CONCEPTUAL STORMWATER MANAGEMENT REPORT
SANTAGUIDA SUBDIVISION

Project No.: CCO-24-1841

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1.0 PURPOSE

Egis Canada Ltd. has prepared this Conceptual Stormwater Management Report in support of an application for Draft Plan Approval of the development known as the Santaguida Subdivision by Domenic Santaguida.

The objective of this stormwater management report is to evaluate the drainage characteristics of the site under existing and proposed conditions and to advance an integrated approach to facilitate the proposed development with no adverse impacts to the receiving drainage systems. The purpose of this report is to provide a conceptual stormwater management design in accordance with the recommendations and guidelines provided by the Ministry of the Environment, Conservation and Parks (MECP). These guidelines encourage the implementation of Best Management Practices (BMPs) for treating and controlling stormwater runoff.

The servicing constraints, design criteria, municipal standards and project specific quality and quantity control objectives were established based on the previous projects completed in Rideau Valley Conservation Authority (RVCA), Beckwith Township, and Lanark County regulatory areas.

During the detailed design stage, further information will be provided regarding the post-development peak flow rates, stormwater management outlet control features, and specifically how the proposed stormwater management strategy will meet quality and quantity control objectives.

2.0 SITE DESCRIPTION

The proposed development is in the Township of Beckwith. The legal description of the land is the Southwest Half of Lot 18, Concession 3, Township of Beckwith, County of Lanark. The subject site is bounded by Richmond Road to the north, vacant land to the east, the unmaintained 3rd Concession to the south and rural, single family residential dwellings to the west. This site currently encompasses one existing local unevaluated wetland in the northwest corner of the site. Based on the topography, the wetland does not appear to have a gravity outlet and will continue to pond in post-development conditions. The remainder of the site is comprised of sections of vegetated meadow and forested areas. The location plan can be found in Appendix A.

The subject property is approximately 33.7 hectares in area and the owner wishes to develop the subject lands into forty (40) rural estate lots accessed via a new street from Richmond Road ending in a cul-de-sac. The length of proposed road is approximately 1,050 m. Each side of the new local road will include a 1.5 m-wide paved asphalt shoulder, providing an active-transportation lane and adding additional impervious surface that is accounted for in the hydrologic model. Block 44, a 6 m-wide corridor along the south limit, will carry a 3 m stone-dust multi-use trail, which is treated as pervious gravel in the stormwater analysis.

As per the topographic survey prepared by McIntosh Perry Surveying Inc. (August 2022), the subject property is relatively flat and gently slopes down in northwest and northeast directions. The elevations range from 130.0 to 135.5 metres above sea level. Surface water features include the unevaluated wetland located in the northwest corner of the property. A 30m setback is recommended for mitigating water quality impacts to protect wildlife habitat and to minimize Anthropocene influence.

2.1 SOIL CONDITIONS

It is understood that a Hydrogeological Investigation and Terrain Analysis Report will be prepared by McIntosh Perry for this site. As this conceptual design work is occurring concurrently with their work, for the purposes of this design, the Ontario GeoHub's soil survey complex was used to determine the underlying soil conditions. Based on this information, the site is comprised of Farmington soil, which is classified as having a hydrological soil group 'B' and Muck, which is classified as having a hydrological soil group 'D'.

Further investigations from the test pits and groundwater testing will be utilized in the detailed design to optimize the site with regards to construction practices for the dwelling placements, road profiles and ditching profiles.

3.0 PROPOSED STORMWATER MANAGEMENT

3.1 DESIGN CRITERIA

In Ontario, the watershed-level management and planning are typically done using watershed plans, sub-watershed plans and/or individual stormwater management plans, in that order. The subject property is not covered by any specific watershed or sub watershed plans and has no existing stormwater controls in place. As such, the subject site will require a site-specific stormwater management plan using the MECP Stormwater Management Planning and Design Manual (March 2003). This methodology promotes water management from an environmentally sustainable perspective. The intent of this stormwater management plan is to provide adequate stormwater treatment for both quantity and quality controls. Stormwater Best Management Practices (BMPs) will be implemented at the "Lot level", "Conveyance" and "End of Pipe" locations. To summarize, roof water will be directed to grass surfaces that in turn will be collected in grassed swales or roadside ditches prior to outletting from the development. Quantity and quality control objectives are expected to be achieved through these enhanced grass swales which will provide temporary attenuation.

The following design criteria is established based on the Stormwater Management Manual, 2003:

- Stormwater quantity controls will be required to regulate the post-development peak flows to predevelopment levels for all design storms including the 2, 5, 10, 25, 50 and 100-year storm events.
- Stormwater quality controls will be required to achieve the "Enhanced" level of protection, which corresponds to 80% long term average removal of Total Suspended Solids (TSS) as recommended in the MECP SWMPD Manual, 2003.
- Incorporate LID features (if applicable) in the stormwater management strategy by implementing a "treatment train" approach to supplement the stormwater quality control; and
- Grading should demonstrate that flows to the wetland will not change and incorporate the regulatory setback requirements (i.e.: maintain post to pre).

- VO6 hydrology inputs updated per the Post-Development Drainage Plan, including revised catchment areas and new impervious features.

3.2 METHODOLOGY

Runoff calculations were completed with the aid of a computer modelling program, Visual OTTHYMO (Version 6.0) (VO6). The proposed model was developed as a rural development and therefore employed NASHYD routines for calculating hydrographs. The overland travel time of concentration for each of the drainage areas was derived using the SCS Lag equation:

$$T_c = 60\left(L^{0.8} \frac{(S'+25.4)^{0.7}}{4238 S^{0.33}} \right) \text{ (min)}$$

Where:

L = Flow length (m)

S' = Potential maximum retention ($S' = \frac{25400}{CN} - 254$)

CN = Curve Number

S = Average watershed land slope (%)

A maximum value of 30m (100ft) was used in calculating the overland sheet flow time of concentration. The remaining overland sheet flow is assumed to form shallow concentrated flows and was calculated as such. The velocity for the shallow concentrated flow was calculated using the following formula:

$$V = K(s)^{0.5} \text{ (m/s)}$$

Where: k = constant (referenced from the National Engineering Handbook, Table 15-3)

V = Velocity of water (m/s)

S = Average watershed land slope (%)

The velocity for channelized flow was also calculated using the above equation, substituting k=0.457. For pre-development, shallow concentrated flows were calculated using a k-value of 5.032 as appropriate for woodlands and cultural meadow lands. For post-development, given that it is expected that much of the lots will be left in their natural state, a k-value of 5.032 was used as well. These values were taken from the National Engineering Handbook Table 15-3 (converting the velocity equation from imperial to metric units). The resulting time of concentration was then determined using the velocity method which "assumes the time of concentration is the sum of the travel times for segments along the hydraulically most distant flow path." (National Engineering Handbook, Page 15-6).

The time of concentration was used to estimate the time to peak through the relation that the time to peak occurs at approximately 67% of the time of concentration. The input value for the simulation time step (DT) in VO6 was taken as 5 minutes where the time of concentration was determined to be less than 20 minutes, and 10 minutes where the time of concentration was determined to be greater than 20 minutes. For the 24-hour SCS Type II distribution, where the time of concentration was determined to be greater than 30 minutes, a DT of 15 minutes was assigned.

No changes were made to the VO6 runoff-routing parameters or time-step; only catchment areas and the curve numbers were updated per Revision D inputs.

The following SCS land-use lookup values were used as the basis to develop composite curve numbers and initial abstraction values to reflect the catchment areas and added impervious shoulders under the Post Drainage Plan and are reflected in Table 4.

Table 1: Curve Numbers and Initial Abstraction Values

Soil Group	B		D	
Land Use	Curve Number	Initial Abstraction (mm)	Curve Number	Initial Abstraction (mm)
Meadow	69	8	84	8
Grass	69	5	84	5
Woods	60	8	79	8
Wetland	50	10	77	10
Gravel	85	2.5	89	2.5
Impervious	98	1.5	98	1.5

As described in Section 2.1, and as per the available soil survey complex on the Ontario GeoHub's website, the existing soils have generally been classified as Class B and D. The drainage areas and land classifications were delineated using AutoCAD.

Given the proximity to the City of Ottawa, the design is based on the hyetographs for the City of Ottawa. The SCS Type II distributions (6-hour, 12-hour, and 24-hour) were reviewed in preparing the proposed design using a 5-minute time step.

It is anticipated that the on-site drainage ditches will be constructed at a minimum of 0.1% for rear yards, 0.3% for side yards and 0.5% for roadside ditches. During the final design process, opportunity to alter the slope of the ditches will be explored considering additional topographic information and final road and lot grading plans. It is expected that all roadside ditches are designed at a minimum depth of 0.85 m.

Driveway culverts will be sized for the 5-year storm while road crossing culverts will be sized for the 10-year storm. Flows during the 100-year storm will be reviewed to confirm they do not overtop the driveways/roads greater than 0.30 m. Driveway culverts are to be a minimum 400 mm diameter with road crossing culverts a minimum 600 mm diameter, consistent with Township standards.

3.3 PRE-DEVELOPMENT DRAINAGE

The pre-development boundary encompasses four (4) drainage areas. Appendix B includes the pre-development drainage plan, which illustrates the pre-development drainage areas within the subject property, noted as A1 through A4. Additionally, the supporting pre-development drainage calculations and associated VO model output results are provided in Appendix D. There are four (4) external drainage areas which contribute to the overall site drainage, noted as EXT1 through EXT4, and were included in the analyses under pre-development conditions. External drainage EXT3 measures 0.060 ha per the post-development; its contribution in pre-development flow increases by < 1% and has negligible hydraulic impact.

Three (3) main stormwater runoff outlet locations were identified, and are further referred to as OUT-1, OUT-2, and OUT-3. OUT-1 is the unevaluated wetland located within the northwest boundary of the subject property, adjacent to Richmond Road. OUT-2 is a large wetland located to the east of the subject property. OUT-3 is a small wetland located immediately northeast of the subject property boundary.

Pre-development drainage area A1 is comprised of the northwest portion of the subject property. The runoff generated generally flows in a northwest direction towards OUT-1. Aside from the wetland, the land uses present in A1 include vegetated meadows (or range), cultivated grass, woodlands, and gravel. Pre-development drainage area A2 is located adjacent to the southeast boundary of drainage area A1. The runoff generated generally flows in a northeast direction towards OUT-2. It is mainly comprised of range and woodlands in addition to a small wetland area. Pre-development drainage area A3 is located adjacent to the southeast boundary of drainage area A2. The runoff generated flows in a northeast direction towards OUT-3. This catchment is comprised of range and wooded area. Pre-development drainage area A4 is located adjacent to the southeast boundary of drainage area A3, and approximately accounts for the southeast half of the subject property. The runoff generated flows in a northeast direction towards OUT-2. This catchment is also comprised of range and wooded area.

External drainage area EXT1 is located immediately northwest of pre-development drainage area A1. The majority of this area is comprised of impervious area from Richmond Road, as well as a small portion of the unevaluated wetland that is mostly located on the subject property. The remaining land consists of gravel and grass. The area slopes down steeply away from the road, and the runoff generated will drain southeast towards OUT-1. External drainage area EXT2 is located along the southwest border of area A1 and drains in a northeast direction onto area A1 and eventually outlets to OUT-1. External drainage area EXT3 is located along the southwest border of area A2 and southeast border of EXT2. It drains northeast onto area A2 and then outlets to OUT-2. External drainage area EXT4 is located along the southwest border of area A4. Runoff generated in this catchment drains in a northeast direction onto area A4, which then outlets to OUT-2. These drainage areas area all comprised of range and woodlands.

The input parameters and results have been summarized in the following tables, while the full detailed output results can be found in Appendix B.

Table 2: Pre-Development Input Parameters

Catchment ID	Area (ha)	CN[1]	Ia[2] (mm)	Tp[3] (hr)
NASHYD				
A1	8.861	66.1	8.5	0.57
A2	4.703	66.4	8.0	0.55
A3	3.481	66.7	8.0	0.61
A4	16.455	70.3	8.0	0.57
EXT2	2.191	64.2	8.0	0.51
EXT3	0.45	64.6	8.0	0.12
EXT4	1.791	78.7	8.0	0.25
STANDHYD				
EXT1	0.468	78.6	9.0	0.11
Total:	**38.40**			

Notes:
1. CN refers to the average weighted curve number based on the land cover and land use.
2. Ia refers to the initial abstraction
3. Tp refers to time to peak

Table 3: Pre-Development VO Model Peak Flow Results (m^3/s)

Catchment	Outlet	6- Hour SCS Type II		12- Hour SCS Type II		24- Hour SCS Type II	
		5-Year	100-Year	5-Year	100-Year	5-Year	100-Year
NASHYD							
A1	Out - 1	0.116	0.335	0.154	0.430	0.202	0.533
A2	Out - 2	0.062	0.180	0.083	0.229	0.108	0.284
A3	Out - 3	0.043	0.124	0.057	0.158	0.074	0.195
A4	Out - 2	0.266	0.739	0.350	0.933	0.449	1.138
EXT2	Out - 1	0.029	0.083	0.038	0.106	0.050	0.133
EXT3	Out - 2	0.002	0.005	0.002	0.007	0.003	0.009
EXT4	Out - 2	0.074	0.192	0.095	0.235	0.121	0.284
STANDHYD							
EXT1	Out - 1	0.017	0.030	0.019	0.033	0.021	0.038

3.4 POST-DEVELOPMENT DRAINAGE

The conceptual post-development drainage scheme for the proposed development is comprised of six (6) drainage areas (B1-B6) which outlet to OUT-1 (northwest wetland), OUT-2 (east wetland) or OUT-3 (northeast wetland). The development will include the addition of ~1,050 m of asphalt roadway with roadside drainage ditches, along with 40 single family homes and associated driveways. Appendix C includes the post-development drainage plan, which illustrates the post-development sub-catchments for the subject lands, noted as B1 through B6. The external drainage areas EXT1 through EXT4 are to remain unchanged under post-development conditions. Supporting drainage calculations and associated VO model output results can also be found in Appendix C and Appendix D.

Post-development drainage area B1 encompasses most of the land contained in the pre-development area A1, as well as a small portion of pre-development area A2. Once developed, it will contain a segment of the asphalt roadway, as well as residential dwellings and their corresponding driveways and lawns. As most of the land will remain in its natural state, the other land uses will consist of range, grass, woodlands, and a portion of the unevaluated wetland on the subject property. Runoff generated within this catchment area will outlet to OUT-1.

Post-development drainage area B2 encompasses the remainder of the land from pre-development area A1, as well as a portion of pre-development area A2. Under post-development conditions, it will contain several backyard areas. However, the land use classifications will not be altered and include the wetland area and woodlands. Runoff generated in this catchment will also outlet to OUT-1. Post-development drainage area B3 encompasses a portion of the pre-development area A2, as well as the majority of pre-development drainage area A3. Similar to B1, it will contain a segment of the asphalt roadway, residential dwellings, driveways, and lawns. Range and grass will be present on the remainder of the area. Runoff generated within this catchment

area will outlet to OUT-3. Post-development drainage area B4 encompasses most of the land contained in pre-development area A4. Once developed, it will contain a segment of the asphalt roadway, as well as residential dwellings and their corresponding driveways and lawns. As most of the land will remain in its natural state, the other land uses will consist of grass and woodlands. Runoff generated within this catchment area will outlet to OUT-2. Post-development drainage area B5 encompasses the remainder of pre-development areas A2 and A3. It will contain backyard areas under post-development conditions, where the original wooded area will not be altered. Runoff generated in this catchment will outlet to OUT-3. Post-development drainage area B6 encompasses the remainder of pre-development area A4. It will also contain backyard areas under post-development conditions and will be composed of woodlands. Runoff generated in this catchment will outlet to OUT-2.

The external drainage areas will not be altered as a result of the development and will be comprised of their original land use covers. Runoff generated in EXT1 will drain southeast into Out-1, located in areas B1 and B2. Runoff generated in EXT2 will drain northeast onto area B1, which will then be conveyed to Out-1 as well. EXT3 will drain northeast onto area B3, which will be conveyed to Out-3. EXT4 will drain northeast onto area B4, eventually outletting to Out-2.

Sub-catchments B1 (7.16 ha), B2 (2.97 ha), B3 (4.42 ha), B4 (11.24 ha), B5 (1.12 ha) and B6 (4.29 ha) collectively cover 31.2 ha of internal developable area. Land uses include paved shoulders, residential lots, driveways, lawns and remaining woodlands. Runoff from B1 and B2 outlets to OUT-1; B4 and B6 to OUT-2; B3 and B5 to OUT-3. Three 1.5 m-wide paved asphalt shoulders along Street A (total 3,150 m^2) and a 6 m-wide Block 44 corridor with a 3 m stone-dust trail are included. Shoulders are modelled as impervious; the trail is treated as pervious gravel.

The input parameters and results have been summarized in the following tables, while the full detailed output results can be found in Appendix C.

Table 4: Post-Development Input Parameters

Catchment ID	Area (ha)	CN[1]	Ia[2] (mm)	Tp[3] (hr)
NASHYD				
B1	7.16	79	7.6	0.85
B2	2.97	80	7.0	0.75
B3	4.42	79	6.8	0.80
B4	11.24	78	6.6	1.00
B5	1.12	83	4.5	0.50
B6	4.29	68	8.0	0.60
EXT2	2.191	70	7.5	0.75
EXT3	0.060	65	8.0	0.20
EXT4	1.791	69	8.0	0.90
STANDHYD				
EXT1	0.468	85	2.0	0.20
Total:	**35.71**			

Notes: CN refers to the average weighted curve number based on the land cover and land use. Ia refers to the initial abstraction. Tp refers to time to peak.

Table 5: Post-Development VO Model Peak Flow Results (m^3/s)

Catchment	Outlet	6-Hour SCS Type II		12- Hour SCS Type II		24- Hour SCS Type II	
		5-Year	100-Year	5-Year	100-Year	5-Year	100-Year
NASHYD							
B1	Out - 1	0.110	0.305	0.144	0.386	0.184	0.472
B2	Out - 1	0.039	0.116	0.053	0.150	0.070	0.188
B3	Out - 3	0.082	0.219	0.106	0.273	0.134	0.332
B4	Out - 2	0.201	0.516	0.275	0.635	0.320	0.756
B5	Out - 3	0.023	0.066	0.030	0.084	0.040	0.106
B6	Out - 2	0.091	0.262	0.122	0.334	0.160	0.418
EXT2	Out - 1	0.029	0.083	0.038	0.106	0.050	0.133
EXT3	Out - 3	0.002	0.005	0.002	0.008	0.003	0.010
EXT4	Out - 2	0.074	0.192	0.095	0.235	0.121	0.284
STANDHYD							
EXT1	Out - 1	0.016	0.029	0.018	0.033	0.021	0.038

OUT-1's peak flows have increased from pre-development values of 0.153 to 0.177 m^3/s (5-yr, 6 h) and 0.438 to 0.497 m^3/s (100-yr, 6 h), reflecting the inclusion of the paved shoulders and adjusted B1/B2 areas. By contrast, OUT-2's peaks have decreased from 0.368 to 0.284 m^3/s (5-yr, 6 h) and from 1.020 to 0.751 m^3/s (100-yr, 6 h) because the reduction in B4's catchment area more than offsets its slight CN increase. OUT-3 shows a moderate rise, from 0.043 to 0.102 m^3/s (5-yr, 6 h) and from 0.124 to 0.277 m^3/s (100-yr, 6 h), driven by B3's higher curve number.

Consequently, OUT-1 and OUT-3 will require quantity-control measures to bring post-development peaks back to or below pre-development levels, whereas OUT-2 now falls below its existing peaks and does not require an outlet control structure.

The proposed detention basins, roadside swales, culvert sizes and outlet control settings remain appropriate. The 1.5 m-wide asphalt shoulders and 3 m stone-dust trail corridor do not create additional overland flow routes; all runoff continues to follow the roadside ditches and offtake swales as shown on the Post-Development Drainage Plan. OUT-1 and OUT-3 still require the same storage volumes to achieve post ≤ pre, while OUT-2 uncontrolled peaks now fall below existing levels and require no control structure. Water-quality targets and LID measures are likewise unaffected. No redesign of the conceptual SWM facilities is necessary.

3.5 Ultimate Off-Site Flow Destination

All post-development runoff released from Outlets 1-3 converges in the provincially significant wetlands east of the site. The wetland discharges via a tributary to Hutton Creek, which flows to the North Branch of the Jock River and ultimately to the Rideau River. Controlled post-development peaks at all outlets are less than or equal to pre-development peaks (see Table 8).

