     21.925     mm"
"             Runoff volume          23.36      29.26      52.62      c.m"
"             Runoff coefficient     0.300      0.889      0.476      "
"             Maximum flow           0.007      0.020      0.021      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.021     0.185     0.000     0.000"
" 33          CATCHMENT 203"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
```

```
"          203   No description"
"       52.000   % Impervious"
"        0.280   Total Area"
"       47.000   Flow length"
"        0.800   Overland Slope"
"        0.134   Pervious Area"
"       47.000   Pervious length"
"        0.800   Pervious slope"
"        0.146   Impervious Area"
"       47.000   Impervious length"
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.300   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.889   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                0.038     0.185     0.000     0.000 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.134      0.146      0.280      hectare"
"             Time of concentration  31.484     3.526      10.261     minutes"
"             Time to Centroid       139.482    92.527     103.839    minutes"
"             Rainfall depth         46.462     46.462     46.462     mm"
"             Rainfall volume        62.44      67.65      130.09     c.m"
"             Rainfall losses        32.550     5.999      18.744     mm"
"             Runoff depth           13.911     40.462     27.718     mm"
"             Runoff volume          18.70      58.91      77.61      c.m"
"             Runoff coefficient     0.300      0.889      0.606      "
"             Maximum flow           0.004      0.037      0.038      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                0.038     0.223     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                0.038     0.223     0.223     0.000"
" 40          HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               "
"             Maximum flow                 0.223    c.m/sec"
"             Hydrograph volume          488.804    c.m"
"                0.038     0.223     0.223     0.223"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                0.038     0.000     0.223     0.223"
" 33          CATCHMENT 205"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         205   No description"
"       39.000   % Impervious"
"        0.320   Total Area"
"       74.000   Flow length"
"        0.800   Overland Slope"
"        0.195   Pervious Area"
"       74.000   Pervious length"
"        0.800   Pervious slope"
"        0.125   Impervious Area"
"       74.000   Impervious length"
```

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"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.300   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.889   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.034     0.000     0.223     0.223 c.m/sec"
"             Catchment 205          Pervious   Impervious Total Area "
"             Surface Area           0.195      0.125      0.320      hectare"
"             Time of concentration  41.340     4.630      17.371     minutes"
"             Time to Centroid       151.908    94.079     114.150    minutes"
"             Rainfall depth         46.462     46.462     46.462     mm"
"             Rainfall volume        90.69      57.98      148.68     c.m"
"             Rainfall losses        32.549     5.525      22.010     mm"
"             Runoff depth           13.913     40.937     24.452     mm"
"             Runoff volume          27.16      51.09      78.25      c.m"
"             Runoff coefficient     0.300      0.889      0.529      "
"             Maximum flow           0.005      0.033      0.034      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.034     0.034     0.223     0.223"
" 33          CATCHMENT 206"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          206   No description"
"        5.000   % Impervious"
"        0.210   Total Area"
"       12.000   Flow length"
"        2.000   Overland Slope"
"        0.199   Pervious Area"
"       12.000   Pervious length"
"        2.000   Pervious slope"
"        0.010   Impervious Area"
"       12.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.300   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.889   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.013     0.034     0.223     0.223 c.m/sec"
"             Catchment 206          Pervious   Impervious Total Area "
"             Surface Area           0.199      0.010      0.210      hectare"
"             Time of concentration  10.543     1.181      9.301      minutes"
"             Time to Centroid       113.081    88.888     109.873    minutes"
"             Rainfall depth         46.462     46.462     46.462     mm"
"             Rainfall volume        92.69      4.88       97.57      c.m"
"             Rainfall losses        32.580     6.141      31.258     mm"
"             Runoff depth           13.881     40.320     15.203     mm"
"             Runoff volume          27.69      4.23       31.93      c.m"
"             Runoff coefficient     0.300      0.889      0.329      "
"             Maximum flow           0.012      0.003      0.013      c.m/sec"
```

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" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.013     0.045     0.223     0.223"
" 33          CATCHMENT 207"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          207   No description"
"       51.000   % Impervious"
"        0.240   Total Area"
"       71.000   Flow length"
"        0.800   Overland Slope"
"        0.118   Pervious Area"
"       71.000   Pervious length"
"        0.800   Pervious slope"
"        0.122   Impervious Area"
"       71.000   Impervious length"
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.300   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.889   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.033     0.045     0.223     0.223 c.m/sec"
"             Catchment 207          Pervious   Impervious Total Area "
"             Surface Area           0.118      0.122      0.240      hectare"
"             Time of concentration  40.326     4.516      13.332     minutes"
"             Time to Centroid       150.626    93.915     107.876    minutes"
"             Rainfall depth         46.462     46.462     46.462     mm"
"             Rainfall volume        54.64      56.87      111.51     c.m"
"             Rainfall losses        32.544     5.519      18.761     mm"
"             Runoff depth           13.918     40.943     27.701     mm"
"             Runoff volume          16.37      50.11      66.48      c.m"
"             Runoff coefficient     0.300      0.889      0.600      "
"             Maximum flow           0.003      0.032      0.033      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.033     0.078     0.223     0.223"
" 33          CATCHMENT 208"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          208   No description"
"       45.000   % Impervious"
"        0.180   Total Area"
"       45.000   Flow length"
"        0.800   Overland Slope"
"        0.099   Pervious Area"
"       45.000   Pervious length"
"        0.800   Pervious slope"
"        0.081   Impervious Area"
"       45.000   Impervious length"
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.300   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
```

```
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.889   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.021     0.078     0.223     0.223 c.m/sec"
"             Catchment 208          Pervious   Impervious Total Area "
"             Surface Area           0.099      0.081      0.180      hectare"
"             Time of concentration  30.673     3.435      11.488     minutes"
"             Time to Centroid       138.455    92.384     106.005    minutes"
"             Rainfall depth         46.462     46.462     46.462     mm"
"             Rainfall volume        46.00      37.63      83.63      c.m"
"             Rainfall losses        32.551     5.956      20.583     mm"
"             Runoff depth           13.911     40.505     25.878     mm"
"             Runoff volume          13.77      32.81      46.58      c.m"
"             Runoff coefficient     0.300      0.889      0.565      "
"             Maximum flow           0.003      0.020      0.021      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.021     0.100     0.223     0.223"
" 33          CATCHMENT 209"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          209   No description"
"       80.000   % Impervious"
"        0.020   Total Area"
"       10.000   Flow length"
"        0.500   Overland Slope"
"        0.004   Pervious Area"
"       10.000   Pervious length"
"        0.500   Pervious slope"
"        0.016   Impervious Area"
"       10.000   Impervious length"
"        0.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.300   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.889   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.005     0.100     0.223     0.223 c.m/sec"
"             Catchment 209          Pervious   Impervious Total Area "
"             Surface Area           0.004      0.016      0.020      hectare"
"             Time of concentration  14.324     1.604      2.604      minutes"
"             Time to Centroid       117.862    89.513     91.742     minutes"
"             Rainfall depth         46.462     46.462     46.462     mm"
"             Rainfall volume        1.86       7.43       9.29       c.m"
"             Rainfall losses        32.574     5.766      11.127     mm"
"             Runoff depth           13.888     40.696     35.334     mm"
"             Runoff volume          0.56       6.51       7.07       c.m"
"             Runoff coefficient     0.300      0.889      0.771      "
"             Maximum flow           0.000      0.005      0.005      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.005     0.103     0.223     0.223"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.005     0.103     0.103     0.223"
```

```
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                "
"             Maximum flow                  0.326    c.m/sec"
"             Hydrograph volume           719.108    c.m"
"                     0.005     0.103     0.103     0.326"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.005     0.000     0.103     0.326"
" 33          CATCHMENT 210"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          210   No description"
"       38.000   % Impervious"
"        0.260   Total Area"
"       22.000   Flow length"
"        0.500   Overland Slope"
"        0.161   Pervious Area"
"       22.000   Pervious length"
"        0.500   Pervious slope"
"        0.099   Impervious Area"
"       22.000   Impervious length"