4.0 MAJOR DRAINAGE ROUTES

The proposed roadside ditches and offtake swales will have an important role in site drainage. They will act as the major drainage routes, will be sized to manage the required flow rate, and will adhere to the MECP guidelines for enhanced grass swales as much as possible. The driveway culverts will be sized for the 5-year storm; however, flows during the 100-year storm will not overtop the driveways greater than 0.30 m. Rock flow check dams will be incorporated to attenuate flows, promote infiltration, and allow for particle filtration. Further details will be provided during detailed design. The site will be designed such that the proposed dwellings will not be adversely affected by any 100-year ponding limits, nor by the adjacent wetlands.

5.0 STORMWATER QUANTITY CONTROL

The following is provided as a summary of pre-development peak flow rates in comparison to the uncontrolled post-development peak flow rates. Table 6 shows that uncontrolled post-development peaks increase at OUT-1 and OUT-3 and decrease at OUT-2 when compared to pre-development.

Table 6: Pre-Development and Uncontrolled Post-Development Peak Flow Results (m3/s)

Design Storm (yr)	6-Hour SCS Type II			12-Hour SCS Type II			24-Hour SCS Type II		
	Pre.	Post.	Δ	Pre.	Post.	Δ	Pre.	Post.	Δ
OUT-1									
5	0.153	0.177	**0.024**	0.204	0.233	**0.029**	0.264	0.299	**0.035**
100	0.438	0.497	**0.059**	0.559	0.627	**0.068**	0.690	0.774	**0.084**
OUT-2									
5	0.368	0.284	**-0.084**	0.484	0.368	**-0.116**	0.623	0.469	**-0.154**
100	1.020	0.751	**-0.269**	1.291	0.954	**-0.346**	1.579	1.144	**-0.435**
OUT-3									
5	0.043	0.102	**0.059**	0.057	0.132	**0.075**	0.074	0.169	**0.095**
100	0.124	0.277	**0.153**	0.158	0.348	**0.190**	0.195	0.425	**0.230**

Based on the results, uncontrolled post-development peak flow, have increased slightly at OUT-1 and OUT-3, due to the increased impervious area from the addition of 1.5 m-wide paved shoulders and minor adjustments to drainage area boundaries. OUT-2, which collect runoff from B4 and B6, shows a reduction in peak flow due to reduction in total catchment area.

For outlets OUT-1 and OUT-3, stormwater management controls will be required to manage runoff and offer restriction of peak flow rates. The proposed stormwater management design will examine both the 5- and 100-year storm events. The roadside ditches and offtake swales to be constructed on-site will be equipped with permanent outlet control devices designed to restrict flows to specified flow rates. It is anticipated that the rear yard offtake swales will have easements associated with the adjacent properties to allow for the temporary storage of water and for future maintenance.

The proposed flat-bottom channels of the swales with estimated gradients of 0.50% along the road and 0.20% in the rear yards will provide ample opportunity for temporary stormwater storage. The ditches will be

constructed with 2.5:1 side slope and 3:1 side slope for those located along the road and in the rear yards, respectively. The opportunity to employ quality control enhancements such as through rock flow check dams will be explored to further offer quality control through a treatment train approach within the development.

For outlet OUT-2, which collects stormwater runoff from drainage areas B4, B6, and EXT4, post-development peak flow rates show a reduction when compared to pre-development peak flow rates. Because OUT-2's uncontrolled peaks now fall below pre-development for every storm event, no quantity-control structure is required at OUT-2.

Detailed sizing of the outlet control structures will be provided during the detailed design stage; however, a conceptual estimate of the requirements has been performed in VO6. The estimated storage requirements have been provided in the table below to confirm the required detention storage volumes for OUT-1 and OUT3.

Table 7: Storage Requirements

Outlet ID	Catchment ID	5-Year Restricted Flow (m^3/s)	5-Year Required Storage (m^3)	100-Year Restricted Flow (m^3/s)	100-Year Required Storage (m^3)
OUT-1	A1+EXT1+EXT2 / B1+B2+EXT1+EXT2	0.234	600	0.648	1300
OUT-3	A3 / B3+B5+EXT3	0.065	500	0.184	1050

Preliminary, high-level calculations have been completed to approximate the available storage on site. The exact location, geometry and alignment of these retention ditches and offtake swales will be confirmed during detailed design.

Concept feasibility is based on a trapezoidal swale section (1.5 m flat bottom, 3H:1V side slopes, 0.90 m ponding to the control crest, 0.3–0.5 % longitudinal grade), giving an active cross-sectional area at depth of A = 3.78 m^2 and a top-water width of ≈ 6.9 m. For near-level storage cells (L = V/A), the indicative lengths to satisfy Table 7 are, for OUT-1, 343.92 m for the 100-year volume and 158.73 m for the 5-year volume; for OUT-3, 277.78 m (100-year) and 132.28 m (5-year). For continuous-grade swales without internal checks (wedge storage, L = 2V/A), the required lengths are, for OUT-1, 687.83 m (100-year) and 317.46 m (5-year), and for OUT-3, 555.56 m (100-year) and 264.55 m (5-year). Corridors shown on the Post-Development Drainage Plan accommodate these ranges; final geometry, lining, driveway-culvert interfaces, and 24–48 h drawdown are addressed during detailed design. Overall, it is anticipated that sufficient storage can be provided to restrict post-development peak flow rates to pre-development levels.

5.1 POST-DEVELOPMENT PEAK FLOW RATES SUMMARY

Based on the maximum available storage, the following table summarizes the anticipated peak flow rates to the respective outlet locations under post-development conditions compared to pre-development levels. Full supporting calculations for the described storage conditions have been provided in Appendix C. Table 8 shows

that post-development peak flows at OUT-1 and OUT-3 are reduced below pre-development levels for all design storms and that proposed storage volumes continue to provide sufficient attenuation, and the post-development peak flows remain below predevelopment levels at both controlled outlets. Detailed design calculations for the proposed outlet control structures will be provided during the detailed design stage.

Table 8: Pre-Development and Controlled Post-Development Peak Flow Results (m^3/s)

Design Storm (yr)	6-Hour SCS Type II			12-Hour SCS Type II			24-Hour SCS Type II		
	Pre.	Post.	Δ	Pre.	Post.	Δ	Pre.	Post.	Δ
OUT-1									
5	0.153	0.124	-0.029	0.204	0.161	-0.043	0.264	0.208	-0.056
100	0.438	0.355	-0.083	0.559	0.463	-0.096	0.690	0.575	-0.115
OUT-3									
5	0.043	0.040	-0.003	0.057	0.051	-0.006	0.074	0.065	-0.009
100	0.124	0.112	-0.012	0.158	0.146	-0.012	0.195	0.184	-0.011

6.0 STORMWATER QUALITY CONTROL

The entire subdivision will employ Best Management Practices (BMPs) wherever possible. The intent of implementing stormwater BMPs throughout the entire development is to ensure that water quality and quantity concerns are addressed at all stages of the development. The stormwater BMPs will be implemented at the lot, conveyance, and end of pipe levels. The new paved shoulders along Street A have been included in the impervious area used for the water-quality sizing to ensure the Enhanced (80 % TSS) target is still met.

Lot level BMPs include the directing of roof leaders onto grassed areas, minimizing ground slopes and maintaining as much of the lot as possible in a natural state. Roof leaders will flow to grass areas, which will provide an opportunity for initial filtration of any sediment and provide an opportunity for absorption and ground water recharge. Recent recommendations by Conservation Authorities and the MECP suggest that yard grading as flat as 0.5% be implemented to promote infiltration. The target range for finished ground slopes will be 1% - 5% where possible. This range of slope will still provide an opportunity for the absorption and filtration process.

The conveyance system to be used in the subdivision is natural overland sheet flow and a combination of roadside ditches and rear yard offtake swales. All swales and ditches will be constructed at minimal gradient where possible, thus promoting absorption and infiltration, as well as providing some opportunity for particle filtration. The gradient of the system will be enough to ensure the continuous flow of stormwater, minimizing standing water. To aid in achieving the quality control objective, additional measures such as permanent rock flow check dams within the ditches and swales will be explored during the detailed design stage. Riprap will be placed at erosion-prone areas and all disturbed areas shall be landscaped as soon as possible.

Given the significant length of open ditch and relatively low percentage of hard surfaced area, the proposed works to be constructed are believed to achieve an enhanced level of quality treatment (80% TSS removal). Details will be provided during the detailed design stage.

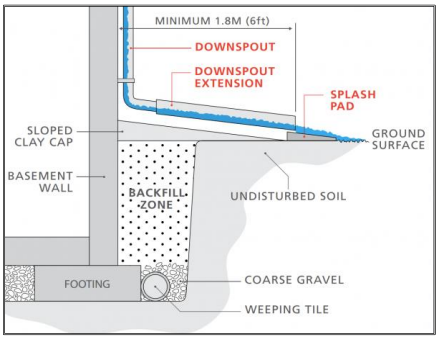
7.0 LOW IMPACT DEVELOPMENT

As the practice of SWM has evolved, increasing emphasis has been placed on treating the runoff as close as possible to the source using a sequence of treatment methods called a "treatment train approach". As a result, Low Impact Development (LID) approaches were established to mimic the existing natural hydrologic environment and to allow the rainwater to infiltrate, filter, and evaporate close to the source. Typical LID practices include rainwater harvesting, green roofs, downspout disconnection, soak-away pits, infiltration trenches and chambers, bio-retention, vegetated filter strips, enhanced grass swales, and permeable pavements.

Based on the type of the proposed development and the existing geotechnical information, downspout disconnections are the most suitable LID features for the site, as shown in the figure below. Downspout disconnection involves directing the runoff from roof leader downspouts to a pervious area, which drains away from the building. This gives an opportunity for the runoff to infiltrate before it reaches the typical curb and gutter system on the street. This also prevents the stormwater runoff from flowing across a "connected" impervious surface such as driveways.

Alternative LID features, such as rainfall harvesting, green roofs, or soak-away pits may not be suitable for the site. They require ongoing maintenance which may necessitate special operations and impose significant efforts to sustain their efficacy. Additionally, LID features on roadways, including permeable pavement or bioswales, may also present a challenge if they go unmaintained and can in turn be detrimental to the overall submission.

Figure 1 – Typical Downspout Disconnection (LID Planning and Design Guide, CVC 2011)



8.0 PROVINCIAL POLICY STATEMENT

The revised Provincial Policy Statement, which came into effect on April 30, 2014, (replacing the PPS issued March 1, 2005) and issued under Section 3 of the Planning Act, notes that Planning authorities shall protect, improve, or restore the quality and quantity of water by:

a) Using the watershed as the ecologically meaningful scale for integrated and long-term planning, which can be a foundation for considering cumulative impacts of development.
b) Minimizing potential negative impacts, including cross-jurisdictional and cross-watershed impacts.
c) Identifying water resource systems consisting of ground water features, hydrologic functions, natural heritage features and areas and surface water features including shoreline areas, which are necessary for the ecological and hydrological integrity of the watershed.
d) Maintaining linkages and related functions among ground water features, hydrologic functions, natural heritage features and areas and surface water features including shoreline areas.
e) Implementing necessary restrictions on development and site alteration to:
    a. protect all municipal drinking water supplies and designated vulnerable areas; and
    b. protect, improve or restore vulnerable surface and ground water, sensitive surface water features and sensitive ground water features and their hydrologic functions.
f) Planning for efficient and sustainable use of water resources, through practices for water conservation and sustaining water quality.
g) Ensuring consideration of environmental lake capacity, where applicable; and
h) Ensuring stormwater management practices minimize stormwater volumes and contaminant loads; and maintain or increase the extent of vegetative and pervious surfaces.

The following table summarizes how many of the above noted sub-sections have been met.

Table 9: Provincial Policy Statement

Sub-section	Applicability
b	The development proposed to limit disturbance as much as possible, maintaining much of the land in its natural state. The percent imperviousness is estimated at 58%, supporting minimized disturbances by preserving natural features.
d, e	The proposed stormwater management plan provides that post-development drainage patterns will be consistent with pre-development patterns such that natural features existing within the site are not negatively impacted by altered drainage flows.
f	The proposed stormwater management plan will provide an enhanced level of quality control. This will ensure that the proposed development does not have any negative impacts from a quality perspective, and through temporary ponding, etc., to achieve the necessary quality objectives. Enhanced grass swales, infiltration trench and rock check dams achieve the MECP enhanced quality control (80% TSS removal).
g	Prompt stabilization and swales conveyance minimize sediment loading and protect receiving water bodies.
h	Stormwater practices including paved shoulders and the trail minimize containment loads and maintain extensive previous surfaces.

9.0 EROSION AND SEDIMENT CONTROL

A site-specific Erosion and Sediment Control Plan will be prepared during the design development stage of the application process, delineating the proposed features to be implemented on-site as temporary and permanent means of managing erosion and sediment control. Following Best Management Practices are recommended to be incorporated into the Erosion and Sediment Control plans.

9.1 TEMPORARY MEASURES

Before construction begins, applicable temporary light silt fence (OPSD 219.110), straw bale and rock flow check dams shall be installed at all natural runoff outlets from the property. It is crucial that these controls be maintained throughout construction and inspection of sediment and erosion control will be facilitated by the Contractor or Contract Administration staff throughout the construction period.

The Contractor, at their discretion or at the instruction of the Township, Conservation Authority or the Contract Administrator shall increase the quantity of sediment and erosion controls on-site to ensure that the site is operating as intended and no additional sediment finds its way offsite or into the adjacent wetlands. Measures shall be inspected weekly and after all rainfall events. Care shall be taken to properly remove sediment from the fences and check dams as required.

Work through winter months shall be closely monitored for erosion along sloped areas. Should erosion be noted, the Contractor shall be alerted and shall take all necessary steps to rectify the situation. Should the Contractor's efforts fail at remediating the eroded areas, the Contractor shall contact the Conservation Authority to review the site conditions and determine the appropriate course of action.

9.2 PERMANENT MEASURES

Rip-rap shall be placed at all locations that have the potential for concentrated flow, particularly at the outflow of all proposed roadside ditches and offtake swales. In addition, rip-rap and geotextile shall be placed at the inlet and outlet of the road crossing culverts. It is crucial that the Contractor ensure that the geotextile is keyed in properly to ensure runoff does not undermine the rip-rapped area. Additional rip-rap is to be placed at erosion prone locations as identified by the Contractor / Contract Administrator / Township or RVCA.

It is expected that the Contractor will promptly ensure that all disturbed areas receive topsoil and seed and that grass be established as soon as possible. Any areas of excess fill shall be removed or levelled as soon as possible and must be located a sufficient distance from the wetlands to ensure that no sediment is washed out into the wetlands. As the vegetation growth along the proposed roadside, offtake swales and within the dry retention areas provides a key component to the control of sediment for the site, it must be properly maintained once established. As the lots are sold it will be up to the landowners to maintain that section of vegetation and ensure that they are not overgrown or impeded by foreign objects.

10.0 SUMMARY

- Runoff will be conveyed via overland sheet flow towards the proposed roadside ditches and offtake swales, which ultimately discharging to one of three local wetlands (OUT-1 on-site, OUT-2 east of the site, and OUT-3 northeast of the site).
- Preliminary calculations demonstrate that sufficient storage can be provided to restrict post-development peak flow rates to pre-development levels. Roadside ditches and offtake swales are proposed to convey runoff, while rock flow check dams and outlet control structures will be employed to limit post-development peak flow rates to pre-development levels.
- Best Management Practices will be implemented throughout (lot level, conveyance and end-of-pipe) to achieve the Enhanced quality-control target (80 % TSS removal). All new impervious including the paved shoulders has been incorporated in the sizing. Further details will be confirmed during detailed design.

11.0 RECOMMENDATIONS

Based on the information presented in this report, we recommend that Beckwith Township and the Rideau Valley Conservation Authority grant approval to this Conceptual Stormwater Management Report, in support of the Santaguida Subdivision and its Post-Development Drainage Plan. The SWM strategy demonstrates that post-development peak flows at OUT-1 and OUT-3 will be controlled at or below pre-development levels, while OUT-2 requires no additional control. All impervious areas have been accurately accounted for in the hydrologic and water-quality designs, and the proposed measures meet the MECP Enhanced treatment objective. No further conceptual revisions are necessary.

This report is respectfully submitted by,

Egis Canada Ltd.

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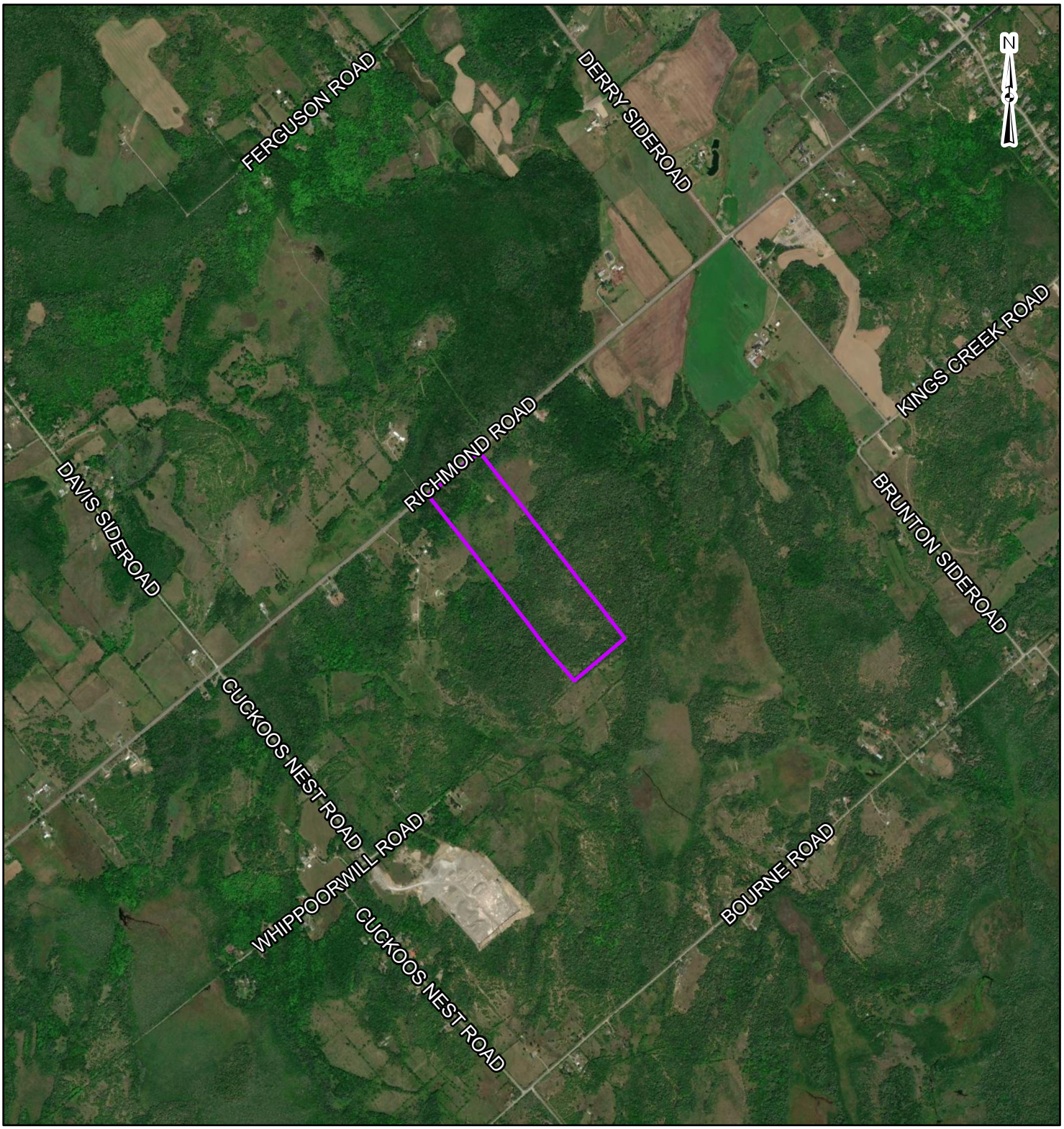
2025-08-28

LICENSED PROFESSIONAL ENGINEER
R.S. RAJA CHOCKALINGAM
100526830
PROVINCE OF ONTARIO

CONCEPTUAL STORMWATER MANAGEMENT REPORT
SANTAGUIDA SUBDIVISION

APPENDIX A – LOCATION PLAN



LEGEND

Site Boundary

500 250 0 500

Scale 1:25,000 Metres

REFERENCE

GIS data provided by the Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry, 2025.