"        0.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.300   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.889   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.027     0.000     0.103     0.326 c.m/sec"
"             Catchment 210          Pervious   Impervious Total Area "
"             Surface Area           0.161      0.099      0.260      hectare"
"             Time of concentration  22.989     2.575      9.907      minutes"
"             Time to Centroid       128.775    91.056     104.603    minutes"
"             Rainfall depth         46.462     46.462     46.462     mm"
"             Rainfall volume        74.90      45.90      120.80     c.m"
"             Rainfall losses        32.555     5.978      22.456     mm"
"             Runoff depth           13.906     40.484     24.006     mm"
"             Runoff volume          22.42      40.00      62.41      c.m"
"             Runoff coefficient     0.300      0.889      0.523      "
"             Maximum flow           0.006      0.026      0.027      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.027     0.027     0.103     0.326"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.027     0.027     0.027     0.326"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                "
"             Maximum flow                  0.351    c.m/sec"
"             Hydrograph volume           781.522    c.m"
"                     0.027     0.027     0.027     0.351"
" 40          HYDROGRAPH   Confluence    1"
"            7   Confluence "
"            1   Node #"
```

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"               "
"             Maximum flow                  0.351    c.m/sec"
"             Hydrograph volume           781.522    c.m"
"                    0.027     0.351     0.027     0.000"
" 54          POND DESIGN"
"         0.351   Current peak flow    c.m/sec"
"         0.233   Target outflow    c.m/sec"
"         782.0   Hydrograph volume    c.m"
"           14.   Number of stages"
"       401.250   Minimum water level    metre"
"       402.550   Maximum water level    metre"
"       401.250   Starting water level    metre"
"             0   Keep Design Data: 1 = True; 0 = False"
"                   Level Discharge    Volume"
"                 401.250     0.000       0.0"
"                 401.350     0.004      27.3"
"                 401.450     0.005      76.4"
"                 401.550     0.006     130.2"
"                 401.650     0.007     188.9"
"                 401.750     0.008     252.7"
"                 401.850     0.009     321.7"
"                 401.950     0.010     396.1"
"                 402.050     0.010     476.1"
"                 402.150     0.011     561.7"
"                 402.250     0.065     653.2"
"                 402.350     0.137     750.7"
"                 402.450     0.143     854.3"
"                 402.550     0.455     963.0"
"             Peak outflow                  0.033    c.m/sec"
"             Maximum level               402.191    metre"
"             Maximum storage             598.883    c.m"
"             Centroidal lag               10.130   hours"
"                  0.027     0.351     0.033     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                "
"             Maximum flow                  0.033    c.m/sec"
"             Hydrograph volume           769.090    c.m"
"                    0.027     0.351     0.033     0.033"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.027     0.000     0.033     0.033"
" 33          CATCHMENT 211"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          211   No description"
"        40.000   % Impervious"
"         0.260   Total Area"
"        47.000   Flow length"
"         2.500   Overland Slope"
"         0.156   Pervious Area"
"        47.000   Pervious length"
"         2.500   Pervious slope"
"         0.104   Impervious Area"
"        47.000   Impervious length"
"         2.500   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        78.000   Pervious SCS Curve No."
"         0.300   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         7.164   Pervious Initial abstraction"
```

```
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.889   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.028     0.000     0.033     0.033 c.m/sec"
"             Catchment 211          Pervious   Impervious Total Area "
"             Surface Area           0.156      0.104      0.260      hectare"
"             Time of concentration  22.368     2.505      9.250      minutes"
"             Time to Centroid       127.993    90.935     103.520    minutes"
"             Rainfall depth         46.462     46.462     46.462     mm"
"             Rainfall volume        72.48      48.32      120.80     c.m"
"             Rainfall losses        32.572     5.944      21.921     mm"
"             Runoff depth           13.890     40.517     24.541     mm"
"             Runoff volume          21.67      42.14      63.81      c.m"
"             Runoff coefficient     0.300      0.889      0.535      "
"             Maximum flow           0.006      0.028      0.028      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.028     0.028     0.033     0.033"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.028     0.028     0.028     0.033"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                "
"             Maximum flow                 0.036    c.m/sec"
"             Hydrograph volume          832.895    c.m"
"                    0.028     0.028     0.028     0.036"
" 40          HYDROGRAPH   Confluence    2"
"            7   Confluence "
"            2   Node #"
"                "
"             Maximum flow                 0.036    c.m/sec"
"             Hydrograph volume          832.895    c.m"
"                    0.028     0.036     0.028     0.000"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                              Version 2.07  rev. 385"
"                MIDUSS created                                      August-08-05"
"           10   Units used:                                          ie METRIC"
"                Job folder:                                 O:\Private Development\"
"               A6814A - Sinclair Subdivision\Design\Storm\SWM\MIDUSS JULY 2017"
"                Output filename:        A6814A_25yr_Pond_100mm orifice_v3a.out"
"                Licensee name:                                              CPC"
"                Company                        Triton Engineering Services Ltd."
"                Date & Time last used:                 20/07/2017 at 3:04:09 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1387.380   Coefficient A"
"        9.697   Constant B"
"        0.820   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           153.133    mm/hr"
"             Total depth                  56.404    mm"
"            6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 200"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          200   No description"
"       43.000   % Impervious"
"        0.520   Total Area"
"       55.000   Flow length"
"        1.000   Overland Slope"
"        0.296   Pervious Area"
"       55.000   Pervious length"
"        1.000   Pervious slope"
"        0.224   Impervious Area"
"       55.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.356   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.907   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.073     0.000     0.000     0.000 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           0.296      0.224      0.520      hectare"
"             Time of concentration  27.641     3.361      11.760     minutes"
"             Time to Centroid       133.871    91.740     106.315    minutes"
"             Rainfall depth         56.404     56.404     56.404     mm"
"             Rainfall volume        167.18     126.12     293.30     c.m"
"             Rainfall losses        36.361     6.173      23.380     mm"
"             Runoff depth           20.042     50.231     33.023     mm"
"             Runoff volume          59.41      112.32     171.72     c.m"
"             Runoff coefficient     0.356      0.907      0.593      "
"             Maximum flow           0.015      0.068      0.073      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
```

```
"             4   Add Runoff "
"                     0.073     0.073     0.000     0.000"
" 33           CATCHMENT 201"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           201   No description"
"        48.000   % Impervious"
"         0.460   Total Area"
"        56.000   Flow length"
"         0.600   Overland Slope"
"         0.239   Pervious Area"
"        56.000   Pervious length"
"         0.600   Pervious slope"
"         0.221   Impervious Area"
"        56.000   Impervious length"
"         0.600   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        78.000   Pervious SCS Curve No."
"         0.356   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         7.164   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
"        98.000   Impervious SCS Curve No."
"         0.907   Impervious Runoff coefficient"
"         0.100   Impervious Ia/S coefficient"
"         0.518   Impervious Initial abstraction"
"                     0.072     0.073     0.000     0.000 c.m/sec"
"              Catchment 201          Pervious   Impervious Total Area "
"              Surface Area           0.239      0.221      0.460      hectare"
"              Time of concentration  32.569     3.960      12.568     minutes"
"              Time to Centroid       140.191    92.609     106.927    minutes"
"              Rainfall depth         56.404     56.404     56.404     mm"
"              Rainfall volume        134.92     124.54     259.46     c.m"
"              Rainfall losses        36.356     5.947      21.759     mm"
"              Runoff depth           20.048     50.457     34.644     mm"
"              Runoff volume          47.95      111.41     159.36     c.m"
"              Runoff coefficient     0.356      0.907      0.620      "
"              Maximum flow           0.011      0.070      0.072      c.m/sec"
" 40           HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                     0.072     0.145     0.000     0.000"
" 33           CATCHMENT 202"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           202   No description"
"        42.000   % Impervious"
"         0.410   Total Area"
"        54.000   Flow length"
"         0.600   Overland Slope"
"         0.238   Pervious Area"
"        54.000   Pervious length"
"         0.600   Pervious slope"
"         0.172   Impervious Area"
"        54.000   Impervious length"
"         0.600   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        78.000   Pervious SCS Curve No."
"         0.356   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         7.164   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
```

```
"       98.000   Impervious SCS Curve No."
"        0.907   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.057     0.145     0.000     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.238      0.172      0.410      hectare"
"             Time of concentration  31.866     3.874      13.797     minutes"
"             Time to Centroid       139.284    92.509     109.091    minutes"
"             Rainfall depth         56.404     56.404     56.404     mm"
"             Rainfall volume        134.13     97.13      231.25     c.m"
"             Rainfall losses        36.366     6.019      23.620     mm"
"             Runoff depth           20.038     50.385     32.784     mm"
"             Runoff volume          47.65      86.76      134.41     c.m"
"             Runoff coefficient     0.356      0.907      0.587      "
"             Maximum flow           0.011      0.054      0.057      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.057     0.202     0.000     0.000"
" 33          CATCHMENT 204"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         204   No description"
"       30.000   % Impervious"
"        0.240   Total Area"
"       35.000   Flow length"
"        2.000   Overland Slope"
"        0.168   Pervious Area"
"       35.000   Pervious length"
"        2.000   Pervious slope"
"        0.072   Impervious Area"
"       35.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.356   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.907   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.026     0.202     0.000     0.000 c.m/sec"
"             Catchment 204          Pervious   Impervious Total Area "
"             Surface Area           0.168      0.072      0.240      hectare"
"             Time of concentration  17.118     2.081      9.317      minutes"
"             Time to Centroid       120.400    89.774     104.510    minutes"
"             Rainfall depth         56.404     56.404     56.404     mm"
"             Rainfall volume        94.76      40.61      135.37     c.m"
"             Rainfall losses        36.366     5.987      27.252     mm"
"             Runoff depth           20.038     50.417     29.151     mm"
"             Runoff volume          33.66      36.30      69.96      c.m"
"             Runoff coefficient     0.356      0.907      0.521      "
"             Maximum flow           0.012      0.024      0.026      c.m/sec"
" 33          CATCHMENT 203"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         203   No description"
"       52.000   % Impervious"
"        0.280   Total Area"
```

```
"       47.000   Flow length"
"        0.800   Overland Slope"
"        0.134   Pervious Area"
"       47.000   Pervious length"
"        0.800   Pervious slope"
"        0.146   Impervious Area"
"       47.000   Impervious length"
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.356   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.907   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                0.046     0.202     0.000     0.000 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.134      0.146      0.280      hectare"
"             Time of concentration  26.894     3.270      9.628      minutes"
"             Time to Centroid       132.915    91.598     102.718    minutes"
"             Rainfall depth         56.404     56.404     56.404     mm"
"             Rainfall volume        75.81      82.12      157.93     c.m"
"             Rainfall losses        36.354     6.150      20.648     mm"
"             Runoff depth           20.049     50.254     35.756     mm"
"             Runoff volume          26.95      73.17      100.12     c.m"
"             Runoff coefficient     0.356      0.907      0.642      "
"             Maximum flow           0.007      0.044      0.046      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                0.046     0.248     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                0.046     0.248     0.248     0.000"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                "
"             Maximum flow                  0.248    c.m/sec"
"             Hydrograph volume           565.614    c.m"
"                0.046     0.248     0.248     0.248"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                0.046     0.000     0.248     0.248"
" 33          CATCHMENT 205"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          205   No description"
"       39.000   % Impervious"
"        0.320   Total Area"
"       74.000   Flow length"
"        0.800   Overland Slope"
"        0.195   Pervious Area"
"       74.000   Pervious length"
"        0.800   Pervious slope"
"        0.125   Impervious Area"
"       74.000   Impervious length"
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
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"        0.356   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.907   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.042     0.000     0.248     0.248 c.m/sec"
"             Catchment 205          Pervious   Impervious Total Area "
"             Surface Area           0.195      0.125      0.320      hectare"
"             Time of concentration  35.314     4.293      16.155     minutes"
"             Time to Centroid       143.706    93.099     112.449    minutes"
"             Rainfall depth         56.404     56.404     56.404     mm"
"             Rainfall volume        110.10     70.39      180.49     c.m"
"             Rainfall losses        36.358     5.759      24.424     mm"
"             Runoff depth           20.046     50.645     31.979     mm"
"             Runoff volume          39.13      63.21      102.33     c.m"
"             Runoff coefficient     0.356      0.907      0.571      "
"             Maximum flow           0.009      0.040      0.042      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.042     0.042     0.248     0.248"
" 33          CATCHMENT 206"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          206   No description"
"        5.000   % Impervious"
"        0.210   Total Area"
"       12.000   Flow length"
"        2.000   Overland Slope"
"        0.199   Pervious Area"
"       12.000   Pervious length"
"        2.000   Pervious slope"
"        0.010   Impervious Area"
"       12.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.356   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.907   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.020     0.042     0.248     0.248 c.m/sec"
"             Catchment 206          Pervious   Impervious Total Area "
"             Surface Area           0.199      0.010      0.210      hectare"
"             Time of concentration  9.006      1.095      8.089      minutes"
"             Time to Centroid       110.011    88.233     107.487    minutes"
"             Rainfall depth         56.404     56.404     56.404     mm"
"             Rainfall volume        112.53     5.92       118.45     c.m"
"             Rainfall losses        36.430     6.656      34.941     mm"
"             Runoff depth           19.974     49.748     21.462     mm"
"             Runoff volume          39.85      5.22       45.07      c.m"
"             Runoff coefficient     0.356      0.907      0.383      "
"             Maximum flow           0.019      0.004      0.020      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.020     0.061     0.248     0.248"
```

```
" 33          CATCHMENT 207"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           207   No description"
"        51.000   % Impervious"
"         0.240   Total Area"
"        71.000   Flow length"
"         0.800   Overland Slope"
"         0.118   Pervious Area"
"        71.000   Pervious length"
"         0.800   Pervious slope"
"         0.122   Impervious Area"
"        71.000   Impervious length"
"         0.800   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        78.000   Pervious SCS Curve No."
"         0.356   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         7.164   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
"        98.000   Impervious SCS Curve No."
"         0.907   Impervious Runoff coefficient"
"         0.100   Impervious Ia/S coefficient"
"         0.518   Impervious Initial abstraction"
"                      0.040     0.061     0.248     0.248 c.m/sec"
"              Catchment 207          Pervious   Impervious Total Area "
"              Surface Area           0.118      0.122      0.240      hectare"
"              Time of concentration  34.448     4.188      12.534     minutes"
"              Time to Centroid       142.590    92.938     106.632    minutes"
"              Rainfall depth         56.404     56.404     56.404     mm"
"              Rainfall volume        66.33      69.04      135.37     c.m"
"              Rainfall losses        36.356     5.826      20.786     mm"
"              Runoff depth           20.047     50.577     35.618     mm"
"              Runoff volume          23.58      61.91      85.48      c.m"
"              Runoff coefficient     0.356      0.907      0.637      "
"              Maximum flow           0.005      0.039      0.040      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                      0.040     0.101     0.248     0.248"
" 33          CATCHMENT 208"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           208   No description"
"        45.000   % Impervious"
"         0.180   Total Area"
"        45.000   Flow length"
"         0.800   Overland Slope"
"         0.099   Pervious Area"
"        45.000   Pervious length"
"         0.800   Pervious slope"
"         0.081   Impervious Area"
"        45.000   Impervious length"
"         0.800   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        78.000   Pervious SCS Curve No."
"         0.356   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         7.164   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
"        98.000   Impervious SCS Curve No."