CLIENT: DOMENIC SANTAGUIDA

PROJECT: SANTAGUIDA SUBDIVISION BECKWITH

TITLE: SANTAGUIDA SUBDIVISION BECKWITH TOWNSHIP

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PROJECT NO:PP-20-9510	FIGURE: 1
Date	Jun., 06, 2025
GIS	SZ
Checked By	RC

C:\Users\a.hamed\McIntosh Perry\GIS - Documents\Projects\2020\PP\PP-20-9510 Santaguida_Subdivision_Beckwith\aprx\LandDevelopment\PP-20-9510_SiteLayout.aprx

CONCEPTUAL STORMWATER MANAGEMENT REPORT
SANTAGUIDA SUBDIVISION

APPENDIX B – PRE-DEVELOPMENT DRAINAGE PLAN, MODEL SCHEMATIC & CALCULATIONS

NOTES:

1. BUILDING ENVELOPE (WELL, SEPTIC AND DWELLING) LOCATIONS AND SIZES SHOWN ON THIS PLAN ARE SCHEMATIC ONLY. TO BE CONFIRMED BY HYDROGEOLOGICAL REPORT RECOMMENDATIONS.
2. TEST WELL LOCATIONS SHOWN ON THIS PLAN ARE APPROXIMATE ONLY AND SHALL BE VERIFIED PRIOR TO DEVELOPMENT OF THE LOT. ANY TEST WELLS THAT DO NOT MEET OBC REQUIREMENTS SHALL BE ABANDONED IN ACCORDANCE WITH O.REG 903.

KEY PLAN N.T.S.
EXT1 0.47 ha 78.6
AREA EXT1 DRAINS SOUTHEAST TO THE UNEVALUATED WETLAND PRESENT ON THE SUBJECT PROPERTY.
UNEVALUATED WETLAND
A1 8.86 ha 66.1
AREA A1 DRAINS NORTHWEST TO THE UNEVALUATED WETLAND PRESENT ON THE SUBJECT PROPERTY.
A2 4.70 ha 66.4
AREA A2 DRAINS NORTHEAST TO THE LARGE UNEVALUATED WETLAND LOCATED EAST OF THE SUBJECT PROPERTY.
A3 3.48 ha 66.7
AREA A3 DRAINS NORTHEAST TO THE SMALL UNEVALUATED WETLAND LOCATED IMMEDIATELY NORTHEAST OF THE SUBJECT PROPERTY.
A4 16.46 ha 70.3
AREA A4 DRAINS NORTHEAST TO THE LARGE UNEVALUATED WETLAND LOCATED EAST OF THE SUBJECT PROPERTY.
EXT2 2.19 ha 64.2
AREA EXT2 DRAINS NORTHEAST INTO AREA A1 WHICH THEN OUTLETS TO THE UNEVALUATED WETLAND PRESENT ON THE SUBJECT PROPERTY.
EXT3 0.45ha 64.6
AREA EXT3 DRAINS NORTHEAST INTO AREA A2 WHICH THEN OUTLETS TO THE LARGE UNEVALUATED WETLAND LOCATED EAST OF THE SUBJECT PROPERTY.
EXT4 1.79 ha 78.7
AREA EXT4 DRAINS NORTHEAST INTO AREA A4 WHICH THEN OUTLETS TO THE LARGE UNEVALUATED WETLAND LOCATED EAST OF THE SUBJECT PROPERTY.
WHIP-POOR-WILL 170m SETBACK (TYP.)
WHIP-POOR-WILL CALLING LOCATION (TYP.)
WHIP-POOR-WILL 20m SETBACK (TYP.)
TW1
TW2
TW3
TW4
TW5
10.0m
30.00
FOR REVIEW ONLY
NOT FOR CONSTRUCTION
SCALE 1:1500
0 25 50 75 100 125 150 Metres

LEGEND

AREA I.D. — A1	AREA SIZE (HECTARES) — 5.00 ha
CURVE NUMBER — 50.00	DIRECTION OF SURFACE DRAINAGE (arrow)

NORTH: | STAMP:

No.	Revision/Issue	Date

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Designed by:	MO
Drawn by:	SH
Checked By:	RC
Scale:	1:1500

Client: DOMENIC SANTAGUIDA
3625 RIVERGATE WAY, OTTAWA, ON, K0A 1B0

Project: SANTAGUIDA SUBDIVISION
BECKWITH TOWNSHIP

Drawing Title: CONCEPTUAL PRE-DEVELOPMENT DRAINAGE PLAN

Check and verify all dimensions before proceeding with the work — Do not scale drawings

Date: JAN.09.2023

Project Number: 0PP-20-9510

Drawing Number: PRE

Hydrologic Parameters for A1

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	A1	Date:	2025-06-30

Drainage Area	8.861	ha
Precent Impervious	0.0	%

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

Slope, Landuse and Soil Type Identification

Agriculture	0	0	ha
Range	1.613	0	ha
Grass	0.052	0.008	ha
Woods	4.45	0.239	ha
Wetland	0.337	2.08	ha
Gravel	0.082	0	ha
Impervious	0	0	ha
Sum	6.534	2.327	ha
Soil Name	Farmington	Muck	
Soil Type	B	D	
Composite C	0.11	0.06	

	Pervious Areas	Impervious Areas	
Length	318.70	0	m
US Elev.	134.80	0	m
DS Elev.	130.00	0	m
Slope	1.51		%
Terrain	Flat		

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	FlatB	0.43	0.18	0.11	0.08	0.05	0.43	0.90	0.11	0.11
	FlatD	0.73	0.32	0.20	0.12	0.05	0.50	0.90	0.06	0.06
SCS Curve No., CN	B	78.00	69.00	69.00	60.00	50.00	85.00	98.00	62.09	62.09
	D	89.00	84.00	84.00	79.00	77.00	89.00	98.00	77.23	77.23
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	8.5	8.5

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
318.7	134.80	130	1.51	Flat	0.10	50.80	13.45	10	50.8	0.57

Hydrologic Parameters Summary

Catchment	8.861		ha
Impervious Percent	0.0		%
Slope	1.51		%
Runoff Co-efficient	0.10		
SCS Curve No:	66.07	66.07	
Modified CN*	66	66	
Initial Abstraction	8.5	8.5	mm
Time of Concentration, Tc	50.8		min
Time to Peak, Tp	0.57		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.

2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.

3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.

4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

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Rational Method - A1

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	A1	Date:	2025-06-30

Drainage Area	8.861	ha
Precent Impervious	0.0	%
Composite Runoff Co-efficent	0.10	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	8.861	0.10	50.8	19.6	1	0.047	47
2- Year	8.861	0.10	50.8	22.7	1	0.054	54
5-Year	8.861	0.10	50.8	30.1	1	0.072	72
10-Year	8.861	0.10	50.8	35.0	1	0.084	84
25-Year	8.861	0.11	50.8	41.2	10	0.108	108
50-Year	8.861	0.12	50.8	45.8	20	0.131	131
100-Year	8.861	0.13	50.8	50.3	25	0.156	156

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

Hydrologic Parameters for A2

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	A2	Date:	2025-06-30

Drainage Area	4.703	ha
Precent Impervious	0.0	%

Rainfall Data

Guage Station:	Smith Falls IDF Lookup	
100 Year 12 HR Rainfall Depth:	94.6	mm

Slope, Landuse and Soil Type Identification

Agriculture	0	ha
Range	3.416	ha
Grass	0	ha
Woods	1.232	ha
Wetland	0.055	ha
Gravel	0	ha
Impervious	0	ha
Sum	4.703	ha
Soil Name	Farmington	
Soil Type	B	
Composite C	0.15	

	Pervious Areas	Impervious Areas	
Length	305.50	0	m
US Elev.	135.00	0	m
DS Elev.	131.00	0	m
Slope	1.31		%
Terrain	Flat		

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	FlatB	0.43	0.18	0.11	0.08	0.05	0.43	0.90	0.15	0.15
SCS Curve No., CN	B	78.00	69.00	69.00	60.00	50.00	85.00	98.00	66.42	66.42
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	8.0	8.0

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
305.5	135.00	131	1.31	Flat	0.15	49.52	14.13	10	49.5	0.55

Hydrologic Parameters Summary

Catchment	4.703		ha
Impervious Percent	0.0		%
Slope	1.31		%
Runoff Co-efficient	0.15		
SCS Curve No:	66.42	66.42	
Modified CN*	65	65	
Initial Abstraction	8.0	8.0	mm
Time of Concentration, Tc	49.5		min
Time to Peak, Tp	0.55		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.
3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

egis

Rational Method - A2

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	A2	Date:	2025-06-30

Drainage Area	4.703	ha
Precent Impervious	0.0	%
Composite Runoff Co-efficent	0.15	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	4.703	0.15	49.5	20.0	1	0.038	38
2- Year	4.703	0.15	49.5	23.1	1	0.044	44
5-Year	4.703	0.15	49.5	30.7	1	0.058	58
10-Year	4.703	0.15	49.5	35.7	1	0.068	68
25-Year	4.703	0.17	49.5	42.0	10	0.091	91
50-Year	4.703	0.18	49.5	46.7	20	0.107	107
100-Year	4.703	0.19	49.5	51.2	25	0.124	124

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

Hydrologic Parameters for A3

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	A3	Date:	2025-06-30

Drainage Area	3.481	ha
Precent Impervious	0.0	%

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

Slope, Landuse and Soil Type Identification

Agriculture	0	0	ha
Range	1.161	0	ha
Grass	0	0	ha
Woods	1.648	0.672	ha
Wetland	0	0	ha
Gravel	0	0	ha
Impervious	0	0	ha
Sum	2.809	0.672	ha
Soil Name	Farmington	Muck	
Soil Type	B	D	
Composite C	0.12	0.12	

	Pervious Areas	Impervious Areas	
Length	292.30	0	m
US Elev.	133.90	0	m
DS Elev.	131.00	0	m
Slope	0.99		%
Terrain	Flat		

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	FlatB	0.43	0.18	0.11	0.08	0.05	0.43	0.90	0.12	0.12
	FlatD	0.73	0.32	0.20	0.12	0.05	0.50	0.90	0.12	0.12
SCS Curve No., CN	B	78.00	69.00	69.00	60.00	50.00	85.00	98.00	63.72	63.72
	D	89.00	84.00	84.00	79.00	77.00	89.00	98.00	79.00	79.00
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	8.0	8.0

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
292.3	133.90	131	0.99	Flat	0.12	54.80	14.74	10	54.8	0.61

Hydrologic Parameters Summary

Catchment	3.481		ha
Impervious Percent	0.0		%
Slope	0.99		%
Runoff Co-efficient	0.12		
SCS Curve No:	66.67	66.67	
Modified CN*	65	65	
Initial Abstraction	8.0	8.0	mm
Time of Concentration, Tc	54.8		min
Time to Peak, Tp	0.61		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.
3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

Rational Method - A3

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	A3	Date:	2025-06-30

Drainage Area	3.481	ha
Precent Impervious	0.0	%
Composite Runoff Co-efficent	0.12	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	3.481	0.12	54.8	18.6	1	0.021	21
2- Year	3.481	0.12	54.8	21.5	1	0.024	24
5-Year	3.481	0.12	54.8	28.6	1	0.032	32
10-Year	3.481	0.12	54.8	33.2	1	0.037	37
25-Year	3.481	0.13	54.8	39.1	10	0.048	48
50-Year	3.481	0.14	54.8	43.5	20	0.057	57
100-Year	3.481	0.15	54.8	47.7	25	0.067	67

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

Hydrologic Parameters for A4

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	A4	Date:	2025-06-30

Drainage Area	16.455	ha
Precent Impervious	0.0	%

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

Slope, Landuse and Soil Type Identification

Agriculture	0	0	ha
Range	0.749	0.337	ha
Grass	0	0	ha
Woods	7.219	8.15	ha
Wetland	0	0	ha
Gravel	0	0	ha
Impervious	0	0	ha
Sum	7.968	8.487	ha
Soil Name	Farmington	Muck	
Soil Type	B	D	
Composite C	0.09	0.13	

	Pervious Areas	Impervious Areas	
Length	294.90	0	m
US Elev.	134.80	0	m
DS Elev.	131.00	0	m
Slope	1.29		%
Terrain	Flat		

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	FlatB	0.43	0.18	0.11	0.08	0.05	0.43	0.90	0.09	0.09
	FlatD	0.73	0.32	0.20	0.12	0.05	0.50	0.90	0.13	0.13
SCS Curve No., CN	B	78.00	69.00	69.00	60.00	50.00	85.00	98.00	60.85	60.85
	D	89.00	84.00	84.00	79.00	77.00	89.00	98.00	79.20	79.20
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	8.0	8.0

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
294.9	134.80	131	1.29	Flat	0.11	50.96	12.07	10	51.0	0.57

Hydrologic Parameters Summary

Catchment	16.455		ha
Impervious Percent	0.0		%
Slope	1.29		%
Runoff Co-efficient	0.11		
SCS Curve No:	70.31	70.31	
Modified CN*	71	71	
Initial Abstraction	8.0	8.0	mm
Time of Concentration, Tc	51.0		min
Time to Peak, Tp	0.57		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.

2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.

3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.

4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

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Rational Method - A4

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	A4	Date:	2025-06-30

Drainage Area	16.455	ha
Precent Impervious	0.0	%
Composite Runoff Co-efficent	0.11	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	16.455	0.11	51.0	19.5	1	0.095	95
2- Year	16.455	0.11	51.0	22.6	1	0.110	110
5-Year	16.455	0.11	51.0	30.0	1	0.147	147
10-Year	16.455	0.11	51.0	35.0	1	0.171	171
25-Year	16.455	0.12	51.0	41.1	10	0.219	219
50-Year	16.455	0.13	51.0	45.7	20	0.264	264
100-Year	16.455	0.14	51.0	50.2	25	0.312	312

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

Hydrologic Parameters for EXT1

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	EXT1	Date:	2025--30

Drainage Area	0.468	ha
Precent Impervious	33.1	%

Rainfall Data

Guage Station:	Smith Falls IDF Lookup	
100 Year 12 HR Rainfall Depth:	94.6	mm

Slope, Landuse and Soil Type Identification

Agriculture	0	ha
Range	0	ha
Grass	0.011	ha
Woods	0	ha
Wetland	0.267	ha
Gravel	0.035	ha
Impervious	0.155	ha
Sum	0.468	ha
Soil Name	Muck	
Soil Type	D	
Composite C	0.39	

	Pervious Areas	Impervious Areas	
Length	8.70	5	m
US Elev.	130.80	131	m
DS Elev.	129.30	130.8	m
Slope	17.24	4.00	%
Terrain	Hilly	Rolling	

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	HillyD	0.78	0.35	0.28	0.21	0.05	0.70	0.90	0.39	0.13
SCS Curve No., CN	D	89.00	84.00	84.00	79.00	77.00	89.00	98.00	85.02	78.59
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	6.5	9.0

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
13.7	131.00	129.3	12.41	Hilly	0.39	3.73	0.51	10	10.0	0.11

Hydrologic Parameters Summary

Catchment	0.468		ha
Impervious Percent	33.1		%
Slope	12.41		%
Runoff Co-efficient	0.39		
SCS Curve No:	85.02	78.59	
Modified CN*	87	81	
Initial Abstraction	6.5	9.0	mm
Time of Concentration, Tc	10.0		min
Time to Peak, Tp	0.11		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.

2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.

3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.

4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

Rational Method - EXT1

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	EXT1	Date:	2025-06-30

Drainage Area	0.468	ha
Precent Impervious	33.1	%
Composite Runoff Co-efficent	0.39	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	0.468	0.39	10.0	57.7	1	0.028	28
2- Year	0.468	0.39	10.0	70.7	1	0.035	35
5-Year	0.468	0.39	10.0	93.8	1	0.046	46
10-Year	0.468	0.39	10.0	109.2	1	0.054	54
25-Year	0.468	0.43	10.0	128.4	10	0.070	70
50-Year	0.468	0.47	10.0	142.8	20	0.085	85
100-Year	0.468	0.49	10.0	156.7	25	0.097	97

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

Hydrologic Parameters for EXT2

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	EXT2	Date:	2025-06-30

Drainage Area	2.191	ha
Precent Impervious	0.0	%

Rainfall Data

Guage Station:	Smith Falls IDF Lookup	
100 Year 12 HR Rainfall Depth:	94.6	mm

Slope, Landuse and Soil Type Identification

Agriculture	0	0	ha
Range	0.84	0	ha
Grass	0	0	ha
Woods	1.265	0.086	ha
Wetland	0	0	ha
Gravel	0	0	ha
Impervious	0	0	ha
Sum	2.105	0.086	ha
Soil Name	Farmington	Muck	
Soil Type	B	D	
Composite C	0.12	0.12	

	Pervious Areas	Impervious Areas	
Length	285.80	0	m
US Elev.	135.90	0	m
DS Elev.	131.00	0	m
Slope	1.71		%
Terrain	Flat		

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	FlatB	0.43	0.18	0.11	0.08	0.05	0.43	0.90	0.12	0.12
	FlatD	0.73	0.32	0.20	0.12	0.05	0.50	0.90	0.12	0.12
SCS Curve No., CN	B	78.00	69.00	69.00	60.00	50.00	85.00	98.00	63.59	63.59
	D	89.00	84.00	84.00	79.00	77.00	89.00	98.00	79.00	79.00
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	8.0	8.0

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
285.8	135.90	131	1.71	Flat	0.12	45.25	13.53	10	45.3	0.51

Hydrologic Parameters Summary

Catchment	2.191		ha
Impervious Percent	0.0		%
Slope	1.71		%
Runoff Co-efficient	0.12		
SCS Curve No:	64.20	64.20	
Modified CN*	63	63	
Initial Abstraction	8.0	8.0	mm
Time of Concentration, Tc	45.3		min
Time to Peak, Tp	0.51		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.
3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

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Rational Method - EXT2

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	EXT2	Date:	2025-06-30

Drainage Area	2.191	ha
Precent Impervious	0.0	%
Composite Runoff Co-efficent	0.12	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	2.191	0.12	45.3	21.3	1	0.015	15
2- Year	2.191	0.12	45.3	24.6	1	0.017	17
5-Year	2.191	0.12	45.3	32.6	1	0.023	23
10-Year	2.191	0.12	45.3	38.0	1	0.027	27
25-Year	2.191	0.13	45.3	44.7	10	0.034	34
50-Year	2.191	0.14	45.3	49.7	20	0.041	41
100-Year	2.191	0.15	45.3	54.5	25	0.048	48

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

Hydrologic Parameters for EXT3

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	EXT3	Date:	2025-06-30

Drainage Area	0.055	ha
Precent Impervious	0.0	%

Rainfall Data

Guage Station:	Smith Falls IDF Lookup	
100 Year 12 HR Rainfall Depth:	94.6	mm

Slope, Landuse and Soil Type Identification

Agriculture	0	ha
Range	0.028	ha
Grass	0	ha
Woods	0.027	ha
Wetland	0	ha
Gravel	0	ha
Impervious	0	ha

	Pervious Areas	Impervious Areas	
Length	28.60	0	m
US Elev.	136.00	0	m
DS Elev.	135.00	0	m
Slope	3.50		%
Terrain	Rolling		

Sum	0.055	ha
Soil Name	Farmington	
Soil Type	B	
Composite C	0.16	

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	RollingB	0.48	0.20	0.16	0.11	0.05	0.53	0.90	0.16	0.16
SCS Curve No., CN	B	78.00	69.00	69.00	60.00	50.00	85.00	98.00	64.58	64.58
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	8.0	8.0

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
28.6	136.00	135	3.50	Rolling	0.16	10.84	1.70	10	10.8	0.12

Hydrologic Parameters Summary

Catchment	0.055		ha
Impervious Percent	0.0		%
Slope	3.50		%
Runoff Co-efficient	0.16		
SCS Curve No:	64.58	64.58	
Modified CN*	63	63	
Initial Abstraction	8.0	8.0	mm
Time of Concentration, Tc	10.8		min
Time to Peak, Tp	0.12		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.
3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