"         0.907   Impervious Runoff coefficient"
```

```
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.026     0.101     0.248     0.248 c.m/sec"
"             Catchment 208          Pervious   Impervious Total Area "
"             Surface Area           0.099      0.081      0.180      hectare"
"             Time of concentration  26.202     3.186      10.729     minutes"
"             Time to Centroid       132.030    91.460     104.757    minutes"
"             Rainfall depth         56.404     56.404     56.404     mm"
"             Rainfall volume        55.84      45.69      101.53     c.m"
"             Rainfall losses        36.357     6.149      22.763     mm"
"             Runoff depth           20.047     50.255     33.640     mm"
"             Runoff volume          19.85      40.71      60.55      c.m"
"             Runoff coefficient     0.356      0.907      0.604      "
"             Maximum flow           0.005      0.025      0.026      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.026     0.127     0.248     0.248"
" 33          CATCHMENT 209"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          209   No description"
"       80.000   % Impervious"
"        0.020   Total Area"
"       10.000   Flow length"
"        0.500   Overland Slope"
"        0.004   Pervious Area"
"       10.000   Pervious length"
"        0.500   Pervious slope"
"        0.016   Impervious Area"
"       10.000   Impervious length"
"        0.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.356   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.907   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.006     0.127     0.248     0.248 c.m/sec"
"             Catchment 209          Pervious   Impervious Total Area "
"             Surface Area           0.004      0.016      0.020      hectare"
"             Time of concentration  12.236     1.488      2.459      minutes"
"             Time to Centroid       114.144    88.885     91.168     minutes"
"             Rainfall depth         56.404     56.404     56.404     mm"
"             Rainfall volume        2.26       9.02       11.28      c.m"
"             Rainfall losses        36.387     6.036      12.106     mm"
"             Runoff depth           20.016     50.368     44.298     mm"
"             Runoff volume          0.80       8.06       8.86       c.m"
"             Runoff coefficient     0.356      0.907      0.796      "
"             Maximum flow           0.000      0.006      0.006      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.006     0.131     0.248     0.248"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.006     0.131     0.131     0.248"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
```

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"               "
"             Maximum flow                  0.379    c.m/sec"
"             Hydrograph volume           867.914    c.m"
"                     0.006     0.131     0.131     0.379"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.006     0.000     0.131     0.379"
" 33          CATCHMENT 210"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          210   No description"
"       38.000   % Impervious"
"        0.260   Total Area"
"       22.000   Flow length"
"        0.500   Overland Slope"
"        0.161   Pervious Area"
"       22.000   Pervious length"
"        0.500   Pervious slope"
"        0.099   Impervious Area"
"       22.000   Impervious length"
"        0.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.356   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.907   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.034     0.000     0.131     0.379 c.m/sec"
"             Catchment 210          Pervious   Impervious Total Area "
"             Surface Area           0.161      0.099      0.260      hectare"
"             Time of concentration  19.638     2.388      9.181      minutes"
"             Time to Centroid       123.630    90.242     103.390    minutes"
"             Rainfall depth         56.404     56.404     56.404     mm"
"             Rainfall volume        90.92      55.73      146.65     c.m"
"             Rainfall losses        36.382     6.115      24.881     mm"
"             Runoff depth           20.022     50.288     31.523     mm"
"             Runoff volume          32.27      49.68      81.96      c.m"
"             Runoff coefficient     0.356      0.907      0.565      "
"             Maximum flow           0.010      0.032      0.034      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.034     0.034     0.131     0.379"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.034     0.034     0.034     0.379"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                "
"             Maximum flow                  0.411    c.m/sec"
"             Hydrograph volume           949.873    c.m"
"                     0.034     0.034     0.034     0.411"
" 40          HYDROGRAPH   Confluence    1"
"            7   Confluence "
"            1   Node #"
"                "
"             Maximum flow                  0.411    c.m/sec"
"             Hydrograph volume           949.873    c.m"
```

```
"                    0.034     0.411     0.034     0.000"
" 54          POND DESIGN"
"        0.411   Current peak flow    c.m/sec"
"        0.233   Target outflow    c.m/sec"
"        950.0   Hydrograph volume    c.m"
"          14.   Number of stages"
"      401.250   Minimum water level    metre"
"      402.550   Maximum water level    metre"
"      401.250   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                401.250     0.000       0.0"
"                401.350     0.004      27.3"
"                401.450     0.005      76.4"
"                401.550     0.006     130.2"
"                401.650     0.007     188.9"
"                401.750     0.008     252.7"
"                401.850     0.009     321.7"
"                401.950     0.010     396.1"
"                402.050     0.010     476.1"
"                402.150     0.011     561.7"
"                402.250     0.065     653.2"
"                402.350     0.137     750.7"
"                402.450     0.143     854.3"
"                402.550     0.455     963.0"
"             Peak outflow                 0.063    c.m/sec"
"             Maximum level              402.245    metre"
"             Maximum storage            649.079    c.m"
"             Centroidal lag               8.829   hours"
"                  0.034     0.411     0.063     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               "
"             Maximum flow                 0.063    c.m/sec"
"             Hydrograph volume          936.847    c.m"
"                    0.034     0.411     0.063     0.063"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.034     0.000     0.063     0.063"
" 33          CATCHMENT 211"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         211   No description"
"      40.000   % Impervious"
"       0.260   Total Area"
"      47.000   Flow length"
"       2.500   Overland Slope"
"       0.156   Pervious Area"
"      47.000   Pervious length"
"       2.500   Pervious slope"
"       0.104   Impervious Area"
"      47.000   Impervious length"
"       2.500   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.356   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
"       0.015   Impervious Manning 'n'"
"      98.000   Impervious SCS Curve No."
"       0.907   Impervious Runoff coefficient"
```

```
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                  0.036     0.000     0.063     0.063 c.m/sec"
"             Catchment 211          Pervious   Impervious Total Area "
"             Surface Area           0.156      0.104      0.260      hectare"
"             Time of concentration  19.108     2.323      8.595      minutes"
"             Time to Centroid       122.957    90.149     102.409    minutes"
"             Rainfall depth         56.404     56.404     56.404     mm"
"             Rainfall volume        87.99      58.66      146.65     c.m"
"             Rainfall losses        36.388     6.082      24.266     mm"
"             Runoff depth           20.016     50.321     32.138     mm"
"             Runoff volume          31.22      52.33      83.56      c.m"
"             Runoff coefficient     0.356      0.907      0.576      "
"             Maximum flow           0.010      0.034      0.036      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                  0.036     0.036     0.063     0.063"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                  0.036     0.036     0.036     0.063"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                "
"             Maximum flow                 0.068    c.m/sec"
"             Hydrograph volume         1020.406    c.m"
"                  0.036     0.036     0.036     0.068"
" 40          HYDROGRAPH   Confluence    2"
"            7   Confluence "
"            2   Node #"
"                "
"             Maximum flow                 0.068    c.m/sec"
"             Hydrograph volume         1020.406    c.m"
"                  0.036     0.068     0.036     0.000"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                              Version 2.07  rev. 385"
"                MIDUSS created                                      August-08-05"
"           10   Units used:                                          ie METRIC"
"                Job folder:                                 O:\Private Development\"
"               A6814A - Sinclair Subdivision\Design\Storm\SWM\MIDUSS JULY 2017"
"                Output filename:        A6814A_50yr_Pond_100mm orifice_v3a.out"
"                Licensee name:                                              CPC"
"                Company                        Triton Engineering Services Ltd."
"                Date & Time last used:                 20/07/2017 at 3:01:10 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1644.390   Coefficient A"
"       11.085   Constant B"
"        0.829   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity          164.392    mm/hr"
"             Total depth                 63.385    mm"
"            6   050hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 200"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          200   No description"
"       43.000   % Impervious"
"        0.520   Total Area"
"       55.000   Flow length"
"        1.000   Overland Slope"
"        0.296   Pervious Area"
"       55.000   Pervious length"
"        1.000   Pervious slope"
"        0.224   Impervious Area"
"       55.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.390   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.916   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.081     0.000     0.000     0.000 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           0.296      0.224      0.520      hectare"
"             Time of concentration  25.668     3.258      11.428     minutes"
"             Time to Centroid       130.597    91.275     105.611    minutes"
"             Rainfall depth         63.385     63.385     63.385     mm"
"             Rainfall volume        187.87     141.73     329.60     c.m"
"             Rainfall losses        38.694     6.342      24.783     mm"
"             Runoff depth           24.691     57.043     38.603     mm"
"             Runoff volume          73.19      127.55     200.73     c.m"
"             Runoff coefficient     0.390      0.916      0.616      "
"             Maximum flow           0.020      0.075      0.081      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
```

```
"             4   Add Runoff "
"                     0.081     0.081     0.000     0.000"
" 33           CATCHMENT 201"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           201   No description"
"        48.000   % Impervious"
"         0.460   Total Area"
"        56.000   Flow length"
"         0.600   Overland Slope"
"         0.239   Pervious Area"
"        56.000   Pervious length"
"         0.600   Pervious slope"
"         0.221   Impervious Area"
"        56.000   Impervious length"
"         0.600   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        78.000   Pervious SCS Curve No."
"         0.390   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         7.164   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
"        98.000   Impervious SCS Curve No."
"         0.916   Impervious Runoff coefficient"
"         0.100   Impervious Ia/S coefficient"
"         0.518   Impervious Initial abstraction"
"                     0.080     0.081     0.000     0.000 c.m/sec"
"              Catchment 201          Pervious   Impervious Total Area "
"              Surface Area           0.239      0.221      0.460      hectare"
"              Time of concentration  30.244     3.839      12.258     minutes"
"              Time to Centroid       136.434    92.150     106.270    minutes"
"              Rainfall depth         63.385     63.385     63.385     mm"
"              Rainfall volume        151.62     139.95     291.57     c.m"
"              Rainfall losses        38.680     6.212      23.095     mm"
"              Runoff depth           24.705     57.174     40.290     mm"
"              Runoff volume          59.09      126.24     185.33     c.m"
"              Runoff coefficient     0.390      0.916      0.643      "
"              Maximum flow           0.014      0.076      0.080      c.m/sec"
" 40           HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                     0.080     0.160     0.000     0.000"
" 33           CATCHMENT 202"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           202   No description"
"        42.000   % Impervious"
"         0.410   Total Area"
"        54.000   Flow length"
"         0.600   Overland Slope"
"         0.238   Pervious Area"
"        54.000   Pervious length"
"         0.600   Pervious slope"
"         0.172   Impervious Area"
"        54.000   Impervious length"
"         0.600   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        78.000   Pervious SCS Curve No."
"         0.390   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         7.164   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
```

```
"       98.000   Impervious SCS Curve No."
"        0.916   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.063     0.160     0.000     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.238      0.172      0.410      hectare"
"             Time of concentration  29.591     3.756      13.425     minutes"
"             Time to Centroid       135.599    92.038     108.342    minutes"
"             Rainfall depth         63.385     63.385     63.385     mm"
"             Rainfall volume        150.73     109.15     259.88     c.m"
"             Rainfall losses        38.675     6.336      25.093     mm"
"             Runoff depth           24.710     57.050     38.293     mm"
"             Runoff volume          58.76      98.24      157.00     c.m"
"             Runoff coefficient     0.390      0.916      0.611      "
"             Maximum flow           0.015      0.059      0.063      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.063     0.223     0.000     0.000"
" 33          CATCHMENT 204"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          204   No description"
"       30.000   % Impervious"
"        0.240   Total Area"
"       35.000   Flow length"
"        2.000   Overland Slope"
"        0.168   Pervious Area"
"       35.000   Pervious length"
"        2.000   Pervious slope"
"        0.072   Impervious Area"
"       35.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.390   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.916   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.029     0.223     0.000     0.000 c.m/sec"
"             Catchment 204          Pervious   Impervious Total Area "
"             Surface Area           0.168      0.072      0.240      hectare"
"             Time of concentration  15.896     2.018      8.978      minutes"
"             Time to Centroid       118.150    89.391     103.815    minutes"
"             Rainfall depth         63.385     63.385     63.385     mm"
"             Rainfall volume        106.49     45.64      152.12     c.m"
"             Rainfall losses        38.718     6.178      28.956     mm"
"             Runoff depth           24.667     57.207     34.429     mm"
"             Runoff volume          41.44      41.19      82.63      c.m"
"             Runoff coefficient     0.390      0.916      0.548      "
"             Maximum flow           0.015      0.026      0.029      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.029     0.252     0.000     0.000"
" 33          CATCHMENT 203"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
```

```
"          203   No description"
"       52.000   % Impervious"
"        0.280   Total Area"
"       47.000   Flow length"
"        0.800   Overland Slope"
"        0.134   Pervious Area"
"       47.000   Pervious length"
"        0.800   Pervious slope"
"        0.146   Impervious Area"
"       47.000   Impervious length"
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.390   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.916   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                0.051     0.252     0.000     0.000 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.134      0.146      0.280      hectare"
"             Time of concentration  24.975     3.170      9.395      minutes"
"             Time to Centroid       129.717    91.161     102.167    minutes"
"             Rainfall depth         63.385     63.385     63.385     mm"
"             Rainfall volume        85.19      92.29      177.48     c.m"
"             Rainfall losses        38.694     6.335      21.868     mm"
"             Runoff depth           24.691     57.050     41.518     mm"
"             Runoff volume          33.18      83.06      116.25     c.m"
"             Runoff coefficient     0.390      0.916      0.664      "
"             Maximum flow           0.009      0.049      0.051      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                0.051     0.303     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                0.051     0.303     0.303     0.000"
" 40          HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               "
"             Maximum flow                 0.303    c.m/sec"
"             Hydrograph volume          741.949    c.m"
"                0.051     0.303     0.303     0.303"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                0.051     0.000     0.303     0.303"
" 33          CATCHMENT 205"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         205   No description"
"       39.000   % Impervious"
"        0.320   Total Area"
"       74.000   Flow length"
"        0.800   Overland Slope"
"        0.195   Pervious Area"
"       74.000   Pervious length"
"        0.800   Pervious slope"
"        0.125   Impervious Area"
"       74.000   Impervious length"
```

```
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.390   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.916   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.046     0.000     0.303     0.303 c.m/sec"
"             Catchment 205          Pervious   Impervious Total Area "
"             Surface Area           0.195      0.125      0.320      hectare"
"             Time of concentration  32.793     4.163      15.674     minutes"
"             Time to Centroid       139.694    92.576     111.522    minutes"
"             Rainfall depth         63.385     63.385     63.385     mm"
"             Rainfall volume        123.73     79.10      202.83     c.m"
"             Rainfall losses        38.676     5.914      25.899     mm"
"             Runoff depth           24.709     57.471     37.487     mm"
"             Runoff volume          48.23      71.72      119.96     c.m"
"             Runoff coefficient     0.390      0.916      0.595      "
"             Maximum flow           0.011      0.044      0.046      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.046     0.046     0.303     0.303"
" 33          CATCHMENT 206"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          206   No description"
"        5.000   % Impervious"
"        0.210   Total Area"
"       12.000   Flow length"
"        2.000   Overland Slope"
"        0.199   Pervious Area"
"       12.000   Pervious length"
"        2.000   Pervious slope"
"        0.010   Impervious Area"
"       12.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.390   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.916   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.026     0.046     0.303     0.303 c.m/sec"
"             Catchment 206          Pervious   Impervious Total Area "
"             Surface Area           0.199      0.010      0.210      hectare"
"             Time of concentration  8.363      1.062      7.578      minutes"
"             Time to Centroid       108.492    87.920     106.279    minutes"
"             Rainfall depth         63.385     63.385     63.385     mm"
"             Rainfall volume        126.45     6.66       133.11     c.m"
"             Rainfall losses        38.757     6.971      37.168     mm"
"             Runoff depth           24.628     56.414     26.217     mm"
"             Runoff volume          49.13      5.92       55.06      c.m"
"             Runoff coefficient     0.390      0.916      0.416      "
"             Maximum flow           0.024      0.004      0.026      c.m/sec"
```

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" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.026     0.071     0.303     0.303"
" 33          CATCHMENT 207"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          207   No description"
"       51.000   % Impervious"
"        0.240   Total Area"
"       71.000   Flow length"
"        0.800   Overland Slope"
"        0.118   Pervious Area"
"       71.000   Pervious length"
"        0.800   Pervious slope"
"        0.122   Impervious Area"
"       71.000   Impervious length"
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.390   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.916   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.044     0.071     0.303     0.303 c.m/sec"
"             Catchment 207          Pervious   Impervious Total Area "
"             Surface Area           0.118      0.122      0.240      hectare"
"             Time of concentration  31.989     4.061      12.230     minutes"
"             Time to Centroid       138.663    92.433     105.955    minutes"
"             Rainfall depth         63.385     63.385     63.385     mm"
"             Rainfall volume        74.54      77.58      152.12     c.m"
"             Rainfall losses        38.684     5.980      22.005     mm"
"             Runoff depth           24.702     57.405     41.380     mm"
"             Runoff volume          29.05      70.26      99.31      c.m"
"             Runoff coefficient     0.390      0.916      0.658      "
"             Maximum flow           0.007      0.042      0.044      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.044     0.115     0.303     0.303"
" 33          CATCHMENT 208"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          208   No description"
"       45.000   % Impervious"
"        0.180   Total Area"
"       45.000   Flow length"
"        0.800   Overland Slope"
"        0.099   Pervious Area"
"       45.000   Pervious length"
"        0.800   Pervious slope"
"        0.081   Impervious Area"
"       45.000   Impervious length"
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.390   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
```

```
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.916   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.029     0.115     0.303     0.303 c.m/sec"
"             Catchment 208          Pervious   Impervious Total Area "
"             Surface Area           0.099      0.081      0.180      hectare"
"             Time of concentration  24.331     3.089      10.443     minutes"
"             Time to Centroid       128.893    91.045     104.148    minutes"
"             Rainfall depth         63.385     63.385     63.385     mm"
"             Rainfall volume        62.75      51.34      114.09     c.m"
"             Rainfall losses        38.679     6.358      24.135     mm"
"             Runoff depth           24.707     57.027     39.251     mm"
"             Runoff volume          24.46      46.19      70.65      c.m"
"             Runoff coefficient     0.390      0.916      0.627      "
"             Maximum flow           0.007      0.028      0.029      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.029     0.144     0.303     0.303"
" 33          CATCHMENT 209"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          209   No description"
"       80.000   % Impervious"
"        0.020   Total Area"
"       10.000   Flow length"
"        0.500   Overland Slope"
"        0.004   Pervious Area"
"       10.000   Pervious length"