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Rational Method - EXT3

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	EXT3	Date:	2025-06-30

Drainage Area	0.055	ha
Precent Impervious	0.0	%
Composite Runoff Co-efficent	0.16	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	0.055	0.16	10.8	55.1	1	0.001	1
2- Year	0.055	0.16	10.8	67.0	1	0.002	2
5-Year	0.055	0.16	10.8	88.9	1	0.002	2
10-Year	0.055	0.16	10.8	103.4	1	0.002	2
25-Year	0.055	0.18	10.8	121.7	10	0.003	3
50-Year	0.055	0.19	10.8	135.3	20	0.004	4
100-Year	0.055	0.20	10.8	148.5	25	0.004	4

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

Hydrologic Parameters for EXT4

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	EXT4	Date:	2025-06-30

Drainage Area	1.791	ha
Precent Impervious	0.0	%

Rainfall Data

Guage Station:	Smith Falls IDF Lookup	
100 Year 12 HR Rainfall Depth:	94.6	mm

Slope, Landuse and Soil Type Identification

Agriculture	0	0	ha
Range	0.06	0	ha
Grass	0	0	ha
Woods	0	1.731	ha
Wetland	0	0	ha
Gravel	0	0	ha
Impervious	0	0	ha
Sum	0.06	1.731	ha
Soil Name	Farmington	Muck	
Soil Type	B	D	
Composite C	0.20	0.15	

	Pervious Areas	Impervious Areas	
Length	119.20	0	m
US Elev.	137.60	0	m
DS Elev.	133.50	0	m
Slope	3.44		%
Terrain	Rolling		

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	RollingB	0.48	0.20	0.16	0.11	0.05	0.53	0.90	0.20	0.20
	RollingD	0.78	0.34	0.24	0.15	0.05	0.60	0.90	0.15	0.15
SCS Curve No., CN	B	78.00	69.00	69.00	60.00	50.00	85.00	98.00	69.00	69.00
	D	89.00	84.00	84.00	79.00	77.00	89.00	98.00	79.00	79.00
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	8.0	8.0

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
119.2	137.60	133.5	3.44	Rolling	0.15	22.49	5.01	10	22.5	0.25

Hydrologic Parameters Summary

Catchment	1.791		ha
Impervious Percent	0.0		%
Slope	3.44		%
Runoff Co-efficient	0.15		
SCS Curve No:	78.66	78.66	
Modified CN*	80	80	
Initial Abstraction	8.0	8.0	mm
Time of Concentration, Tc	22.5		min
Time to Peak, Tp	0.25		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.
3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

egis

Rational Method - EXT4

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	EXT4	Date:	2025-06-30

Drainage Area	1.791	ha
Precent Impervious	0.0	%
Composite Runoff Co-efficent	0.15	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	1.791	0.15	22.5	34.6	1	0.025	25
2- Year	1.791	0.15	22.5	40.1	1	0.029	29
5-Year	1.791	0.15	22.5	53.2	1	0.039	39
10-Year	1.791	0.15	22.5	61.9	1	0.045	45
25-Year	1.791	0.17	22.5	72.8	10	0.060	60
50-Year	1.791	0.18	22.5	81.0	20	0.071	71
100-Year	1.791	0.19	22.5	88.9	25	0.082	82

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

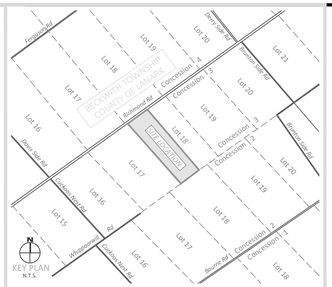
CONCEPTUAL STORMWATER MANAGEMENT REPORT
SANTAGUIDA SUBDIVISION

APPENDIX C – POST-DEVELOPMENT DRAINAGE PLAN, MODEL SCHEMATIC & CALCULATIONS

NOTES:

1. BUILDING ENVELOPE (WELL, SEPTIC AND DWELLING) LOCATIONS AND SIZES SHOWN ON THIS PLAN ARE SCHEMATIC ONLY. TO BE CONFIRMED BY HYDROGEOLOGICAL REPORT RECOMMENDATIONS.

2. TEST WELL LOCATIONS SHOWN ON THIS PLAN ARE APPROXIMATE ONLY AND SHALL BE VERIFIED PRIOR TO DEVELOPMENT OF THE LOT. ANY TEST WELLS THAT DO NOT MEET OBC REQUIREMENTS SHALL BE ABANDONED IN ACCORDANCE WITH O.REG 903.



FOR REVIEW ONLY
NOT FOR CONSTRUCTION

SCALE 1 : 1500
0 25 50 75 100 125 150 Metres

LEGEND

AREA I.D. — B1 | 5.00 ha | 50.00 — AREA SIZE (HECTARES) / CURVE NUMBER

DIRECTION OF SURFACE DRAINAGE

CONCEPTUAL STORMWATER MANAGEMENT FACILITIES

NORTH:

STAMP:

No.	Revision/Issue	Date

egis
3240 Drummond Concession 5A, R.R.7
Perth, ON K7H 3C9
Tel: 613-267-6524 Fax: 613-267-7992
www.egis-group.com

Designed by:	MO
Drawn by:	SH
Checked By:	RC
Scale:	1:1500

Client: DOMENIC SANTAGUIDA
3625 RIVERGATE WAY, OTTAWA, ON, K0A 1B0

Project: SANTAGUIDA SUBDIVISION
BECKWITH TOWNSHIP

Drawing Title: CONCEPTUAL POST-DEVELOPMENT DRAINAGE PLAN

Check and verify all dimensions before proceeding with the work — Do not scale drawings

Date: JAN.09.2023
Project Number: 0PP-20-9510
Drawing Number: POST

Hydrologic Parameters for B1

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	B1	Date:	2025-06-30

Drainage Area	8.070	ha
Precent Impervious	9.2	%

Rainfall Data

Guage Station:	Smith Falls IDF Lookup	
100 Year 12 HR Rainfall Depth:	94.6	mm

Slope, Landuse and Soil Type Identification

Agriculture	0	0	ha
Range	1.163	0	ha
Grass	0.9	0	ha
Woods	3.054	0.143	ha
Wetland	0.337	1.73	ha
Gravel	0	0	ha
Impervious	0.683	0.06	ha
Sum	6.137	1.933	ha
Soil Name	Farmington	Muck	
Soil Type	B	D	
Composite C	0.19	0.08	

	Pervious Areas	Impervious Areas	
Length	310.00	45	m
US Elev.	135.20	135.7	m
DS Elev.	130.50	135.2	m
Slope	1.52	1.11	%
Terrain	Flat	Flat	

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	FlatB	0.43	0.18	0.11	0.08	0.05	0.43	0.90	0.19	0.10
	FlatD	0.73	0.32	0.20	0.12	0.05	0.50	0.90	0.08	0.06
SCS Curve No., CN	B	78.00	69.00	69.00	60.00	50.00	85.00	98.00	66.71	62.79
	D	89.00	84.00	84.00	79.00	77.00	89.00	98.00	77.80	77.15
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	7.6	8.2

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
355	135.70	130.5	1.46	Flat	0.16	50.96	15.22	10	51.0	0.57

Hydrologic Parameters Summary

Catchment	8.07		ha
Impervious Percent	9.2		%
Slope	1.46		%
Runoff Co-efficient	0.16		
SCS Curve No:	69.36	66.46	
Modified CN*	69	66	
Initial Abstraction	7.6	8.2	mm
Time of Concentration, Tc	51.0		min
Time to Peak, Tp	0.57		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.
3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

Rational Method - B1

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	B1	Date:	2025-06-30

Drainage Area	8.07	ha
Precent Impervious	9.2	%
Composite Runoff Co-efficent	0.16	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters							
Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method							
Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	8.07	0.16	51.0	19.5	1	0.068	68
2- Year	8.07	0.16	51.0	22.6	1	0.079	79
5-Year	8.07	0.16	51.0	30.0	1	0.105	105
10-Year	8.07	0.16	51.0	35.0	1	0.122	122
25-Year	8.07	0.18	51.0	41.1	10	0.161	161
50-Year	8.07	0.19	51.0	45.7	20	0.189	189
100-Year	8.07	0.20	51.0	50.2	25	0.219	219

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

Hydrologic Parameters for B2

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	B2	Date:	2025-06-30

Drainage Area	2.966	ha
Precent Impervious	0.0	%

Rainfall Data

Guage Station:	Smith Falls IDF Lookup	
100 Year 12 HR Rainfall Depth:	94.6	mm

Slope, Landuse and Soil Type Identification

Agriculture	0	0	ha
Range	0.703	0.047	ha
Grass	0	0	ha
Woods	1.865	0	ha
Wetland	0.06	0.291	ha
Gravel	0	0	ha
Impervious	0	0	ha
Sum	2.628	0.338	ha
Soil Name	Farmington	Muck	
Soil Type	B	D	
Composite C	0.11	0.09	

	Pervious Areas	Impervious Areas	
Length	214.00	0	m
US Elev.	133.70	0	m
DS Elev.	130.50	0	m
Slope	1.50		%
Terrain	Flat		

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	FlatB	0.43	0.18	0.11	0.08	0.05	0.43	0.90	0.11	0.11
	FlatD	0.73	0.32	0.20	0.12	0.05	0.50	0.90	0.09	0.09
SCS Curve No., CN	B	78.00	69.00	69.00	60.00	50.00	85.00	98.00	62.18	62.18
	D	89.00	84.00	84.00	79.00	77.00	89.00	98.00	77.97	77.97
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	8.2	8.2

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
214	133.70	130.5	1.50	Flat	0.11	41.30	10.09	10	41.3	0.46

Hydrologic Parameters Summary

Catchment	2.966		ha
Impervious Percent	0.0		%
Slope	1.50		%
Runoff Co-efficient	0.11		
SCS Curve No:	63.98	63.98	
Modified CN*	62	62	
Initial Abstraction	8.2	8.2	mm
Time of Concentration, Tc	41.3		min
Time to Peak, Tp	0.46		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.
3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

Rational Method - B2

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	B2	Date:	2025-06-30

Drainage Area	2.966	ha
Precent Impervious	0.0	%
Composite Runoff Co-efficent	0.11	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	2.966	0.11	41.3	22.7	1	0.020	20
2- Year	2.966	0.11	41.3	26.2	1	0.023	23
5-Year	2.966	0.11	41.3	34.8	1	0.031	31
10-Year	2.966	0.11	41.3	40.5	1	0.036	36
25-Year	2.966	0.12	41.3	47.6	10	0.046	46
50-Year	2.966	0.13	41.3	53.0	20	0.055	55
100-Year	2.966	0.14	41.3	58.2	25	0.065	65

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

Hydrologic Parameters for B3

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	B3	Date:	2025-06-30

Drainage Area	4.576	ha
Precent Impervious	11.6	%

Rainfall Data

Guage Station:	Smith Falls IDF Lookup	
100 Year 12 HR Rainfall Depth:	94.6	mm

Slope, Landuse and Soil Type Identification

Agriculture	0	ha
Range	3.291	ha
Grass	0.7	ha
Woods	0	ha
Wetland	0.055	ha
Gravel	0	ha
Impervious	0.53	ha
Sum	4.576	ha
Soil Name	Farmington	
Soil Type	B	
Composite C	0.25	

	Pervious Areas	Impervious Areas	
Length	340.00	0	m
US Elev.	136.10	0	m
DS Elev.	132.00	0	m
Slope	1.21		%
Terrain	Flat		

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	FlatB	0.43	0.18	0.11	0.08	0.05	0.43	0.90	0.25	0.17
SCS Curve No., CN	B	78.00	69.00	69.00	60.00	50.00	85.00	98.00	72.13	68.74
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	6.8	7.5

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
340	136.10	132	1.21	Flat	0.25	47.98	16.02	10	48.0	0.54

Hydrologic Parameters Summary

Catchment	4.576		ha
Impervious Percent	11.6		%
Slope	1.21		%
Runoff Co-efficient	0.25		
SCS Curve No:	72.13	68.74	
Modified CN*	72	68	
Initial Abstraction	6.8	7.5	mm
Time of Concentration, Tc	48.0		min
Time to Peak, Tp	0.54		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.
3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

Rational Method - B3

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	B3	Date:	2025-06-30

Drainage Area	4.576	ha
Precent Impervious	11.6	%
Composite Runoff Co-efficent	0.25	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	4.576	0.25	48.0	20.4	1	0.063	63
2- Year	4.576	0.25	48.0	23.6	1	0.073	73
5-Year	4.576	0.25	48.0	31.3	1	0.097	97
10-Year	4.576	0.25	48.0	36.5	1	0.113	113
25-Year	4.576	0.28	48.0	42.9	10	0.148	148
50-Year	4.576	0.30	48.0	47.7	20	0.177	177
100-Year	4.576	0.31	48.0	52.4	25	0.201	201

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

Hydrologic Parameters for B4

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	B4	Date:	2025-06-30

Drainage Area	12.476	ha
Precent Impervious	12.9	%

Rainfall Data

Guage Station:	Smith Falls IDF Lookup	
100 Year 12 HR Rainfall Depth:	94.6	mm

Slope, Landuse and Soil Type Identification

					Pervious Areas	Impervious Areas	
Agriculture	0	0	ha				
Range	0	0	ha	Length	590.00	45	m
Grass	1.2	1.1	ha	US Elev.	139.70	140.2	m
Woods	3.012	5.554	ha	DS Elev.	132.00	139.7	m
Wetland	0	0	ha	Slope	1.31	1.11	%
Gravel	0	0	ha	Terrain	Flat	Flat	
Impervious	0.83	0.78	ha				
Sum	5.042	7.434	ha				
Soil Name	Farmington	Muck					
Soil Type	B	D					
Composite C	0.22	0.21					

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	FlatB	0.43	0.18	0.11	0.08	0.05	0.43	0.90	0.22	0.09
	FlatD	0.73	0.32	0.20	0.12	0.05	0.50	0.90	0.21	0.13
SCS Curve No., CN	B	78.00	69.00	69.00	60.00	50.00	85.00	98.00	68.40	62.56
	D	89.00	84.00	84.00	79.00	77.00	89.00	98.00	81.73	79.83
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	6.6	7.4

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
635	140.20	132	1.29	Flat	0.21	67.22	26.73	10	67.2	0.75

Hydrologic Parameters Summary

Catchment	12.476		ha
Impervious Percent	12.9		%
Slope	1.29		%
Runoff Co-efficient	0.21		
SCS Curve No:	76.34	73.14	
Modified CN*	77	74	
Initial Abstraction	6.6	7.4	mm
Time of Concentration, Tc	67.2		min
Time to Peak, Tp	0.75		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.

2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.

3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.

4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

Rational Method - B4

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	B4	Date:	2025-06-30

Drainage Area	12.476	ha
Precent Impervious	12.9	%
Composite Runoff Co-efficent	0.21	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	12.476	0.21	67.2	16.0	1	0.113	113
2- Year	12.476	0.21	67.2	18.7	1	0.132	132
5-Year	12.476	0.21	67.2	24.8	1	0.175	175
10-Year	12.476	0.21	67.2	28.8	1	0.204	204
25-Year	12.476	0.23	67.2	33.9	10	0.263	263
50-Year	12.476	0.25	67.2	37.7	20	0.317	317
100-Year	12.476	0.26	67.2	41.4	25	0.363	363

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

Hydrologic Parameters for B5

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	B5	Date:	2025-06-30

Drainage Area	1.122	ha
Precent Impervious	0.0	%

Rainfall Data

Guage Station:	Smith Falls IDF Lookup	
100 Year 12 HR Rainfall Depth:	94.6	mm

Slope, Landuse and Soil Type Identification

Agriculture	0	0	ha
Range	0	0	ha
Grass	0	0	ha
Woods	0.781	0.341	ha
Wetland	0	0	ha
Gravel	0	0	ha
Impervious	0	0	ha
Sum	0.781	0.341	ha
Soil Name	Farmington	Muck	
Soil Type	B	D	
Composite C	0.08	0.12	

	Pervious Areas	Impervious Areas	
Length	67.80	0	m
US Elev.	132.00	0	m
DS Elev.	131.20	0	m
Slope	1.18		%
Terrain	Flat		

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	FlatB	0.43	0.18	0.11	0.08	0.05	0.43	0.90	0.08	0.08
	FlatD	0.73	0.32	0.20	0.12	0.05	0.50	0.90	0.12	0.12
SCS Curve No., CN	B	78.00	69.00	69.00	60.00	50.00	85.00	98.00	60.00	60.00
	D	89.00	84.00	84.00	79.00	77.00	89.00	98.00	79.00	79.00
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	8.0	8.0

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
67.8	132.00	131.2	1.18	Flat	0.09	25.67	3.70	10	25.7	0.29

Hydrologic Parameters Summary

Catchment	1.122		ha
Impervious Percent	0.0		%
Slope	1.18		%
Runoff Co-efficient	0.09		
SCS Curve No:	65.77	65.77	
Modified CN*	64	64	
Initial Abstraction	8.0	8.0	mm
Time of Concentration, Tc	25.7		min
Time to Peak, Tp	0.29		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.

2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.

3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.

4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

Rational Method - B5

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	B5	Date:	2025-06-30

Drainage Area	1.122	ha
Precent Impervious	0.0	%
Composite Runoff Co-efficent	0.09	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	1.122	0.09	25.7	31.6	1	0.009	9
2- Year	1.122	0.09	25.7	36.5	1	0.010	10
5-Year	1.122	0.09	25.7	48.5	1	0.013	13
10-Year	1.122	0.09	25.7	56.4	1	0.015	15
25-Year	1.122	0.10	25.7	66.4	10	0.020	20
50-Year	1.122	0.11	25.7	73.8	20	0.025	25
100-Year	1.122	0.11	25.7	81.0	25	0.027	27

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

Hydrologic Parameters for B6

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	B6	Date:	2025-06-30

Drainage Area	4.290	ha
Precent Impervious	0.0	%

Rainfall Data

Guage Station:	Smith Falls IDF Lookup	
100 Year 12 HR Rainfall Depth:	94.6	mm

Slope, Landuse and Soil Type Identification

Agriculture	0	0	ha
Range	0	0	ha
Grass	0	0	ha
Woods	2.696	1.594	ha
Wetland	0	0	ha
Gravel	0	0	ha
Impervious	0	0	ha
Sum	2.696	1.594	ha
Soil Name	Farmington	Muck	
Soil Type	B	D	
Composite C	0.08	0.12	

	Pervious Areas	Impervious Areas	
Length	85.00	0	m
US Elev.	132.10	0	m
DS Elev.	131.00	0	m
Slope	1.29		%
Terrain	Flat		

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	FlatB	0.43	0.18	0.11	0.08	0.05	0.43	0.90	0.08	0.08
	FlatD	0.73	0.32	0.20	0.12	0.05	0.50	0.90	0.12	0.12
SCS Curve No., CN	B	78.00	69.00	69.00	60.00	50.00	85.00	98.00	60.00	60.00
	D	89.00	84.00	84.00	79.00	77.00	89.00	98.00	79.00	79.00
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	8.0	8.0

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
85	132.10	131	1.29	Flat	0.09	27.91	3.98	10	27.9	0.31

Hydrologic Parameters Summary

Catchment	4.29		ha
Impervious Percent	0.0		%
Slope	1.29		%
Runoff Co-efficient	0.09		
SCS Curve No:	67.06	67.06	
Modified CN*	67	67	
Initial Abstraction	8.0	8.0	mm
Time of Concentration, Tc	27.9		min
Time to Peak, Tp	0.31		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.
3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

Rational Method - B6

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	B6	Date:	2025-06-30

Drainage Area	4.29	ha
Precent Impervious	0.0	%
Composite Runoff Co-efficent	0.09	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	4.29	0.09	27.9	29.9	1	0.031	31
2- Year	4.29	0.09	27.9	34.5	1	0.036	36
5-Year	4.29	0.09	27.9	45.8	1	0.048	48
10-Year	4.29	0.09	27.9	53.3	1	0.056	56
25-Year	4.29	0.10	27.9	62.7	10	0.073	73
50-Year	4.29	0.11	27.9	69.7	20	0.089	89
100-Year	4.29	0.11	27.9	76.5	25	0.097	97

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

Hydrologic Parameters for EXT1

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	EXT1	Date:	2025-06-30

Drainage Area	0.468	ha
Precent Impervious	33.1	%

Rainfall Data

Guage Station:	Smith Falls IDF Lookup	
100 Year 12 HR Rainfall Depth:	94.6	mm

Slope, Landuse and Soil Type Identification

Agriculture	0	ha
Range	0	ha
Grass	0.011	ha
Woods	0	ha
Wetland	0.267	ha
Gravel	0.035	ha
Impervious	0.155	ha
Sum	0.468	ha
Soil Name	Muck	
Soil Type	D	
Composite C	0.39	

	Pervious Areas	Impervious Areas	
Length	8.70	5	m
US Elev.	130.80	131	m
DS Elev.	129.30	130.8	m
Slope	17.24	4.00	%
Terrain	Hilly	Rolling	

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	HillyD	0.78	0.35	0.28	0.21	0.05	0.70	0.90	0.39	0.13
SCS Curve No., CN	D	89.00	84.00	84.00	79.00	77.00	89.00	98.00	85.02	78.59
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	6.5	9.0

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
13.7	131.00	129.3	12.41	Hilly	0.39	3.73	0.51	10	10.0	0.11

Hydrologic Parameters Summary

Catchment	0.468		ha
Impervious Percent	33.1		%
Slope	12.41		%
Runoff Co-efficient	0.39		
SCS Curve No:	85.02	78.59	
Modified CN*	87	81	
Initial Abstraction	6.5	9.0	mm
Time of Concentration, Tc	10.0		min
Time to Peak, Tp	0.11		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.

2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.

3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.

4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

Rational Method - EXT1

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	EXT1	Date:	2025-06-30

Drainage Area	0.468	ha
Precent Impervious	33.1	%
Composite Runoff Co-efficent	0.39	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	0.468	0.39	10.0	57.7	1	0.028	28
2- Year	0.468	0.39	10.0	70.7	1	0.035	35
5-Year	0.468	0.39	10.0	93.8	1	0.046	46
10-Year	0.468	0.39	10.0	109.2	1	0.054	54
25-Year	0.468	0.43	10.0	128.4	10	0.070	70
50-Year	0.468	0.47	10.0	142.8	20	0.085	85
100-Year	0.468	0.49	10.0	156.7	25	0.097	97

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

Hydrologic Parameters for EXT2

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	EXT2	Date:	2025-06-30

Drainage Area	2.191	ha
Precent Impervious	0.0	%

Rainfall Data

Guage Station:	Smith Falls IDF Lookup	
100 Year 12 HR Rainfall Depth:	94.6	mm

Slope, Landuse and Soil Type Identification

Agriculture	0	0	ha
Range	0.84	0	ha
Grass	0	0	ha
Woods	1.265	0.086	ha
Wetland	0	0	ha
Gravel	0	0	ha
Impervious	0	0	ha
Sum	2.105	0.086	ha
Soil Name	Farmington	Muck	
Soil Type	B	D	
Composite C	0.12	0.12	

	Pervious Areas	Impervious Areas	
Length	285.80	0	m
US Elev.	135.90	0	m
DS Elev.	131.00	0	m
Slope	1.71		%
Terrain	Flat		

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	FlatB	0.43	0.18	0.11	0.08	0.05	0.43	0.90	0.12	0.12
	FlatD	0.73	0.32	0.20	0.12	0.05	0.50	0.90	0.12	0.12
SCS Curve No., CN	B	78.00	69.00	69.00	60.00	50.00	85.00	98.00	63.59	63.59
	D	89.00	84.00	84.00	79.00	77.00	89.00	98.00	79.00	79.00
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	8.0	8.0

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
285.8	135.90	131	1.71	Flat	0.12	45.25	13.53	10	45.3	0.51

Hydrologic Parameters Summary

Catchment	2.191		ha
Impervious Percent	0.0		%
Slope	1.71		%
Runoff Co-efficient	0.12		
SCS Curve No:	64.20	64.20	
Modified CN*	63	63	
Initial Abstraction	8.0	8.0	mm
Time of Concentration, Tc	45.3		min
Time to Peak, Tp	0.51		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.
3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

Rational Method - EXT2

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	EXT2	Date:	2025-06-30

Drainage Area	2.191	ha
Precent Impervious	0.0	%
Composite Runoff Co-efficent	0.12	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	2.191	0.12	45.3	21.3	1	0.015	15
2- Year	2.191	0.12	45.3	24.6	1	0.017	17
5-Year	2.191	0.12	45.3	32.6	1	0.023	23
10-Year	2.191	0.12	45.3	38.0	1	0.027	27
25-Year	2.191	0.13	45.3	44.7	10	0.034	34
50-Year	2.191	0.14	45.3	49.7	20	0.041	41
100-Year	2.191	0.15	45.3	54.5	25	0.048	48

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

Hydrologic Parameters for EXT3

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	EXT3	Date:	2025-06-30

Drainage Area	0.055	ha
Precent Impervious	0.0	%

Rainfall Data

Guage Station:	Smith Falls IDF Lookup	
100 Year 12 HR Rainfall Depth:	94.6	mm

Slope, Landuse and Soil Type Identification

Agriculture	0	ha
Range	0.028	ha
Grass	0	ha
Woods	0.027	ha
Wetland	0	ha
Gravel	0	ha
Impervious	0	ha

	Pervious Areas	Impervious Areas	
Length	28.60	0	m
US Elev.	136.00	0	m
DS Elev.	135.00	0	m
Slope	3.50		%
Terrain	Rolling		

Sum	0.055	ha
Soil Name	Farmington	
Soil Type	B	
Composite C	0.16	

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	RollingB	0.48	0.20	0.16	0.11	0.05	0.53	0.90	0.16	0.16
SCS Curve No., CN	B	78.00	69.00	69.00	60.00	50.00	85.00	98.00	64.58	64.58
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	8.0	8.0

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
28.6	136.00	135	3.50	Rolling	0.16	10.84	1.70	10	10.8	0.12

Hydrologic Parameters Summary

Catchment	0.055		ha
Impervious Percent	0.0		%
Slope	3.50		%
Runoff Co-efficient	0.16		
SCS Curve No:	64.58	64.58	
Modified CN*	63	63	
Initial Abstraction	8.0	8.0	mm
Time of Concentration, Tc	10.8		min
Time to Peak, Tp	0.12		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.
3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

Rational Method - EXT3

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	EXT3	Date:	2025-06-30

Drainage Area	0.055	ha
Precent Impervious	0.0	%
Composite Runoff Co-efficent	0.16	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	0.055	0.16	10.8	55.1	1	0.001	1
2- Year	0.055	0.16	10.8	67.0	1	0.002	2
5-Year	0.055	0.16	10.8	88.9	1	0.002	2
10-Year	0.055	0.16	10.8	103.4	1	0.002	2
25-Year	0.055	0.18	10.8	121.7	10	0.003	3
50-Year	0.055	0.19	10.8	135.3	20	0.004	4
100-Year	0.055	0.20	10.8	148.5	25	0.004	4

Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

Hydrologic Parameters for EXT4

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	EXT4	Date:	2025-06-30

Drainage Area	1.791	ha
Precent Impervious	0.0	%

Rainfall Data

Guage Station:	Smith Falls IDF Lookup	
100 Year 12 HR Rainfall Depth:	94.6	mm

Slope, Landuse and Soil Type Identification

Agriculture	0	0	ha
Range	0.06	0	ha
Grass	0	0	ha
Woods	0	1.731	ha
Wetland	0	0	ha
Gravel	0	0	ha
Impervious	0	0	ha
Sum	0.06	1.731	ha
Soil Name	Farmington	Muck	
Soil Type	B	D	
Composite C	0.20	0.15	

	Pervious Areas	Impervious Areas	
Length	119.20	0	m
US Elev.	137.60	0	m
DS Elev.	133.50	0	m
Slope	3.44		%
Terrain	Rolling		

Note:
Flat:0-2% slopes
Rolling:2-6% slopes
Hilly:>6% slopes

Composite Runoff and Curve Number Calculations

Parameter	Hydrologic Soil Group	Land Use							Composite Values	
		Agriculture	Range	Grass	Woods	Wetland	Gravel	Imperv.	Incl. Imperv. Nashyd	Not Incl. Imperv. Standhyd
Runoff Coefficient, C	RollingB	0.48	0.20	0.16	0.11	0.05	0.53	0.90	0.20	0.20
	RollingD	0.78	0.34	0.24	0.15	0.05	0.60	0.90	0.15	0.15
SCS Curve No., CN	B	78.00	69.00	69.00	60.00	50.00	85.00	98.00	69.00	69.00
	D	89.00	84.00	84.00	79.00	77.00	89.00	98.00	79.00	79.00
Initial Abstraction, mm		5	8	5	8	10	2.5	1.5	8.0	8.0

Time of Concentration Calculations

Total Flow Length	US Elev.	DS Elev.	Avg. Slope	Terrain	Composite C	Airport Formula	Bransby Formula	Minimum	Tc (min)	Tp (hr)
119.2	137.60	133.5	3.44	Rolling	0.15	22.49	5.01	10	22.5	0.25

Hydrologic Parameters Summary

Catchment	1.791		ha
Impervious Percent	0.0		%
Slope	3.44		%
Runoff Co-efficient	0.15		
SCS Curve No:	78.66	78.66	
Modified CN*	80	80	
Initial Abstraction	8.0	8.0	mm
Time of Concentration, Tc	22.5		min
Time to Peak, Tp	0.25		hr

Notes:

1.Hydrologic Soil Group obtained from Design Chart H2-6A, M.T.O. Drainage Manual, 1980.
2.Runoff coefficient obtained from M.T.O. Design Chart 1.07, M.T.O. Drainage Management Manual, 1997, and Tables 4-5a to 4-5d, Maryland State Highway Administration.
3.SCS Curve No. obtained from M.T.O. Design Chart 1.09, M.T.O. Drainage Management Manual, 1997, and Table 2-2a, TR-55, page 2-5.
4.Use Airport Equation to calculate time of concentration for C < 0.40, and Bransby-Williams for C > 0.40.

Rational Method - EXT4

Project Name:	Santaguida Subdivision	Designed By:	SZ
Project Number:	20-9510	Checked By:	RC
Catchment ID:	EXT4	Date:	2025-06-30

Drainage Area	1.791	ha
Precent Impervious	0.0	%
Composite Runoff Co-efficent	0.15	

Rainfall Data

Guage Station: Smith Falls IDF Lookup

100 Year 12 HR Rainfall Depth: 94.6 mm

IDF Parameters

Co-efficient	25 mm	2 -Year	5 Year	10 Year	25 Year	50 Year	100 Year
A	405	20.2	26.8	31.2	36.7	40.8	44.8
B	3	0	0	0	0	0	0
C	0.76	0.699	0.699	0.699	0.699	0.699	0.699

Rational Method

Design Storm	Area (ha)	Composite C	Tc (min)	I (mm/hr)	Composite C Multiplier (%)	Peakflow (m3/s)	Peakflow (L/s)
25 mm Storm	1.791	0.15	22.5	34.6	1	0.025	25
2- Year	1.791	0.15	22.5	40.1	1	0.029	29
5-Year	1.791	0.15	22.5	53.2	1	0.039	39
10-Year	1.791	0.15	22.5	61.9	1	0.045	45
25-Year	1.791	0.17	22.5	72.8	10	0.060	60
50-Year	1.791	0.18	22.5	81.0	20	0.071	71
100-Year	1.791	0.19	22.5	88.9	25	0.082	82

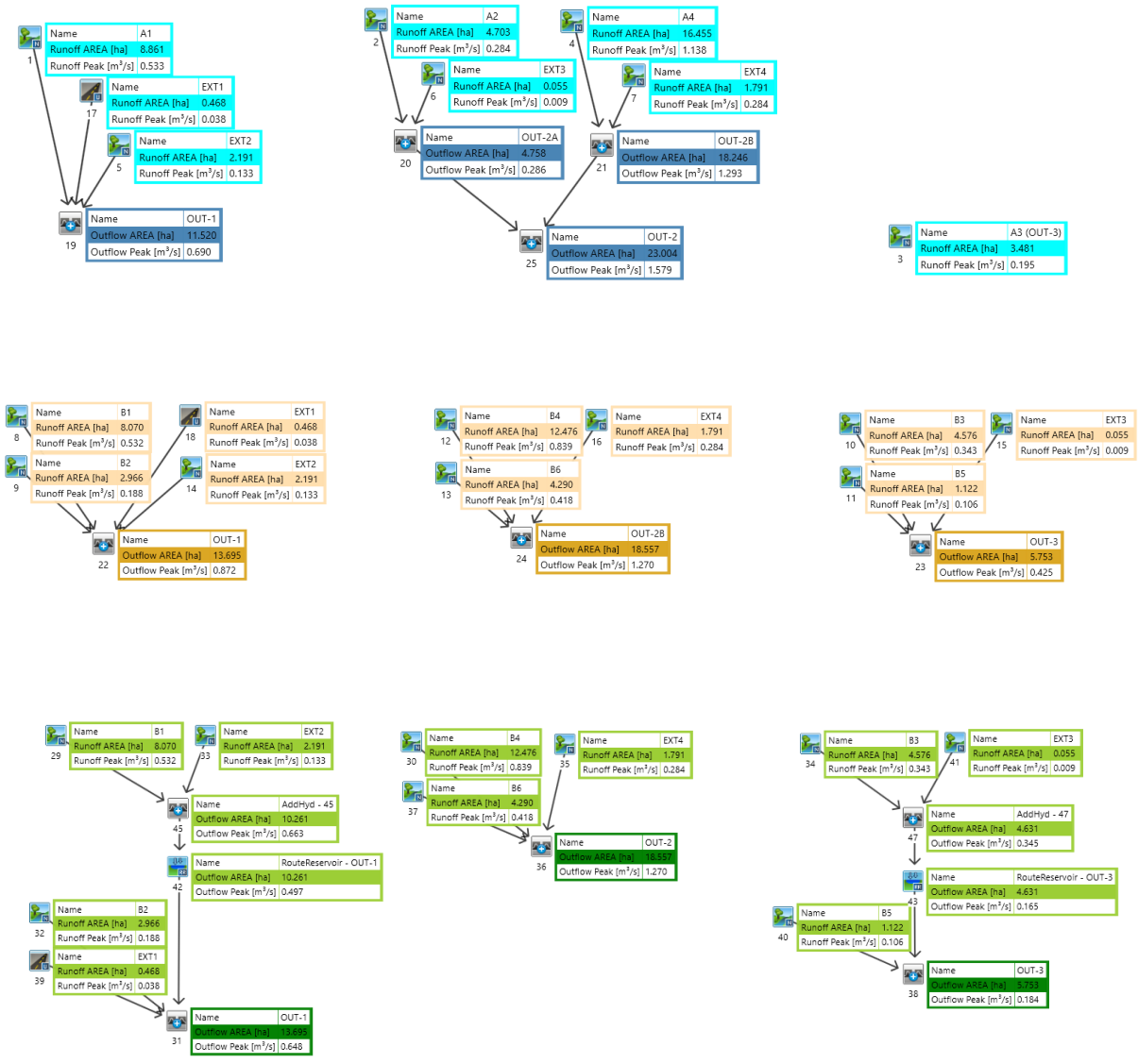
Notes:

1. Composite runoff co-efficents are calculated based on the weighted landuse
2. Runoff co-effcients for 25, 50 and 100 year storms have been increased by 10%, 20% and 25% respectively.

CONCEPTUAL STORMWATER MANAGEMENT REPORT
SANTAGUIDA SUBDIVISION

APPENDIX D – VO6 MODEL SCHEMATIC & RESULTS

VO6 MODEL SCHEMATIC: Pre-Development, Post-Development (Uncontrolled) and Post-Development (Controlled)



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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2019)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\s.zahedi\AppData\Local\Civica\VH5\e58e56e5-dd85-4558-af7a-fb9e8006ce04\316
c3e59-3e52-47b0-b7b3-ac19e64bb5d4\sce
  Summary filename:
C:\Users\s.zahedi\AppData\Local\Civica\VH5\e58e56e5-dd85-4558-af7a-fb9e8006ce04\316
c3e59-3e52-47b0-b7b3-ac19e64bb5d4\sce


DATE: 07-30-2025                          TIME: 04:57:17

USER:


COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------
-------------------------
  ************************************************
  ** SIMULATION : 100yr 12hr 5min SCS           **
  ************************************************


-------------------
|    READ STORM    |    Filename: C:\Users\s.zahedi\AppD
|                  |              ata\Local\Temp\
|                  |              ec928a9d-07b7-4727-811a-533524b929ca\7f37955d
| Ptotal= 94.80 mm |    Comments: 100yr 12hr 5min SCS
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  3.08    3.79 |  6.17   17.06 |  9.25    3.32
                0.08    2.37 |  3.17    3.79 |  6.25   17.06 |  9.33    3.32
                0.17    2.37 |  3.25    3.79 |  6.33   17.06 |  9.42    3.32
                0.25    2.37 |  3.33    3.79 |  6.42   17.06 |  9.50    3.32
                0.33    2.37 |  3.42    3.79 |  6.50   17.06 |  9.58    3.32
                0.42    2.37 |  3.50    3.79 |  6.58    7.58 |  9.67    3.32
                0.50    2.37 |  3.58    3.79 |  6.67    7.58 |  9.75    3.32
                0.58    2.37 |  3.67    3.79 |  6.75    7.58 |  9.83    3.32
                0.67    2.37 |  3.75    3.79 |  6.83    7.58 |  9.92    3.32
                0.75    2.37 |  3.83    3.79 |  6.92    7.58 | 10.00    3.32
                0.83    2.37 |  3.92    3.79 |  7.00    7.58 | 10.08    1.90
                0.92    2.37 |  4.00    3.79 |  7.08    5.69 | 10.17    1.90
                1.00    2.37 |  4.08    5.69 |  7.17    5.69 | 10.25    1.90
                1.08    2.37 |  4.17    5.69 |  7.25    5.69 | 10.33    1.90
                1.17    2.37 |  4.25    5.69 |  7.33    5.69 | 10.42    1.90
                1.25    2.37 |  4.33    5.69 |  7.42    5.69 | 10.50    1.90
                1.33    2.37 |  4.42    5.69 |  7.50    5.69 | 10.58    1.90
                1.42    2.37 |  4.50    5.69 |  7.58    5.69 | 10.67    1.90
                1.50    2.37 |  4.58    7.58 |  7.67    5.69 | 10.75    1.90
                1.58    2.37 |  4.67    7.58 |  7.75    5.69 | 10.83    1.90
                1.67    2.37 |  4.75    7.58 |  7.83    5.69 | 10.92    1.90
                1.75    2.37 |  4.83    7.58 |  7.92    5.69 | 11.00    1.90
                1.83    2.37 |  4.92    7.58 |  8.00    5.69 | 11.08    1.90
                1.92    2.37 |  5.00    7.58 |  8.08    3.32 | 11.17    1.90
                2.00    2.37 |  5.08   11.38 |  8.17    3.32 | 11.25    1.90
                2.08    2.84 |  5.17   11.38 |  8.25    3.32 | 11.33    1.90
                2.17    2.84 |  5.25   11.38 |  8.33    3.32 | 11.42    1.90
                2.25    2.84 |  5.33   11.38 |  8.42    3.32 | 11.50    1.90
                2.33    2.84 |  5.42   11.38 |  8.50    3.32 | 11.58    1.90
                2.42    2.84 |  5.50   11.38 |  8.58    3.32 | 11.67    1.90
                2.50    2.84 |  5.58   45.50 |  8.67    3.32 | 11.75    1.90
                2.58    2.84 |  5.67   45.50 |  8.75    3.32 | 11.83    1.90
                2.67    2.84 |  5.75   45.50 |  8.83    3.32 | 11.92    1.90
                2.75    2.84 |  5.83  125.14 |  8.92    3.32 | 12.00    1.90
                2.83    2.84 |  5.92  125.14 |  9.00    3.32 |
                2.92    2.84 |  6.00  125.14 |  9.08    3.32 |
                3.00    2.84 |  6.08   17.06 |  9.17    3.32 |

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

-------------------
| CALIB            |
| NASHYD   (  0003)|   Area    (ha)=   3.48   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.61


     Unit Hyd Qpeak  (cms)=   0.218

     PEAK FLOW       (cms)=   0.158 (i)
     TIME TO PEAK    (hrs)=   6.667
     RUNOFF VOLUME    (mm)=  33.699
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.355

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

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   8.86   Curve Number   (CN)= 66.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.50   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.57

     Unit Hyd Qpeak  (cms)=   0.594

     PEAK FLOW       (cms)=   0.430 (i)
     TIME TO PEAK    (hrs)=   6.583
     RUNOFF VOLUME    (mm)=  34.297
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.362

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

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0005)|   Area    (ha)=   2.19   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.51