"        0.500   Pervious slope"
"        0.016   Impervious Area"
"       10.000   Impervious length"
"        0.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.390   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.916   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.006     0.144     0.303     0.303 c.m/sec"
"             Catchment 209          Pervious   Impervious Total Area "
"             Surface Area           0.004      0.016      0.020      hectare"
"             Time of concentration  11.363     1.442      2.407      minutes"
"             Time to Centroid       112.333    88.557     90.870     minutes"
"             Rainfall depth         63.385     63.385     63.385     mm"
"             Rainfall volume        2.54       10.14      12.68      c.m"
"             Rainfall losses        38.745     6.213      12.719     mm"
"             Runoff depth           24.641     57.172     50.666     mm"
"             Runoff volume          0.99       9.15       10.13      c.m"
"             Runoff coefficient     0.390      0.916      0.811      "
"             Maximum flow           0.000      0.006      0.006      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.006     0.149     0.303     0.303"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.006     0.149     0.149     0.303"
```

```
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                "
"             Maximum flow                  0.452    c.m/sec"
"             Hydrograph volume          1097.060    c.m"
"                     0.006     0.149     0.149     0.452"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.006     0.000     0.149     0.452"
" 33          CATCHMENT 210"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          210   No description"
"       38.000   % Impervious"
"        0.260   Total Area"
"       22.000   Flow length"
"        0.500   Overland Slope"
"        0.161   Pervious Area"
"       22.000   Pervious length"
"        0.500   Pervious slope"
"        0.099   Impervious Area"
"       22.000   Impervious length"
"        0.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.390   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.916   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.038     0.000     0.149     0.452 c.m/sec"
"             Catchment 210          Pervious   Impervious Total Area "
"             Surface Area           0.161      0.099      0.260      hectare"
"             Time of concentration  18.236     2.315      8.901      minutes"
"             Time to Centroid       121.092    89.855     102.777    minutes"
"             Rainfall depth         63.385     63.385     63.385     mm"
"             Rainfall volume        102.18     62.62      164.80     c.m"
"             Rainfall losses        38.688     6.271      26.370     mm"
"             Runoff depth           24.697     57.114     37.016     mm"
"             Runoff volume          39.81      56.43      96.24      c.m"
"             Runoff coefficient     0.390      0.916      0.590      "
"             Maximum flow           0.013      0.036      0.038      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.038     0.038     0.149     0.452"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.038     0.038     0.038     0.452"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                "
"             Maximum flow                  0.488    c.m/sec"
"             Hydrograph volume          1193.301    c.m"
"                     0.038     0.038     0.038     0.488"
" 40          HYDROGRAPH   Confluence    1"
"            7   Confluence "
"            1   Node #"
```

```
"               "
"             Maximum flow                  0.488    c.m/sec"
"             Hydrograph volume          1193.301    c.m"
"                    0.038     0.488     0.038     0.000"
" 54          POND DESIGN"
"        0.488   Current peak flow    c.m/sec"
"        0.233   Target outflow    c.m/sec"
"       1200.0   Hydrograph volume    c.m"
"          14.   Number of stages"
"      401.250   Minimum water level    metre"
"      402.550   Maximum water level    metre"
"      401.250   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                401.250     0.000       0.0"
"                401.350     0.004      27.3"
"                401.450     0.005      76.4"
"                401.550     0.006     130.2"
"                401.650     0.007     188.9"
"                401.750     0.008     252.7"
"                401.850     0.009     321.7"
"                401.950     0.010     396.1"
"                402.050     0.010     476.1"
"                402.150     0.011     561.7"
"                402.250     0.065     653.2"
"                402.350     0.137     750.7"
"                402.450     0.143     854.3"
"                402.550     0.455     963.0"
"             Peak outflow                  0.115    c.m/sec"
"             Maximum level               402.319    metre"
"             Maximum storage             720.769    c.m"
"             Centroidal lag                7.517   hours"
"                  0.038     0.488     0.115     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               "
"             Maximum flow                  0.115    c.m/sec"
"             Hydrograph volume          1180.367    c.m"
"                    0.038     0.488     0.115     0.115"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.038     0.000     0.115     0.115"
" 33          CATCHMENT 211"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         211   No description"
"      40.000   % Impervious"
"       0.260   Total Area"
"      47.000   Flow length"
"       2.500   Overland Slope"
"       0.156   Pervious Area"
"      47.000   Pervious length"
"       2.500   Pervious slope"
"       0.104   Impervious Area"
"      47.000   Impervious length"
"       2.500   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.390   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
```

```
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.916   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.040     0.000     0.115     0.115 c.m/sec"
"             Catchment 211          Pervious   Impervious Total Area "
"             Surface Area           0.156      0.104      0.260      hectare"
"             Time of concentration  17.744     2.252      8.346      minutes"
"             Time to Centroid       120.473    89.764     101.845    minutes"
"             Rainfall depth         63.385     63.385     63.385     mm"
"             Rainfall volume        98.88      65.92      164.80     c.m"
"             Rainfall losses        38.674     6.226      25.695     mm"
"             Runoff depth           24.711     57.160     37.691     mm"
"             Runoff volume          38.55      59.45      98.00      c.m"
"             Runoff coefficient     0.390      0.916      0.601      "
"             Maximum flow           0.013      0.038      0.040      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.040     0.040     0.115     0.115"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.040     0.040     0.040     0.115"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                "
"             Maximum flow                 0.123    c.m/sec"
"             Hydrograph volume         1278.362    c.m"
"                    0.040     0.040     0.040     0.123"
" 40          HYDROGRAPH   Confluence    2"
"            7   Confluence "
"            2   Node #"
"                "
"             Maximum flow                 0.123    c.m/sec"
"             Hydrograph volume         1278.362    c.m"
"                    0.040     0.123     0.040     0.000"
```

```
"                MIDUSS Output ----------------------------------------------->"
"                MIDUSS version                              Version 2.07  rev. 385"
"                MIDUSS created                                      August-08-05"
"           10   Units used:                                          ie METRIC"
"                Job folder:                                 O:\Private Development\"
"               A6814A - Sinclair Subdivision\Design\Storm\SWM\MIDUSS JULY 2017"
"                Output filename:       A6814A_100yr_Pond_100mm orifice_v3a.out"
"                Licensee name:                                              CPC"
"                Company                        Triton Engineering Services Ltd."
"                Date & Time last used:                 20/07/2017 at 2:57:27 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1780.100   Coefficient A"
"       11.090   Constant B"
"        0.828   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           178.409    mm/hr"
"             Total depth                  68.976    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 200"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          200   No description"
"       43.000   % Impervious"
"        0.520   Total Area"
"       55.000   Flow length"
"        1.000   Overland Slope"
"        0.296   Pervious Area"
"       55.000   Pervious length"
"        1.000   Pervious slope"
"        0.224   Impervious Area"
"       55.000   Impervious length"
"        1.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.415   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.923   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.088     0.000     0.000     0.000 c.m/sec"
"             Catchment 200          Pervious   Impervious Total Area "
"             Surface Area           0.296      0.224      0.520      hectare"
"             Time of concentration  24.086     3.148      11.056     minutes"
"             Time to Centroid       128.308    90.952     105.061    minutes"
"             Rainfall depth         68.976     68.976     68.976     mm"
"             Rainfall volume        204.45     154.23     358.68     c.m"
"             Rainfall losses        40.357     6.468      25.785     mm"
"             Runoff depth           28.619     62.508     43.191     mm"
"             Runoff volume          84.83      139.77     224.60     c.m"
"             Runoff coefficient     0.415      0.923      0.633      "
"             Maximum flow           0.024      0.083      0.088      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
```

```
"             4   Add Runoff "
"                     0.088     0.088     0.000     0.000"
" 33           CATCHMENT 201"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           201   No description"
"        48.000   % Impervious"
"         0.460   Total Area"
"        56.000   Flow length"
"         0.600   Overland Slope"
"         0.239   Pervious Area"
"        56.000   Pervious length"
"         0.600   Pervious slope"
"         0.221   Impervious Area"
"        56.000   Impervious length"
"         0.600   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        78.000   Pervious SCS Curve No."
"         0.415   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         7.164   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
"        98.000   Impervious SCS Curve No."