     Unit Hyd Qpeak  (cms)=   0.164

     PEAK FLOW       (cms)=   0.106 (i)
     TIME TO PEAK    (hrs)=   6.500
     RUNOFF VOLUME    (mm)=  31.926
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.337

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

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0017)|   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  15.50   Dir. Conn.(%)=  15.50


-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.07         0.40
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       4.00        17.24
     Length            (m)=       5.00         8.70
     Mannings n           =      0.130        0.250

     Max.Eff.Inten.(mm/hr)=     125.14        99.33
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.02 (ii)   60.00 (ii)
     Unit Hyd. Tpeak (min)=       5.00        60.00
     Unit Hyd. peak  (cms)=       0.34         0.02

                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.03         0.03          0.033 (iii)
     TIME TO PEAK    (hrs)=       6.08         6.92           6.08
     RUNOFF VOLUME    (mm)=      93.80        63.02          67.72
     TOTAL RAINFALL   (mm)=      94.80        94.80          94.80
     RUNOFF COEFFICIENT   =       0.99         0.66           0.71

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

-------------------
| ADD HYD  (  0019)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):     8.86   0.430     6.58    34.30
     + ID2= 2 (  0017):     0.47   0.033     6.08    67.72
       ================================================
       ID = 3 (  0019):     9.33   0.454     6.58    35.97

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

-------------------
| ADD HYD  (  0019)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0019):     9.33   0.454     6.58    35.97
     + ID2= 2 (  0005):     2.19   0.106     6.50    31.93
```

```
       ================================================
       ID = 1 (  0019):    11.52   0.559     6.58    35.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD   (  0008)|   Area    (ha)=   8.07   Curve Number   (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.60   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.57

     Unit Hyd Qpeak  (cms)=   0.541

     PEAK FLOW       (cms)=   0.435 (i)
     TIME TO PEAK    (hrs)=   6.583
     RUNOFF VOLUME    (mm)=  37.769
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.398

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

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD   (  0009)|   Area    (ha)=   2.97   Curve Number   (CN)= 62.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.20   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.46

     Unit Hyd Qpeak  (cms)=   0.246

     PEAK FLOW       (cms)=   0.150 (i)
     TIME TO PEAK    (hrs)=   6.417
     RUNOFF VOLUME    (mm)=  30.952
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.326

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

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD   (  0014)|   Area    (ha)=   2.19   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.51

     Unit Hyd Qpeak  (cms)=   0.164

     PEAK FLOW       (cms)=   0.106 (i)
     TIME TO PEAK    (hrs)=   6.500
     RUNOFF VOLUME    (mm)=  31.926

     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.337

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

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| STANDHYD (  0018)|   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  15.50   Dir. Conn.(%)=  15.50
-------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.07         0.40
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       4.00        17.24
     Length            (m)=      55.86         8.70
     Mannings n           =      0.130        0.250

     Max.Eff.Inten.(mm/hr)=     125.14        99.33
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       4.33 (ii)   60.00 (ii)
     Unit Hyd. Tpeak (min)=       5.00        60.00
     Unit Hyd. peak  (cms)=       0.23         0.02
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.03          0.033 (iii)
     TIME TO PEAK    (hrs)=       6.08         6.92          6.08
     RUNOFF VOLUME    (mm)=      93.80        63.02         67.72
     TOTAL RAINFALL   (mm)=      94.80        94.80         94.80
     RUNOFF COEFFICIENT   =       0.99         0.66          0.71

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

-------------------
| ADD HYD  (  0022)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0014):     2.19   0.106     6.50    31.93
     + ID2= 2 (  0018):     0.47   0.033     6.08    67.72
       ================================================
       ID = 3 (  0022):     2.66   0.129     6.58    38.23

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

-------------------
| ADD HYD  (  0022)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0022):     2.66   0.129     6.58    38.23
     + ID2= 2 (  0008):     8.07   0.435     6.58    37.77
       ================================================
       ID = 1 (  0022):    10.73   0.564     6.58    37.88

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

-------------------
| ADD HYD  (  0022)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0022):    10.73   0.564     6.58    37.88
     + ID2= 2 (  0009):     2.97   0.150     6.42    30.95
       ================================================
       ID = 3 (  0022):    13.69   0.707     6.58    36.38

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD   (  0010)|   Area    (ha)=   4.58   Curve Number   (CN)= 72.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.80   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.54

     Unit Hyd Qpeak  (cms)=   0.324

     PEAK FLOW       (cms)=   0.283 (i)
     TIME TO PEAK    (hrs)=   6.500
     RUNOFF VOLUME    (mm)=  41.459
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.437

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

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD   (  0011)|   Area    (ha)=   1.12   Curve Number   (CN)= 64.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.29

     Unit Hyd Qpeak  (cms)=   0.148

     PEAK FLOW       (cms)=   0.084 (i)
     TIME TO PEAK    (hrs)=   6.250
     RUNOFF VOLUME    (mm)=  32.789
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.346

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

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| NASHYD   (  0015)|   Area    (ha)=   0.05   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.12

     Unit Hyd Qpeak  (cms)=   0.018

     PEAK FLOW       (cms)=   0.007 (i)
     TIME TO PEAK    (hrs)=   6.083
     RUNOFF VOLUME    (mm)=  31.494
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.332

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

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

-------------------
| ADD HYD  (  0023)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0010):     4.58   0.283     6.50    41.46
     + ID2= 2 (  0011):     1.12   0.084     6.25    32.79
       ================================================
       ID = 3 (  0023):     5.70   0.346     6.42    39.75

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

-------------------
| ADD HYD  (  0023)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0023):     5.70   0.346     6.42    39.75
     + ID2= 2 (  0015):     0.05   0.007     6.08    31.49
       ================================================
       ID = 1 (  0023):     5.75   0.348     6.42    39.67
```

```
     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0012)|   Area    (ha)=  12.48   Curve Number   (CN)= 77.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.60   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.75

     Unit Hyd Qpeak  (cms)=   0.635

     PEAK FLOW       (cms)=   0.705 (i)
     TIME TO PEAK    (hrs)=   6.750
     RUNOFF VOLUME    (mm)=  47.414
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.500

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0013)|   Area    (ha)=   4.29   Curve Number   (CN)= 67.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.529

     PEAK FLOW       (cms)=   0.334 (i)
     TIME TO PEAK    (hrs)=   6.250
     RUNOFF VOLUME    (mm)=  35.543
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.375

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0016)|   Area    (ha)=   1.79   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.25

     Unit Hyd Qpeak  (cms)=   0.274

     PEAK FLOW       (cms)=   0.235 (i)
     TIME TO PEAK    (hrs)=   6.167
     RUNOFF VOLUME    (mm)=  50.088
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.528

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

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

--------------------
| ADD HYD  (  0024)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0012):    12.48   0.705     6.75    47.41
     + ID2= 2 (  0013):     4.29   0.334     6.25    35.54
       ================================================
       ID = 3 (  0024):    16.77   0.903     6.58    44.38

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

--------------------
| ADD HYD  (  0024)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0024):    16.77   0.903     6.58    44.38
     + ID2= 2 (  0016):     1.79   0.235     6.17    50.09
       ================================================
       ID = 1 (  0024):    18.56   1.049     6.42    44.93

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=   4.70   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.55

     Unit Hyd Qpeak  (cms)=   0.327

     PEAK FLOW       (cms)=   0.229 (i)
     TIME TO PEAK    (hrs)=   6.583
     RUNOFF VOLUME    (mm)=  33.698
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.355

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0006)|   Area    (ha)=   0.05   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

     Unit Hyd Qpeak  (cms)=   0.018

     PEAK FLOW       (cms)=   0.007 (i)
     TIME TO PEAK    (hrs)=   6.083
     RUNOFF VOLUME    (mm)=  31.494
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.332

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

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

--------------------
| ADD HYD  (  0020)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0002):     4.70   0.229     6.58    33.70
     + ID2= 2 (  0006):     0.05   0.007     6.08    31.49
       ================================================
       ID = 3 (  0020):     4.76   0.231     6.58    33.67

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0004)|   Area    (ha)=  16.45   Curve Number   (CN)= 71.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.57

     Unit Hyd Qpeak  (cms)=   1.103

     PEAK FLOW       (cms)=   0.933 (i)
     TIME TO PEAK    (hrs)=   6.583
     RUNOFF VOLUME    (mm)=  39.539
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.417

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0007)|   Area    (ha)=   1.79   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.25

     Unit Hyd Qpeak  (cms)=   0.274

     PEAK FLOW       (cms)=   0.235 (i)
     TIME TO PEAK    (hrs)=   6.167
     RUNOFF VOLUME    (mm)=  50.088
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.528

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

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

--------------------
| ADD HYD  (  0021)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0004):    16.45   0.933     6.58    39.54
     + ID2= 2 (  0007):     1.79   0.235     6.17    50.09
       ================================================
       ID = 3 (  0021):    18.25   1.061     6.50    40.57

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

--------------------
| ADD HYD  (  0025)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0020):     4.76   0.231     6.58    33.67
     + ID2= 2 (  0021):    18.25   1.061     6.50    40.57
       ================================================
       ID = 3 (  0025):    23.00   1.291     6.50    39.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0029)|   Area    (ha)=   8.07   Curve Number   (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.60   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.57

     Unit Hyd Qpeak  (cms)=   0.541

     PEAK FLOW       (cms)=   0.435 (i)
     TIME TO PEAK    (hrs)=   6.583
     RUNOFF VOLUME    (mm)=  37.769
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.398

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
```

```
| NASHYD   (  0033)|   Area    (ha)=   2.19   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.51

     Unit Hyd Qpeak  (cms)=   0.164

     PEAK FLOW       (cms)=   0.106 (i)
     TIME TO PEAK    (hrs)=   6.500
     RUNOFF VOLUME    (mm)=  31.926
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.337

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

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

-------------------
| ADD HYD  (  0045)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0029):     8.07   0.435     6.58    37.77
     + ID2= 2 (  0033):     2.19   0.106     6.50    31.93
       ================================================
       ID = 3 (  0045):    10.26   0.540     6.58    36.52

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0042)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0000   |    0.6520      0.1300
                          0.2430      0.0600   |    0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0045)    10.261      0.540      6.58      36.52
   OUTFLOW: ID= 1 (  0042)    10.261      0.398      7.08      36.52

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 73.74
                  TIME SHIFT OF PEAK FLOW         (min)= 30.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0868

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0032)|   Area    (ha)=   2.97   Curve Number   (CN)= 62.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.20   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.46

     Unit Hyd Qpeak  (cms)=   0.246

     PEAK FLOW       (cms)=   0.150 (i)
     TIME TO PEAK    (hrs)=   6.417
     RUNOFF VOLUME    (mm)=  30.952
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.326

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

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0039)|   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  15.50   Dir. Conn.(%)=  15.50
-------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.07         0.40
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       4.00        17.24
     Length            (m)=      55.86         8.70
     Mannings n           =      0.130        0.250

     Max.Eff.Inten.(mm/hr)=     125.14        99.33
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       4.33 (ii)   60.00 (ii)
     Unit Hyd. Tpeak (min)=       5.00        60.00
     Unit Hyd. peak  (cms)=       0.23         0.02
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.03          0.033 (iii)
     TIME TO PEAK    (hrs)=       6.08         6.92           6.08
     RUNOFF VOLUME    (mm)=      93.80        63.02          67.72
     TOTAL RAINFALL   (mm)=      94.80        94.80          94.80
     RUNOFF COEFFICIENT   =       0.99         0.66           0.71

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

-------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0032):     2.97   0.150     6.42    30.95
     + ID2= 2 (  0039):     0.47   0.033     6.08    67.72
       ================================================
       ID = 3 (  0031):     3.43   0.170     6.50    35.96

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

-------------------
| ADD HYD  (  0031)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0031):     3.43   0.170     6.50    35.96
     + ID2= 2 (  0042):    10.26   0.398     7.08    36.52
       ================================================
       ID = 1 (  0031):    13.70   0.522     6.92    36.38

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0030)|   Area    (ha)=  12.48   Curve Number   (CN)= 77.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.60   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.75

     Unit Hyd Qpeak  (cms)=   0.635

     PEAK FLOW       (cms)=   0.705 (i)
     TIME TO PEAK    (hrs)=   6.750
     RUNOFF VOLUME    (mm)=  47.414
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.500

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

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0035)|   Area    (ha)=   1.79   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.25

     Unit Hyd Qpeak  (cms)=   0.274

     PEAK FLOW       (cms)=   0.235 (i)
     TIME TO PEAK    (hrs)=   6.167
     RUNOFF VOLUME    (mm)=  50.088
     TOTAL RAINFALL   (mm)=  94.800

     RUNOFF COEFFICIENT   =   0.528

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

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0037)|   Area    (ha)=   4.29   Curve Number   (CN)= 67.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.529

     PEAK FLOW       (cms)=   0.334 (i)
     TIME TO PEAK    (hrs)=   6.250
     RUNOFF VOLUME    (mm)=  35.543
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.375

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

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

-------------------
| ADD HYD  (  0036)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):    12.48   0.705     6.75    47.41
     + ID2= 2 (  0035):     1.79   0.235     6.17    50.09
       ================================================
       ID = 3 (  0036):    14.27   0.791     6.67    47.75

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

-------------------
| ADD HYD  (  0036)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0036):    14.27   0.791     6.67    47.75
     + ID2= 2 (  0037):     4.29   0.334     6.25    35.54
       ================================================
       ID = 1 (  0036):    18.56   1.049     6.42    44.93

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0034)|   Area    (ha)=   4.58   Curve Number   (CN)= 72.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.80   # of Linear Res.(N)= 3.00
```

```
--------------------   U.H. Tp(hrs)=   0.54

     Unit Hyd Qpeak  (cms)=   0.324

     PEAK FLOW       (cms)=   0.283 (i)
     TIME TO PEAK    (hrs)=   6.500
     RUNOFF VOLUME    (mm)=  41.459
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.437

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0041)|   Area    (ha)=   0.05   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

     Unit Hyd Qpeak  (cms)=   0.018

     PEAK FLOW       (cms)=   0.007 (i)
     TIME TO PEAK    (hrs)=   6.083
     RUNOFF VOLUME    (mm)=  31.494
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.332

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

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

--------------------
| ADD HYD  (  0047)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0034):     4.58   0.283     6.50    41.46
     + ID2= 2 (  0041):     0.05   0.007     6.08    31.49
       ================================================
       ID = 3 (  0047):     4.63   0.284     6.50    41.34

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0043)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0000   |    0.1950      0.1050
                          0.0740      0.0500   |    0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0047)      4.631     0.284      6.50      41.34
   OUTFLOW: ID= 1 (  0043)      4.631     0.132      7.42      41.31

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 46.38
                  TIME SHIFT OF PEAK FLOW         (min)= 55.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0763

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0040)|   Area    (ha)=   1.12   Curve Number   (CN)= 64.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.29

     Unit Hyd Qpeak  (cms)=   0.148

     PEAK FLOW       (cms)=   0.084 (i)
     TIME TO PEAK    (hrs)=   6.250
     RUNOFF VOLUME    (mm)=  32.789
     TOTAL RAINFALL   (mm)=  94.800
     RUNOFF COEFFICIENT   =   0.346

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

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

--------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0040):     1.12   0.084     6.25    32.79
     + ID2= 2 (  0043):     4.63   0.132     7.42    41.31
       ================================================
       ID = 3 (  0038):     5.75   0.146     7.25    39.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
========================

      V    V   I    SSSSS  U   U    A    L              (v 6.2.2019)
      V    V   I    SS     U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
       V  V    I      SS   U   U  A   A  L
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
      O   O    T      T    H   H   Y Y   MM MM  O   O

       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\s.zahedi\AppData\Local\Civica\VH5\e58e56e5-dd85-4558-af7a-fb9e8006ce04\011
21eb9-f801-4dde-8ad9-9c10dd3e1d9f\sce
  Summary filename:
C:\Users\s.zahedi\AppData\Local\Civica\VH5\e58e56e5-dd85-4558-af7a-fb9e8006ce04\011
21eb9-f801-4dde-8ad9-9c10dd3e1d9f\sce


DATE: 07-30-2025                          TIME: 04:57:18

USER:



COMMENTS: _____________________________________________________


--------------------------------------------------------------------------------
-------------------------
  ************************************************
  ** SIMULATION : 100yr 24hr 5min SCS           **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\s.zahedi\AppD
|                  |              ata\Local\Temp\
|                  |              ec928a9d-07b7-4727-811a-533524b929ca\cf0589b1
| Ptotal=117.60 mm |    Comments: 100yr 24hr 5min SCS
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  6.08    2.12 | 12.17   16.93 | 18.25    2.12
                0.08    1.29 |  6.17    2.12 | 12.25   16.93 | 18.33    2.12
                0.17    1.29 |  6.25    2.12 | 12.33   16.93 | 18.42    2.12
                0.25    1.29 |  6.33    2.12 | 12.42   16.93 | 18.50    2.12
                0.33    1.29 |  6.42    2.12 | 12.50   16.93 | 18.58    2.12
                0.42    1.29 |  6.50    2.12 | 12.58    8.70 | 18.67    2.12
                0.50    1.29 |  6.58    2.12 | 12.67    8.70 | 18.75    2.12
                0.58    1.29 |  6.67    2.12 | 12.75    8.70 | 18.83    2.12
                0.67    1.29 |  6.75    2.12 | 12.83    8.70 | 18.92    2.12
                0.75    1.29 |  6.83    2.12 | 12.92    8.70 | 19.00    2.12
                0.83    1.29 |  6.92    2.12 | 13.00    8.70 | 19.08    2.12
                0.92    1.29 |  7.00    2.12 | 13.08    6.35 | 19.17    2.12
                1.00    1.29 |  7.08    2.59 | 13.17    6.35 | 19.25    2.12
                1.08    1.29 |  7.17    2.59 | 13.25    6.35 | 19.33    2.12
                1.17    1.29 |  7.25    2.59 | 13.33    6.35 | 19.42    2.12
                1.25    1.29 |  7.33    2.59 | 13.42    6.35 | 19.50    2.12
                1.33    1.29 |  7.42    2.59 | 13.50    6.35 | 19.58    2.12
                1.42    1.29 |  7.50    2.59 | 13.58    4.94 | 19.67    2.12
                1.50    1.29 |  7.58    2.59 | 13.67    4.94 | 19.75    2.12
                1.58    1.29 |  7.67    2.59 | 13.75    4.94 | 19.83    2.12
                1.67    1.29 |  7.75    2.59 | 13.83    4.94 | 19.92    2.12
                1.75    1.29 |  7.83    2.59 | 13.92    4.94 | 20.00    2.12
                1.83    1.29 |  7.92    2.59 | 14.00    4.94 | 20.08    1.41
                1.92    1.29 |  8.00    2.59 | 14.08    3.53 | 20.17    1.41
                2.00    1.29 |  8.08    3.06 | 14.17    3.53 | 20.25    1.41
                2.08    1.53 |  8.17    3.06 | 14.25    3.53 | 20.33    1.41
                2.17    1.53 |  8.25    3.06 | 14.33    3.53 | 20.42    1.41
                2.25    1.53 |  8.33    3.06 | 14.42    3.53 | 20.50    1.41
                2.33    1.53 |  8.42    3.06 | 14.50    3.53 | 20.58    1.41
                2.42    1.53 |  8.50    3.06 | 14.58    3.53 | 20.67    1.41
                2.50    1.53 |  8.58    3.29 | 14.67    3.53 | 20.75    1.41
                2.58    1.53 |  8.67    3.29 | 14.75    3.53 | 20.83    1.41
                2.67    1.53 |  8.75    3.29 | 14.83    3.53 | 20.92    1.41
                2.75    1.53 |  8.83    3.29 | 14.92    3.53 | 21.00    1.41
                2.83    1.53 |  8.92    3.29 | 15.00    3.53 | 21.08    1.41
                2.92    1.53 |  9.00    3.29 | 15.08    3.53 | 21.17    1.41
                3.00    1.53 |  9.08    3.76 | 15.17    3.53 | 21.25    1.41
                3.08    1.53 |  9.17    3.76 | 15.25    3.53 | 21.33    1.41
                3.17    1.53 |  9.25    3.76 | 15.33    3.53 | 21.42    1.41
                3.25    1.53 |  9.33    3.76 | 15.42    3.53 | 21.50    1.41
                3.33    1.53 |  9.42    3.76 | 15.50    3.53 | 21.58    1.41
                3.42    1.53 |  9.50    3.76 | 15.58    3.53 | 21.67    1.41
                3.50    1.53 |  9.58    4.23 | 15.67    3.53 | 21.75    1.41
                3.58    1.53 |  9.67    4.23 | 15.75    3.53 | 21.83    1.41
                3.67    1.53 |  9.75    4.23 | 15.83    3.53 | 21.92    1.41
                3.75    1.53 |  9.83    4.23 | 15.92    3.53 | 22.00    1.41
                3.83    1.53 |  9.92    4.23 | 16.00    3.53 | 22.08    1.41
                3.92    1.53 | 10.00    4.23 | 16.08    2.12 | 22.17    1.41
                4.00    1.53 | 10.08    5.41 | 16.17    2.12 | 22.25    1.41
                4.08    1.88 | 10.17    5.41 | 16.25    2.12 | 22.33    1.41
                4.17    1.88 | 10.25    5.41 | 16.33    2.12 | 22.42    1.41
                4.25    1.88 | 10.33    5.41 | 16.42    2.12 | 22.50    1.41
                4.33    1.88 | 10.42    5.41 | 16.50    2.12 | 22.58    1.41
                4.42    1.88 | 10.50    5.41 | 16.58    2.12 | 22.67    1.41
                4.50    1.88 | 10.58    7.29 | 16.67    2.12 | 22.75    1.41
                4.58    1.88 | 10.67    7.29 | 16.75    2.12 | 22.83    1.41
```

4.67	1.88	10.75	7.29	16.83	2.12	22.92	1.41
4.75	1.88	10.83	7.29	16.92	2.12	23.00	1.41
4.83	1.88	10.92	7.29	17.00	2.12	23.08	1.41
4.92	1.88	11.00	7.29	17.08	2.12	23.17	1.41
5.00	1.88	11.08	11.29	17.17	2.12	23.25	1.41
5.08	1.88	11.17	11.29	17.25	2.12	23.33	1.41
5.17	1.88	11.25	11.29	17.33	2.12	23.42	1.41
5.25	1.88	11.33	11.29	17.42	2.12	23.50	1.41
5.33	1.88	11.42	11.29	17.50	2.12	23.58	1.41
5.42	1.88	11.50	11.29	17.58	2.12	23.67	1.41
5.50	1.88	11.58	34.81	17.67	2.12	23.75	1.41
5.58	1.88	11.67	34.81	17.75	2.12	23.83	1.41
5.67	1.88	11.75	34.81	17.83	2.12	23.92	1.41
5.75	1.88	11.83	143.94	17.92	2.12	24.00	1.41
5.83	1.88	11.92	143.94	18.00	2.12		
5.92	1.88	12.00	143.94	18.08	2.12		
6.00	1.88	12.08	16.93	18.17	2.12		

CALIB					
NASHYD (0003)	Area (ha)= 3.48	Curve Number (CN)= 65.0			
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.61				

Unit Hyd Qpeak (cms)= 0.218

PEAK FLOW (cms)= 0.195 (i)
TIME TO PEAK (hrs)= 12.583
RUNOFF VOLUME (mm)= 48.755
TOTAL RAINFALL (mm)= 117.600
RUNOFF COEFFICIENT = 0.415

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

CALIB					
NASHYD (0001)	Area (ha)= 8.86	Curve Number (CN)= 66.0			
ID= 1 DT= 5.0 min	Ia (mm)= 8.50	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.57				

Unit Hyd Qpeak (cms)= 0.594

PEAK FLOW (cms)= 0.533 (i)
TIME TO PEAK (hrs)= 12.583
RUNOFF VOLUME (mm)= 49.604
TOTAL RAINFALL (mm)= 117.600
RUNOFF COEFFICIENT = 0.422

CN* = 85.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0019)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):	8.86	0.533	12.58	49.60
+ ID2= 2 (0017):	0.47	0.038	12.08	88.77
ID = 3 (0019):	9.33	0.560	12.58	51.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0019)				
3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (0019):	9.33	0.560	12.58	51.57
+ ID2= 2 (0005):	2.19	0.133	12.50	46.42
ID = 1 (0019):	11.52	0.690	12.58	50.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0008)	Area (ha)= 8.07	Curve Number (CN)= 69.0			
ID= 1 DT= 5.0 min	Ia (mm)= 7.60	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.57				

Unit Hyd Qpeak (cms)= 0.541

PEAK FLOW (cms)= 0.532 (i)
TIME TO PEAK (hrs)= 12.583
RUNOFF VOLUME (mm)= 53.988
TOTAL RAINFALL (mm)= 117.600
RUNOFF COEFFICIENT = 0.459

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

CALIB					
NASHYD (0009)	Area (ha)= 2.97	Curve Number (CN)= 62.0			
ID= 1 DT= 5.0 min	Ia (mm)= 8.20	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.46				

Unit Hyd Qpeak (cms)= 0.246

PEAK FLOW (cms)= 0.188 (i)
TIME TO PEAK (hrs)= 12.417
RUNOFF VOLUME (mm)= 45.147
TOTAL RAINFALL (mm)= 117.600
RUNOFF COEFFICIENT = 0.384

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

CALIB					
NASHYD (0014)	Area (ha)= 2.19	Curve Number (CN)= 63.0			
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.51				

Unit Hyd Qpeak (cms)= 0.164

PEAK FLOW (cms)= 0.133 (i)
TIME TO PEAK (hrs)= 12.500
RUNOFF VOLUME (mm)= 46.417
TOTAL RAINFALL (mm)= 117.600
RUNOFF COEFFICIENT = 0.395

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

CALIB					
STANDHYD (0018)	Area (ha)= 0.47				
ID= 1 DT= 5.0 min	Total Imp(%)= 15.50	Dir. Conn.(%)= 15.50			

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.07	0.40	
Dep. Storage (mm)=	1.00	1.50	
Average Slope (%)=	4.00	17.24	
Length (m)=	55.86	8.70	
Mannings n =	0.130	0.250	
Max.Eff.Inten.(mm/hr)=	143.94	119.44	
over (min)	5.00	5.00	
Storage Coeff. (min)=	4.09 (ii)	60.00 (ii)	
Unit Hyd. Tpeak (min)=	5.00	60.00	
Unit Hyd. peak (cms)=	0.24	0.02	
			TOTALS
PEAK FLOW (cms)=	0.03	0.03	0.038 (iii)

CALIB					
STANDHYD (0017)	Area (ha)= 0.47				
ID= 1 DT= 5.0 min	Total Imp(%)= 15.50	Dir. Conn.(%)= 15.50			

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.07	0.40	
Dep. Storage (mm)=	1.00	1.50	
Average Slope (%)=	4.00	17.24	
Length (m)=	5.00	8.70	
Mannings n =	0.130	0.250	
Max.Eff.Inten.(mm/hr)=	143.94	119.44	
over (min)	5.00	5.00	
Storage Coeff. (min)=	0.96 (ii)	60.00 (ii)	
Unit Hyd. Tpeak (min)=	5.00	60.00	
Unit Hyd. peak (cms)=	0.34	0.02	
			TOTALS
PEAK FLOW (cms)=	0.03	0.03	0.038 (iii)
TIME TO PEAK (hrs)=	12.08	12.92	12.08
RUNOFF VOLUME (mm)=	116.60	83.76	88.77
TOTAL RAINFALL (mm)=	117.60	117.60	117.60
RUNOFF COEFFICIENT =	0.99	0.71	0.75

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CALIB					
NASHYD (0005)	Area (ha)= 2.19	Curve Number (CN)= 63.0			
ID= 1 DT= 5.0 min	Ia (mm)= 8.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.51				

Unit Hyd Qpeak (cms)= 0.164

PEAK FLOW (cms)= 0.133 (i)
TIME TO PEAK (hrs)= 12.500
RUNOFF VOLUME (mm)= 46.417
TOTAL RAINFALL (mm)= 117.600
RUNOFF COEFFICIENT = 0.395

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

CALIB					
STANDHYD (0018)	Area (ha)= 0.47				
ID= 1 DT= 5.0 min	Total Imp(%)= 15.50	Dir. Conn.(%)= 15.50			

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	0.07	0.40	
Dep. Storage (mm)=	1.00	1.50	
Average Slope (%)=	4.00	17.24	
Length (m)=	55.86	8.70	
Mannings n =	0.130	0.250	
Max.Eff.Inten.(mm/hr)=	143.94	119.44	
over (min)	5.00	10.00	
Storage Coeff. (min)=	4.09 (ii)	60.00 (ii)	
Unit Hyd. Tpeak (min)=	5.00	60.00	
Unit Hyd. peak (cms)=	0.24	0.02	
			TOTALS
PEAK FLOW (cms)=	0.03	0.03	0.038 (iii)

```
     TIME TO PEAK    (hrs)=      12.08        12.92          12.08
     RUNOFF VOLUME    (mm)=     116.60        83.76          88.77
     TOTAL RAINFALL   (mm)=     117.60       117.60         117.60
     RUNOFF COEFFICIENT   =       0.99         0.71           0.75

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------------------
| ADD HYD  (  0022)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0014):     2.19   0.133    12.50    46.42
     + ID2= 2 (  0018):     0.47   0.038    12.08    88.77
       ================================================
       ID = 3 (  0022):     2.66   0.157    12.50    53.87

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

-------------------
| ADD HYD  (  0022)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0022):     2.66   0.157    12.50    53.87
     + ID2= 2 (  0008):     8.07   0.532    12.58    53.99
       ================================================
       ID = 1 (  0022):    10.73   0.689    12.58    53.96

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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-------------------
| ADD HYD  (  0022)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0022):    10.73   0.689    12.58    53.96
     + ID2= 2 (  0009):     2.97   0.188    12.42    45.15
       ================================================
       ID = 3 (  0022):    13.69   0.872    12.50    52.05

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0010)|   Area    (ha)=   4.58   Curve Number   (CN)= 72.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.80   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.54

     Unit Hyd Qpeak  (cms)=   0.324

     PEAK FLOW       (cms)=   0.343 (i)
     TIME TO PEAK    (hrs)=  12.500
     RUNOFF VOLUME    (mm)=  58.575
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.498

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

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-------------------
| CALIB            |
| NASHYD   (  0011)|   Area    (ha)=   1.12   Curve Number   (CN)= 64.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.29

     Unit Hyd Qpeak  (cms)=   0.148

     PEAK FLOW       (cms)=   0.106 (i)
     TIME TO PEAK    (hrs)=  12.250
     RUNOFF VOLUME    (mm)=  47.556
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.404

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

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-------------------
| CALIB            |
| NASHYD   (  0015)|   Area    (ha)=   0.05   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.12

     Unit Hyd Qpeak  (cms)=   0.018

     PEAK FLOW       (cms)=   0.009 (i)
     TIME TO PEAK    (hrs)=  12.083
     RUNOFF VOLUME    (mm)=  45.793
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.389

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

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-------------------
| ADD HYD  (  0023)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0010):     4.58   0.343    12.50    58.58
     + ID2= 2 (  0011):     1.12   0.106    12.25    47.56
       ================================================
       ID = 3 (  0023):     5.70   0.423    12.42    56.41

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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-------------------
| ADD HYD  (  0023)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0023):     5.70   0.423    12.42    56.41
     + ID2= 2 (  0015):     0.05   0.009    12.08    45.79
       ================================================
       ID = 1 (  0023):     5.75   0.425    12.42    56.30

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0012)|   Area    (ha)=  12.48   Curve Number   (CN)= 77.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.60   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.75

     Unit Hyd Qpeak  (cms)=   0.635

     PEAK FLOW       (cms)=   0.839 (i)
     TIME TO PEAK    (hrs)=  12.750
     RUNOFF VOLUME    (mm)=  65.933
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.561

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

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0013)|   Area    (ha)=   4.29   Curve Number   (CN)= 67.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.529

     PEAK FLOW       (cms)=   0.418 (i)
     TIME TO PEAK    (hrs)=  12.250
     RUNOFF VOLUME    (mm)=  51.162
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.435

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

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-------------------
| CALIB            |
| NASHYD   (  0016)|   Area    (ha)=   1.79   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.25

     Unit Hyd Qpeak  (cms)=   0.274

     PEAK FLOW       (cms)=   0.284 (i)
     TIME TO PEAK    (hrs)=  12.167
     RUNOFF VOLUME    (mm)=  69.339
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.590