"         0.923   Impervious Runoff coefficient"
"         0.100   Impervious Ia/S coefficient"
"         0.518   Impervious Initial abstraction"
"                     0.087     0.088     0.000     0.000 c.m/sec"
"              Catchment 201          Pervious   Impervious Total Area "
"              Surface Area           0.239      0.221      0.460      hectare"
"              Time of concentration  28.381     3.710      11.894     minutes"
"              Time to Centroid       133.831    91.809     105.750    minutes"
"              Rainfall depth         68.976     68.976     68.976     mm"
"              Rainfall volume        164.99     152.30     317.29     c.m"
"              Rainfall losses        40.368     6.549      24.135     mm"
"              Runoff depth           28.608     62.427     44.841     mm"
"              Runoff volume          68.43      137.84     206.27     c.m"
"              Runoff coefficient     0.415      0.923      0.659      "
"              Maximum flow           0.018      0.082      0.087      c.m/sec"
" 40           HYDROGRAPH Add Runoff "
"             4   Add Runoff "
"                     0.087     0.175     0.000     0.000"
" 33           CATCHMENT 202"
"             1   Triangular SCS"
"             1   Equal length"
"             1   SCS method"
"           202   No description"
"        42.000   % Impervious"
"         0.410   Total Area"
"        54.000   Flow length"
"         0.600   Overland Slope"
"         0.238   Pervious Area"
"        54.000   Pervious length"
"         0.600   Pervious slope"
"         0.172   Impervious Area"
"        54.000   Impervious length"
"         0.600   Impervious slope"
"         0.250   Pervious Manning 'n'"
"        78.000   Pervious SCS Curve No."
"         0.415   Pervious Runoff coefficient"
"         0.100   Pervious Ia/S coefficient"
"         7.164   Pervious Initial abstraction"
"         0.015   Impervious Manning 'n'"
```

```
"       98.000   Impervious SCS Curve No."
"        0.923   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.069     0.175     0.000     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.238      0.172      0.410      hectare"
"             Time of concentration  27.768     3.630      12.993     minutes"
"             Time to Centroid       133.029    91.699     107.731    minutes"
"             Rainfall depth         68.976     68.976     68.976     mm"
"             Rainfall volume        164.03     118.78     282.80     c.m"
"             Rainfall losses        40.367     6.635      26.200     mm"
"             Runoff depth           28.609     62.341     42.777     mm"
"             Runoff volume          68.03      107.35     175.38     c.m"
"             Runoff coefficient     0.415      0.923      0.628      "
"             Maximum flow           0.018      0.064      0.069      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.069     0.244     0.000     0.000"
" 33          CATCHMENT 204"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         204   No description"
"       30.000   % Impervious"
"        0.240   Total Area"
"       35.000   Flow length"
"        2.000   Overland Slope"
"        0.168   Pervious Area"
"       35.000   Pervious length"
"        2.000   Pervious slope"
"        0.072   Impervious Area"
"       35.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.415   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.923   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.034     0.244     0.000     0.000 c.m/sec"
"             Catchment 204          Pervious   Impervious Total Area "
"             Surface Area           0.168      0.072      0.240      hectare"
"             Time of concentration  14.917     1.950      8.638      minutes"
"             Time to Centroid       116.524    89.092     103.240    minutes"
"             Rainfall depth         68.976     68.976     68.976     mm"
"             Rainfall volume        115.88     49.66      165.54     c.m"
"             Rainfall losses        40.366     6.292      30.144     mm"
"             Runoff depth           28.610     62.684     38.832     mm"
"             Runoff volume          48.07      45.13      93.20      c.m"
"             Runoff coefficient     0.415      0.923      0.567      "
"             Maximum flow           0.018      0.029      0.034      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                    0.034     0.278     0.000     0.000"
" 33          CATCHMENT 203"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
```

```
"          203   No description"
"       52.000   % Impervious"
"        0.280   Total Area"
"       47.000   Flow length"
"        0.800   Overland Slope"
"        0.134   Pervious Area"
"       47.000   Pervious length"
"        0.800   Pervious slope"
"        0.146   Impervious Area"
"       47.000   Impervious length"
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.415   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.923   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                0.056     0.278     0.000     0.000 c.m/sec"
"             Catchment 203          Pervious   Impervious Total Area "
"             Surface Area           0.134      0.146      0.280      hectare"
"             Time of concentration  23.436     3.063      9.118      minutes"
"             Time to Centroid       127.468    90.833     101.720    minutes"
"             Rainfall depth         68.976     68.976     68.976     mm"
"             Rainfall volume        92.70      100.43     193.13     c.m"
"             Rainfall losses        40.361     6.510      22.759     mm"
"             Runoff depth           28.615     62.467     46.218     mm"
"             Runoff volume          38.46      90.95      129.41     c.m"
"             Runoff coefficient     0.415      0.923      0.679      "
"             Maximum flow           0.011      0.054      0.056      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"           4   Add Runoff "
"                0.056     0.333     0.000     0.000"
" 40          HYDROGRAPH Copy to Outflow"
"           8   Copy to Outflow"
"                0.056     0.333     0.333     0.000"
" 40          HYDROGRAPH   Combine    1"
"           6   Combine "
"           1   Node #"
"               "
"             Maximum flow                 0.333    c.m/sec"
"             Hydrograph volume          828.856    c.m"
"                0.056     0.333     0.333     0.333"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                0.056     0.000     0.333     0.333"
" 33          CATCHMENT 205"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         205   No description"
"       39.000   % Impervious"
"        0.320   Total Area"
"       74.000   Flow length"
"        0.800   Overland Slope"
"        0.195   Pervious Area"
"       74.000   Pervious length"
"        0.800   Pervious slope"
"        0.125   Impervious Area"
"       74.000   Impervious length"
```

```
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.415   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.923   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.051     0.000     0.333     0.333 c.m/sec"
"             Catchment 205          Pervious   Impervious Total Area "
"             Surface Area           0.195      0.125      0.320      hectare"
"             Time of concentration  30.773     4.022      15.148     minutes"
"             Time to Centroid       136.896    92.217     110.799    minutes"
"             Rainfall depth         68.976     68.976     68.976     mm"
"             Rainfall volume        134.64     86.08      220.72     c.m"
"             Rainfall losses        40.356     6.110      27.000     mm"
"             Runoff depth           28.620     62.867     41.976     mm"
"             Runoff volume          55.87      78.46      134.32     c.m"
"             Runoff coefficient     0.415      0.923      0.613      "
"             Maximum flow           0.014      0.047      0.051      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.051     0.051     0.333     0.333"
" 33          CATCHMENT 206"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          206   No description"
"        5.000   % Impervious"
"        0.210   Total Area"
"       12.000   Flow length"
"        2.000   Overland Slope"
"        0.199   Pervious Area"
"       12.000   Pervious length"
"        2.000   Pervious slope"
"        0.010   Impervious Area"
"       12.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.415   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.923   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.032     0.051     0.333     0.333 c.m/sec"
"             Catchment 206          Pervious   Impervious Total Area "
"             Surface Area           0.199      0.010      0.210      hectare"
"             Time of concentration  7.848      1.026      7.151      minutes"
"             Time to Centroid       107.481    87.691     105.459    minutes"
"             Rainfall depth         68.976     68.976     68.976     mm"
"             Rainfall volume        137.61     7.24       144.85     c.m"
"             Rainfall losses        40.453     7.290      38.795     mm"
"             Runoff depth           28.524     61.686     30.182     mm"
"             Runoff volume          56.90      6.48       63.38      c.m"
"             Runoff coefficient     0.415      0.923      0.440      "
"             Maximum flow           0.029      0.004      0.032      c.m/sec"
```

```
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.032     0.083     0.333     0.333"
" 33          CATCHMENT 207"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          207   No description"
"       51.000   % Impervious"
"        0.240   Total Area"
"       71.000   Flow length"
"        0.800   Overland Slope"
"        0.118   Pervious Area"
"       71.000   Pervious length"
"        0.800   Pervious slope"
"        0.122   Impervious Area"
"       71.000   Impervious length"
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.415   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.923   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.048     0.083     0.333     0.333 c.m/sec"
"             Catchment 207          Pervious   Impervious Total Area "
"             Surface Area           0.118      0.122      0.240      hectare"
"             Time of concentration  30.018     3.924      11.871     minutes"
"             Time to Centroid       135.925    92.087     105.439    minutes"
"             Rainfall depth         68.976     68.976     68.976     mm"
"             Rainfall volume        81.12      84.43      165.54     c.m"
"             Rainfall losses        40.364     6.210      22.946     mm"
"             Runoff depth           28.612     62.766     46.031     mm"
"             Runoff volume          33.65      76.83      110.47     c.m"
"             Runoff coefficient     0.415      0.923      0.674      "
"             Maximum flow           0.008      0.046      0.048      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.048     0.131     0.333     0.333"
" 33          CATCHMENT 208"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          208   No description"
"       45.000   % Impervious"
"        0.180   Total Area"
"       45.000   Flow length"
"        0.800   Overland Slope"
"        0.099   Pervious Area"
"       45.000   Pervious length"
"        0.800   Pervious slope"
"        0.081   Impervious Area"
"       45.000   Impervious length"
"        0.800   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.415   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
```

```
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.923   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.032     0.131     0.333     0.333 c.m/sec"
"             Catchment 208          Pervious   Impervious Total Area "
"             Surface Area           0.099      0.081      0.180      hectare"
"             Time of concentration  22.833     2.984      10.109     minutes"
"             Time to Centroid       126.698    90.715     103.631    minutes"
"             Rainfall depth         68.976     68.976     68.976     mm"
"             Rainfall volume        68.29      55.87      124.16     c.m"
"             Rainfall losses        40.380     6.556      25.159     mm"
"             Runoff depth           28.597     62.421     43.817     mm"
"             Runoff volume          28.31      50.56      78.87      c.m"
"             Runoff coefficient     0.415      0.923      0.643      "
"             Maximum flow           0.008      0.030      0.032      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.032     0.163     0.333     0.333"
" 33          CATCHMENT 209"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          209   No description"
"       80.000   % Impervious"
"        0.020   Total Area"
"       10.000   Flow length"
"        0.500   Overland Slope"
"        0.004   Pervious Area"
"       10.000   Pervious length"
"        0.500   Pervious slope"
"        0.016   Impervious Area"
"       10.000   Impervious length"
"        0.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.415   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.923   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.007     0.163     0.333     0.333 c.m/sec"
"             Catchment 209          Pervious   Impervious Total Area "
"             Surface Area           0.004      0.016      0.020      hectare"
"             Time of concentration  10.663     1.394      2.343      minutes"
"             Time to Centroid       111.044    88.311     90.639     minutes"
"             Rainfall depth         68.976     68.976     68.976     mm"
"             Rainfall volume        2.76       11.04      13.80      c.m"
"             Rainfall losses        40.418     6.397      13.201     mm"
"             Runoff depth           28.558     62.579     55.775     mm"
"             Runoff volume          1.14       10.01      11.15      c.m"
"             Runoff coefficient     0.415      0.923      0.821      "
"             Maximum flow           0.001      0.007      0.007      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.007     0.168     0.333     0.333"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.007     0.168     0.168     0.333"
```

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" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                "
"             Maximum flow                  0.501    c.m/sec"
"             Hydrograph volume          1227.062    c.m"
"                     0.007     0.168     0.168     0.501"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                     0.007     0.000     0.168     0.501"
" 33          CATCHMENT 210"
"            1   Triangular SCS"
"            1   Equal length"
"            1   SCS method"
"          210   No description"
"       38.000   % Impervious"
"        0.260   Total Area"
"       22.000   Flow length"
"        0.500   Overland Slope"
"        0.161   Pervious Area"
"       22.000   Pervious length"
"        0.500   Pervious slope"
"        0.099   Impervious Area"
"       22.000   Impervious length"
"        0.500   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       78.000   Pervious SCS Curve No."
"        0.415   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"        7.164   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.923   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.042     0.000     0.168     0.501 c.m/sec"
"             Catchment 210          Pervious   Impervious Total Area "
"             Surface Area           0.161      0.099      0.260      hectare"
"             Time of concentration  17.113     2.237      8.587      minutes"
"             Time to Centroid       119.339    89.563     102.274    minutes"
"             Rainfall depth         68.976     68.976     68.976     mm"
"             Rainfall volume        111.19     68.15      179.34     c.m"
"             Rainfall losses        40.379     6.331      27.441     mm"
"             Runoff depth           28.598     62.645     41.536     mm"
"             Runoff volume          46.10      61.89      107.99     c.m"
"             Runoff coefficient     0.415      0.923      0.608      "
"             Maximum flow           0.016      0.039      0.042      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                     0.042     0.042     0.168     0.501"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                     0.042     0.042     0.042     0.501"
" 40          HYDROGRAPH   Combine    1"
"            6   Combine "
"            1   Node #"
"                "
"             Maximum flow                  0.542    c.m/sec"
"             Hydrograph volume          1335.055    c.m"
"                     0.042     0.042     0.042     0.542"
" 40          HYDROGRAPH   Confluence    1"
"            7   Confluence "
"            1   Node #"
```

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"                "
"             Maximum flow                  0.542    c.m/sec"
"             Hydrograph volume          1335.055    c.m"
"                    0.042     0.542     0.042     0.000"
" 54          POND DESIGN"
"        0.542   Current peak flow    c.m/sec"
"        0.233   Target outflow    c.m/sec"
"       1340.0   Hydrograph volume    c.m"
"          14.   Number of stages"
"      401.250   Minimum water level    metre"
"      402.550   Maximum water level    metre"
"      401.250   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                401.250     0.000       0.0"
"                401.350     0.004      27.3"
"                401.450     0.005      76.4"
"                401.550     0.006     130.2"
"                401.650     0.007     188.9"
"                401.750     0.008     252.7"
"                401.850     0.009     321.7"
"                401.950     0.010     396.1"
"                402.050     0.010     476.1"
"                402.150     0.011     561.7"
"                402.250     0.065     653.2"
"                402.350     0.137     750.7"
"                402.450     0.143     854.3"
"                402.550     0.455     963.0"
"             Peak outflow                  0.138    c.m/sec"
"             Maximum level               402.364    metre"
"             Maximum storage             765.464    c.m"
"             Centroidal lag                6.957   hours"
"                  0.042     0.542     0.138     0.000 c.m/sec"
" 40          HYDROGRAPH   Combine    2"
"           6   Combine "
"           2   Node #"
"               "
"             Maximum flow                  0.138    c.m/sec"
"             Hydrograph volume          1322.292    c.m"
"                    0.042     0.542     0.138     0.138"
" 40          HYDROGRAPH Start - New Tributary"
"           2   Start - New Tributary"
"                    0.042     0.000     0.138     0.138"
" 33          CATCHMENT 211"
"           1   Triangular SCS"
"           1   Equal length"
"           1   SCS method"
"         211   No description"
"      40.000   % Impervious"
"       0.260   Total Area"
"      47.000   Flow length"
"       2.500   Overland Slope"
"       0.156   Pervious Area"
"      47.000   Pervious length"
"       2.500   Pervious slope"
"       0.104   Impervious Area"
"      47.000   Impervious length"
"       2.500   Impervious slope"
"       0.250   Pervious Manning 'n'"
"      78.000   Pervious SCS Curve No."
"       0.415   Pervious Runoff coefficient"
"       0.100   Pervious Ia/S coefficient"
"       7.164   Pervious Initial abstraction"
```

```
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.923   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.044     0.000     0.138     0.138 c.m/sec"
"             Catchment 211          Pervious   Impervious Total Area "
"             Surface Area           0.156      0.104      0.260      hectare"
"             Time of concentration  16.651     2.176      8.052      minutes"
"             Time to Centroid       118.774    89.470     101.366    minutes"
"             Rainfall depth         68.976     68.976     68.976     mm"
"             Rainfall volume        107.60     71.74      179.34     c.m"
"             Rainfall losses        40.420     6.289      26.767     mm"
"             Runoff depth           28.557     62.688     42.209     mm"
"             Runoff volume          44.55      65.20      109.74     c.m"
"             Runoff coefficient     0.415      0.923      0.618      "
"             Maximum flow           0.016      0.041      0.044      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.044     0.044     0.138     0.138"
" 40          HYDROGRAPH Copy to Outflow"
"            8   Copy to Outflow"
"                    0.044     0.044     0.044     0.138"
" 40          HYDROGRAPH   Combine    2"
"            6   Combine "
"            2   Node #"
"                "
"             Maximum flow                 0.151    c.m/sec"
"             Hydrograph volume         1432.036    c.m"
"                    0.044     0.044     0.044     0.151"
" 40          HYDROGRAPH   Confluence    2"
"            7   Confluence "
"            2   Node #"
"                "
"             Maximum flow                 0.151    c.m/sec"
"             Hydrograph volume         1432.036    c.m"
"                    0.044     0.151     0.044     0.000"
```