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

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-------------------
| ADD HYD  (  0024)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0012):    12.48   0.839    12.75    65.93
     + ID2= 2 (  0013):     4.29   0.418    12.25    51.16
       ================================================
       ID = 3 (  0024):    16.77   1.086    12.50    62.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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-------------------
| ADD HYD  (  0024)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0024):    16.77   1.086    12.50    62.15
     + ID2= 2 (  0016):     1.79   0.284    12.17    69.34
       ================================================
       ID = 1 (  0024):    18.56   1.270    12.33    62.85
```

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     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| NASHYD   (  0002)|   Area    (ha)=   4.70   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.55

     Unit Hyd Qpeak  (cms)=   0.327

     PEAK FLOW       (cms)=   0.284 (i)
     TIME TO PEAK    (hrs)=  12.500
     RUNOFF VOLUME    (mm)=  48.755
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.415

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

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--------------------
| CALIB            |
| NASHYD   (  0006)|   Area    (ha)=   0.05   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

     Unit Hyd Qpeak  (cms)=   0.018

     PEAK FLOW       (cms)=   0.009 (i)
     TIME TO PEAK    (hrs)=  12.083
     RUNOFF VOLUME    (mm)=  45.793
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.389

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

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--------------------
| ADD HYD  (  0020)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0002):     4.70   0.284    12.50    48.75
     + ID2= 2 (  0006):     0.05   0.009    12.08    45.79
       ================================================
       ID = 3 (  0020):     4.76   0.286    12.50    48.72

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0004)|   Area    (ha)=  16.45   Curve Number   (CN)= 71.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.57

     Unit Hyd Qpeak  (cms)=   1.103

     PEAK FLOW       (cms)=   1.138 (i)
     TIME TO PEAK    (hrs)=  12.583
     RUNOFF VOLUME    (mm)=  56.302
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.479

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

---------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0007)|   Area    (ha)=   1.79   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.25

     Unit Hyd Qpeak  (cms)=   0.274

     PEAK FLOW       (cms)=   0.284 (i)
     TIME TO PEAK    (hrs)=  12.167
     RUNOFF VOLUME    (mm)=  69.339
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.590

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

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

--------------------
| ADD HYD  (  0021)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0004):    16.45   1.138    12.58    56.30
     + ID2= 2 (  0007):     1.79   0.284    12.17    69.34
       ================================================
       ID = 3 (  0021):    18.25   1.293    12.50    57.58

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

--------------------
| ADD HYD  (  0025)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0020):     4.76   0.286    12.50    48.72

     + ID2= 2 (  0021):    18.25   1.293    12.50    57.58
       ================================================
       ID = 3 (  0025):    23.00   1.579    12.50    55.75

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0029)|   Area    (ha)=   8.07   Curve Number   (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.60   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.57

     Unit Hyd Qpeak  (cms)=   0.541

     PEAK FLOW       (cms)=   0.532 (i)
     TIME TO PEAK    (hrs)=  12.583
     RUNOFF VOLUME    (mm)=  53.988
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.459

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

---------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0033)|   Area    (ha)=   2.19   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.51

     Unit Hyd Qpeak  (cms)=   0.164

     PEAK FLOW       (cms)=   0.133 (i)
     TIME TO PEAK    (hrs)=  12.500
     RUNOFF VOLUME    (mm)=  46.417
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.395

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

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

--------------------
| ADD HYD  (  0045)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0029):     8.07   0.532    12.58    53.99
     + ID2= 2 (  0033):     2.19   0.133    12.50    46.42
       ================================================
       ID = 3 (  0045):    10.26   0.663    12.58    52.37

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
---------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0042)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0000   |    0.6520      0.1300
                          0.2430      0.0600   |    0.0000      0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0045)     10.261      0.663     12.58      52.37
   OUTFLOW: ID= 1 (  0042)     10.261      0.497     13.00      52.37

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 74.97
                  TIME SHIFT OF PEAK FLOW         (min)= 25.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1035

---------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0032)|   Area    (ha)=   2.97   Curve Number   (CN)= 62.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.20   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.46

     Unit Hyd Qpeak  (cms)=   0.246

     PEAK FLOW       (cms)=   0.188 (i)
     TIME TO PEAK    (hrs)=  12.417
     RUNOFF VOLUME    (mm)=  45.147
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.384

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

---------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0039)|   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  15.50   Dir. Conn.(%)=  15.50
--------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.07         0.40
     Dep. Storage     (mm)=      1.00         1.50
     Average Slope     (%)=      4.00        17.24
     Length            (m)=     55.86         8.70
     Mannings n           =     0.130        0.250

     Max.Eff.Inten.(mm/hr)=    143.94       119.44
```

```
              over (min)        5.00        10.00
     Storage Coeff.  (min)=      4.09 (ii)   60.00 (ii)
     Unit Hyd. Tpeak (min)=      5.00        60.00
     Unit Hyd. peak  (cms)=      0.24         0.02
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.03         0.03         0.038 (iii)
     TIME TO PEAK    (hrs)=     12.08        12.92         12.08
     RUNOFF VOLUME    (mm)=    116.60        83.76         88.77
     TOTAL RAINFALL   (mm)=    117.60       117.60        117.60
     RUNOFF COEFFICIENT   =      0.99         0.71          0.75

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
             CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

-------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0032):     2.97   0.188    12.42    45.15
     + ID2= 2 (  0039):     0.47   0.038    12.08    88.77
       ================================================
       ID = 3 (  0031):     3.43   0.210    12.42    51.09

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

-------------------
| ADD HYD  (  0031)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0031):     3.43   0.210    12.42    51.09
     + ID2= 2 (  0042):    10.26   0.497    13.00    52.37
       ================================================
       ID = 1 (  0031):    13.70   0.648    12.92    52.05

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

-------------------
| CALIB            |
| NASHYD   (  0030)|   Area    (ha)=  12.48   Curve Number   (CN)= 77.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.60   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.75

     Unit Hyd Qpeak  (cms)=   0.635

     PEAK FLOW       (cms)=   0.839 (i)
     TIME TO PEAK    (hrs)=  12.750
     RUNOFF VOLUME    (mm)=  65.933
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.561

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

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

-------------------
| CALIB            |
| NASHYD   (  0035)|   Area    (ha)=   1.79   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.25

     Unit Hyd Qpeak  (cms)=   0.274

     PEAK FLOW       (cms)=   0.284 (i)
     TIME TO PEAK    (hrs)=  12.167
     RUNOFF VOLUME    (mm)=  69.339
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.590

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

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

-------------------
| CALIB            |
| NASHYD   (  0037)|   Area    (ha)=   4.29   Curve Number   (CN)= 67.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.529

     PEAK FLOW       (cms)=   0.418 (i)
     TIME TO PEAK    (hrs)=  12.250
     RUNOFF VOLUME    (mm)=  51.162
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.435

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

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

-------------------
| ADD HYD  (  0036)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0030):    12.48   0.839    12.75    65.93
     + ID2= 2 (  0035):     1.79   0.284    12.17    69.34
       ================================================
       ID = 3 (  0036):    14.27   0.938    12.58    66.36

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

-------------------
| ADD HYD  (  0036)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0036):    14.27   0.938    12.58    66.36
     + ID2= 2 (  0037):     4.29   0.418    12.25    51.16
       ================================================
       ID = 1 (  0036):    18.56   1.270    12.33    62.85

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

-------------------
| CALIB            |
| NASHYD   (  0034)|   Area    (ha)=   4.58   Curve Number   (CN)= 72.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.80   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.54

     Unit Hyd Qpeak  (cms)=   0.324

     PEAK FLOW       (cms)=   0.343 (i)
     TIME TO PEAK    (hrs)=  12.500
     RUNOFF VOLUME    (mm)=  58.575
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.498

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

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

-------------------
| CALIB            |
| NASHYD   (  0041)|   Area    (ha)=   0.05   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.12

     Unit Hyd Qpeak  (cms)=   0.018

     PEAK FLOW       (cms)=   0.009 (i)
     TIME TO PEAK    (hrs)=  12.083
     RUNOFF VOLUME    (mm)=  45.793
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.389

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

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

-------------------
| ADD HYD  (  0047)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0034):     4.58   0.343    12.50    58.58
     + ID2= 2 (  0041):     0.05   0.009    12.08    45.79
       ================================================
       ID = 3 (  0047):     4.63   0.345    12.50    58.42

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

-------------------
| RESERVOIR(  0043)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0000   |    0.1950      0.1050
                          0.0740      0.0500   |    0.0000      0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0047)     4.631      0.345     12.50      58.42
   OUTFLOW: ID= 1 (  0043)     4.631      0.165     13.33      58.39

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 48.02
                  TIME SHIFT OF PEAK FLOW         (min)= 50.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0916

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

-------------------
| CALIB            |
| NASHYD   (  0040)|   Area    (ha)=   1.12   Curve Number   (CN)= 64.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.29

     Unit Hyd Qpeak  (cms)=   0.148

     PEAK FLOW       (cms)=   0.106 (i)
     TIME TO PEAK    (hrs)=  12.250
     RUNOFF VOLUME    (mm)=  47.556
     TOTAL RAINFALL   (mm)= 117.600
     RUNOFF COEFFICIENT   =   0.404

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

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

-------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0040):     1.12   0.106    12.25    47.56
     + ID2= 2 (  0043):     4.63   0.165    13.33    58.39
       ================================================
       ID = 3 (  0038):     5.75   0.184    13.17    56.28

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

 FINISH
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2019)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat

  Output  filename:
C:\Users\s.zahedi\AppData\Local\Civica\VH5\e58e56e5-dd85-4558-af7a-fb9e8006ce04\779
ead43-33bf-4b10-b291-75bd72b7be58\sce
  Summary filename:
C:\Users\s.zahedi\AppData\Local\Civica\VH5\e58e56e5-dd85-4558-af7a-fb9e8006ce04\779
ead43-33bf-4b10-b291-75bd72b7be58\sce

DATE: 07-30-2025                          TIME: 04:57:17

USER:


COMMENTS: _____________________________________________________

--------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 100yr 6hr 5min SCS            **
  ***********************************************


-------------------
|    READ STORM    |    Filename: C:\Users\s.zahedi\AppD
|                  |              ata\Local\Temp\
|                  |              ec928a9d-07b7-4727-811a-533524b929ca\f533f344
| Ptotal= 76.80 mm |    Comments: 100yr 6hr 5min SCS
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  1.58    7.68 |  3.17   16.90 |  4.75    4.61
                0.08    3.07 |  1.67    7.68 |  3.25   16.90 |  4.83    4.61
                0.17    3.07 |  1.75    7.68 |  3.33   16.90 |  4.92    4.61
                0.25    3.07 |  1.83    7.68 |  3.42   16.90 |  5.00    4.61
                0.33    3.07 |  1.92    7.68 |  3.50   16.90 |  5.08    3.07
                0.42    3.07 |  2.00    7.68 |  3.58    7.68 |  5.17    3.07
                0.50    3.07 |  2.08    9.22 |  3.67    7.68 |  5.25    3.07
                0.58    4.61 |  2.17    9.22 |  3.75    7.68 |  5.33    3.07
                0.67    4.61 |  2.25    9.22 |  3.83    7.68 |  5.42    3.07
                0.75    4.61 |  2.33    9.22 |  3.92    7.68 |  5.50    3.07
                0.83    4.61 |  2.42    9.22 |  4.00    7.68 |  5.58    3.07
                0.92    4.61 |  2.50    9.22 |  4.08    6.14 |  5.67    3.07
                1.00    4.61 |  2.58   46.08 |  4.17    6.14 |  5.75    3.07
                1.08    4.61 |  2.67   46.08 |  4.25    6.14 |  5.83    3.07
                1.17    4.61 |  2.75   46.08 |  4.33    6.14 |  5.92    3.07
                1.25    4.61 |  2.83  119.81 |  4.42    6.14 |  6.00    3.07
                1.33    4.61 |  2.92  119.81 |  4.50    6.14 |
                1.42    4.61 |  3.00  119.81 |  4.58    4.61 |
                1.50    4.61 |  3.08   16.90 |  4.67    4.61 |
--------------------------------------------------------------------------------

-------------------
| CALIB             |
| NASHYD   (  0003)|   Area     (ha)=   3.48   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00

-------------------   U.H. Tp(hrs)=   0.61

     Unit Hyd Qpeak  (cms)=   0.218

     PEAK FLOW       (cms)=   0.124 (i)
     TIME TO PEAK    (hrs)=   3.667
     RUNOFF VOLUME    (mm)=  23.025
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.300

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD   (  0001)|   Area     (ha)=   8.86   Curve Number   (CN)= 66.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.50   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.57

     Unit Hyd Qpeak  (cms)=   0.594

     PEAK FLOW       (cms)=   0.335 (i)
     TIME TO PEAK    (hrs)=   3.583
     RUNOFF VOLUME    (mm)=  23.423
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.305

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD   (  0005)|   Area     (ha)=   2.19   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.51

     Unit Hyd Qpeak  (cms)=   0.164

     PEAK FLOW       (cms)=   0.083 (i)
     TIME TO PEAK    (hrs)=   3.583
     RUNOFF VOLUME    (mm)=  21.714
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.283

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0017)|   Area     (ha)=   0.47

|ID= 1 DT= 5.0 min |   Total Imp(%)=  15.50   Dir. Conn.(%)=  15.50
-------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.07         0.40
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       4.00        17.24
     Length            (m)=       5.00         8.70
     Mannings n           =       0.130        0.250

     Max.Eff.Inten.(mm/hr)=     119.81        89.31
               over (min)        5.00         5.00
     Storage Coeff.  (min)=       1.03 (ii)   60.00 (ii)
     Unit Hyd. Tpeak (min)=       5.00        60.00
     Unit Hyd. peak  (cms)=       0.34         0.02
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.02          0.030 (iii)
     TIME TO PEAK    (hrs)=       3.08         3.92          3.08
     RUNOFF VOLUME    (mm)=      75.80        47.20         51.56
     TOTAL RAINFALL   (mm)=      76.80        76.80         76.80
     RUNOFF COEFFICIENT   =       0.99         0.61          0.67

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

-------------------
| ADD HYD  (  0019)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):     8.86   0.335     3.58    23.42
     + ID2= 2 (  0017):     0.47   0.030     3.08    51.56
       ================================================
       ID = 3 (  0019):     9.33   0.356     3.58    24.83

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

-------------------
| ADD HYD  (  0019)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0019):     9.33   0.356     3.58    24.83
```

```
     + ID2= 2 (  0005):     2.19   0.083     3.58    21.71
       ==================================================
       ID = 1 (  0019):    11.52   0.438     3.58    24.24

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0008)|   Area    (ha)=   8.07   Curve Number   (CN)= 69.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.60   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.57

     Unit Hyd Qpeak  (cms)=   0.541

     PEAK FLOW       (cms)=   0.344 (i)
     TIME TO PEAK    (hrs)=   3.583
     RUNOFF VOLUME    (mm)=  26.121
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.340

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0009)|   Area    (ha)=   2.97   Curve Number   (CN)= 62.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.20   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.46

     Unit Hyd Qpeak  (cms)=   0.246

     PEAK FLOW       (cms)=   0.116 (i)
     TIME TO PEAK    (hrs)=   3.500
     RUNOFF VOLUME    (mm)=  20.981
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.273

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0014)|   Area    (ha)=   2.19   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.51

     Unit Hyd Qpeak  (cms)=   0.164

     PEAK FLOW       (cms)=   0.083 (i)
     TIME TO PEAK    (hrs)=   3.583
```

```
     RUNOFF VOLUME    (mm)=  21.714
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.283

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0018)|   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  15.50   Dir. Conn.(%)=  15.50
--------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.07         0.40
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       4.00        17.24
     Length            (m)=      55.86         8.70
     Mannings n           =      0.130        0.250

     Max.Eff.Inten.(mm/hr)=     119.81        89.31
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       4.40 (ii)   60.00 (ii)
     Unit Hyd. Tpeak (min)=       5.00        60.00
     Unit Hyd. peak  (cms)=       0.23         0.02

                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.02          0.029 (iii)
     TIME TO PEAK    (hrs)=       3.08         3.92           3.08
     RUNOFF VOLUME    (mm)=      75.80        47.20          51.56
     TOTAL RAINFALL   (mm)=      76.80        76.80          76.80
     RUNOFF COEFFICIENT   =       0.99         0.61           0.67

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
             YOU SHOULD CONSIDER SPLITTING THE AREA.

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  85.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
          THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0022)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0014):     2.19   0.083     3.58    21.71
     + ID2= 2 (  0018):     0.47   0.029     3.08    51.56
       ==================================================
```

```
       ID = 3 (  0022):     2.66   0.103     3.58    26.97

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

--------------------
| ADD HYD  (  0022)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0022):     2.66   0.103     3.58    26.97
     + ID2= 2 (  0008):     8.07   0.344     3.58    26.12
       ==================================================
       ID = 1 (  0022):    10.73   0.447     3.58    26.33

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

--------------------
| ADD HYD  (  0022)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0022):    10.73   0.447     3.58    26.33
     + ID2= 2 (  0009):     2.97   0.116     3.50    20.98
       ==================================================
       ID = 3 (  0022):    13.69   0.560     3.58    25.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0010)|   Area    (ha)=   4.58   Curve Number   (CN)= 72.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.80   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.54

     Unit Hyd Qpeak  (cms)=   0.324

     PEAK FLOW       (cms)=   0.227 (i)
     TIME TO PEAK    (hrs)=   3.583
     RUNOFF VOLUME    (mm)=  29.031
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.378

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0011)|   Area    (ha)=   1.12   Curve Number   (CN)= 64.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.29
```

```
     Unit Hyd Qpeak  (cms)=   0.148

     PEAK FLOW       (cms)=   0.066 (i)
     TIME TO PEAK    (hrs)=   3.250
     RUNOFF VOLUME    (mm)=  22.351
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.291

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0015)|   Area    (ha)=   0.05   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.12

     Unit Hyd Qpeak  (cms)=   0.018

     PEAK FLOW       (cms)=   0.005 (i)
     TIME TO PEAK    (hrs)=   3.083
     RUNOFF VOLUME    (mm)=  21.421
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.279

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

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

--------------------
| ADD HYD  (  0023)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0010):     4.58   0.227     3.58    29.03
     + ID2= 2 (  0011):     1.12   0.066     3.25    22.35
       ==================================================
       ID = 3 (  0023):     5.70   0.275     3.50    27.72

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

--------------------
| ADD HYD  (  0023)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0023):     5.70   0.275     3.50    27.72
     + ID2= 2 (  0015):     0.05   0.005     3.08    21.42
       ==================================================
       ID = 1 (  0023):     5.75   0.277     3.50    27.66
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0012)	Area (ha)=	12.48	Curve Number (CN)=	77.0	
ID= 1 DT= 5.0 min	Ia (mm)=	6.60	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.75			

Unit Hyd Qpeak (cms)= 0.635

PEAK FLOW (cms)= 0.573 (i)
TIME TO PEAK (hrs)= 3.833
RUNOFF VOLUME (mm)= 33.737
TOTAL RAINFALL (mm)= 76.800
RUNOFF COEFFICIENT = 0.439

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

CALIB					
NASHYD (0013)	Area (ha)=	4.29	Curve Number (CN)=	67.0	
ID= 1 DT= 5.0 min	Ia (mm)=	8.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.31			

Unit Hyd Qpeak (cms)= 0.529

PEAK FLOW (cms)= 0.262 (i)
TIME TO PEAK (hrs)= 3.250
RUNOFF VOLUME (mm)= 24.403
TOTAL RAINFALL (mm)= 76.800
RUNOFF COEFFICIENT = 0.318

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

CALIB					
NASHYD (0016)	Area (ha)=	1.79	Curve Number (CN)=	80.0	
ID= 1 DT= 5.0 min	Ia (mm)=	8.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.25			

Unit Hyd Qpeak (cms)= 0.274

PEAK FLOW (cms)= 0.192 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 35.749
TOTAL RAINFALL (mm)= 76.800
RUNOFF COEFFICIENT = 0.465

Unit Hyd Qpeak (cms)= 0.018

PEAK FLOW (cms)= 0.005 (i)
TIME TO PEAK (hrs)= 3.083
RUNOFF VOLUME (mm)= 21.421
TOTAL RAINFALL (mm)= 76.800
RUNOFF COEFFICIENT = 0.279

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

ADD HYD (0020)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	4.70	0.180	3.58	23.02
+ ID2= 2 (0006):	0.05	0.005	3.08	21.42
ID = 3 (0020):	4.76	0.181	3.58	23.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0004)	Area (ha)=	16.45	Curve Number (CN)=	71.0	
ID= 1 DT= 5.0 min	Ia (mm)=	8.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.57			

Unit Hyd Qpeak (cms)= 1.103

PEAK FLOW (cms)= 0.739 (i)
TIME TO PEAK (hrs)= 3.583
RUNOFF VOLUME (mm)= 27.432
TOTAL RAINFALL (mm)= 76.800
RUNOFF COEFFICIENT = 0.357

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

CALIB					
NASHYD (0007)	Area (ha)=	1.79	Curve Number (CN)=	80.0	
ID= 1 DT= 5.0 min	Ia (mm)=	8.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.25			

Unit Hyd Qpeak (cms)= 0.274

PEAK FLOW (cms)= 0.192 (i)

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

ADD HYD (0024)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0012):	12.48	0.573	3.83	33.74
+ ID2= 2 (0013):	4.29	0.262	3.25	24.40
ID = 3 (0024):	16.77	0.725	3.58	31.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0024)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0024):	16.77	0.725	3.58	31.35
+ ID2= 2 (0016):	1.79	0.192	3.17	35.75
ID = 1 (0024):	18.56	0.834	3.42	31.77

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0002)	Area (ha)=	4.70	Curve Number (CN)=	65.0	
ID= 1 DT= 5.0 min	Ia (mm)=	8.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.55			

Unit Hyd Qpeak (cms)= 0.327

PEAK FLOW (cms)= 0.180 (i)
TIME TO PEAK (hrs)= 3.583
RUNOFF VOLUME (mm)= 23.025
TOTAL RAINFALL (mm)= 76.800
RUNOFF COEFFICIENT = 0.300

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

CALIB					
NASHYD (0006)	Area (ha)=	0.05	Curve Number (CN)=	63.0	
ID= 1 DT= 5.0 min	Ia (mm)=	8.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.12			

TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 35.749
TOTAL RAINFALL (mm)= 76.800
RUNOFF COEFFICIENT = 0.465

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

ADD HYD (0021)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0004):	16.45	0.739	3.58	27.43
+ ID2= 2 (0007):	1.79	0.192	3.17	35.75
ID = 3 (0021):	18.25	0.842	3.50	28.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0025)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0020):	4.76	0.181	3.58	23.01
+ ID2= 2 (0021):	18.25	0.842	3.50	28.25
ID = 3 (0025):	23.00	1.020	3.50	27.16

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0029)	Area (ha)=	8.07	Curve Number (CN)=	69.0	
ID= 1 DT= 5.0 min	Ia (mm)=	7.60	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.57			

Unit Hyd Qpeak (cms)= 0.541

PEAK FLOW (cms)= 0.344 (i)
TIME TO PEAK (hrs)= 3.583
RUNOFF VOLUME (mm)= 26.121
TOTAL RAINFALL (mm)= 76.800
RUNOFF COEFFICIENT = 0.340

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

```
| CALIB            |
| NASHYD   (  0033)|   Area    (ha)=   2.19   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.51

     Unit Hyd Qpeak  (cms)=   0.164

     PEAK FLOW       (cms)=   0.083 (i)
     TIME TO PEAK    (hrs)=   3.583
     RUNOFF VOLUME    (mm)=  21.714
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.283

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

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

-------------------
| ADD HYD  (  0045)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0029):     8.07   0.344     3.58    26.12
     + ID2= 2 (  0033):     2.19   0.083     3.58    21.71
       ================================================
       ID = 3 (  0045):    10.26   0.426     3.58    25.18

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0042)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000      0.0000   |    0.6520      0.1300
                         0.2430      0.0600   |    0.0000      0.0000

                             AREA     QPEAK     TPEAK       R.V.
                             (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0045)     10.261      0.426      3.58      25.18
   OUTFLOW: ID= 1 (  0042)     10.261      0.305      4.17      25.18

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 71.54
                  TIME SHIFT OF PEAK FLOW         (min)= 35.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0708

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0032)|   Area    (ha)=   2.97   Curve Number   (CN)= 62.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.20   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.46

     Unit Hyd Qpeak  (cms)=   0.246

     PEAK FLOW       (cms)=   0.116 (i)
     TIME TO PEAK    (hrs)=   3.500
     RUNOFF VOLUME    (mm)=  20.981
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.273

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

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0039)|   Area    (ha)=   0.47
|ID= 1 DT= 5.0 min |   Total Imp(%)=  15.50   Dir. Conn.(%)=  15.50
-------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.07         0.40
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       4.00        17.24
     Length            (m)=      55.86         8.70
     Mannings n             =     0.130        0.250

     Max.Eff.Inten.(mm/hr)=     119.81        89.31
                   over (min)        5.00        10.00
     Storage Coeff.  (min)=       4.40 (ii)   60.00 (ii)
     Unit Hyd. Tpeak (min)=       5.00        60.00
     Unit Hyd. peak  (cms)=       0.23         0.02
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.02         0.02          0.029 (iii)
     TIME TO PEAK    (hrs)=       3.08         3.92           3.08
     RUNOFF VOLUME    (mm)=      75.80        47.20          51.56
     TOTAL RAINFALL   (mm)=      76.80        76.80          76.80
     RUNOFF COEFFICIENT   =       0.99         0.61           0.67

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!
***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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-------------------
| ADD HYD  (  0031)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0032):     2.97   0.116     3.50    20.98
     + ID2= 2 (  0039):     0.47   0.029     3.08    51.56
       ================================================
       ID = 3 (  0031):     3.43   0.134     3.50    25.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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-------------------
| ADD HYD  (  0031)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0031):     3.43   0.134     3.50    25.15
     + ID2= 2 (  0042):    10.26   0.305     4.17    25.18
       ================================================
       ID = 1 (  0031):    13.70   0.400     4.00    25.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0030)|   Area    (ha)=  12.48   Curve Number   (CN)= 77.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.60   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.75

     Unit Hyd Qpeak  (cms)=   0.635

     PEAK FLOW       (cms)=   0.573 (i)
     TIME TO PEAK    (hrs)=   3.833
     RUNOFF VOLUME    (mm)=  33.737
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.439

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

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0035)|   Area    (ha)=   1.79   Curve Number   (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.25

     Unit Hyd Qpeak  (cms)=   0.274

     PEAK FLOW       (cms)=   0.192 (i)
     TIME TO PEAK    (hrs)=   3.167
     RUNOFF VOLUME    (mm)=  35.749
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.465

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

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0037)|   Area    (ha)=   4.29   Curve Number   (CN)= 67.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.31

     Unit Hyd Qpeak  (cms)=   0.529

     PEAK FLOW       (cms)=   0.262 (i)
     TIME TO PEAK    (hrs)=   3.250
     RUNOFF VOLUME    (mm)=  24.403
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.318

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

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-------------------
| ADD HYD  (  0036)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0030):    12.48   0.573     3.83    33.74
     + ID2= 2 (  0035):     1.79   0.192     3.17    35.75
       ================================================
       ID = 3 (  0036):    14.27   0.643     3.67    33.99

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

-------------------
| ADD HYD  (  0036)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0036):    14.27   0.643     3.67    33.99
     + ID2= 2 (  0037):     4.29   0.262     3.25    24.40
       ================================================
       ID = 1 (  0036):    18.56   0.834     3.42    31.77

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| CALIB            |
| NASHYD   (  0034)|   Area    (ha)=   4.58   Curve Number   (CN)= 72.0
```

```
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.80   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.54

     Unit Hyd Qpeak  (cms)=   0.324

     PEAK FLOW       (cms)=   0.227 (i)
     TIME TO PEAK    (hrs)=   3.583
     RUNOFF VOLUME    (mm)=  29.031
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.378

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

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD   (  0041)|   Area    (ha)=   0.05   Curve Number   (CN)= 63.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.12

     Unit Hyd Qpeak  (cms)=   0.018

     PEAK FLOW       (cms)=   0.005 (i)
     TIME TO PEAK    (hrs)=   3.083
     RUNOFF VOLUME    (mm)=  21.421
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.279

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

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-------------------
| ADD HYD  (  0047)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0034):     4.58   0.227     3.58    29.03
     + ID2= 2 (  0041):     0.05   0.005     3.08    21.42
       ================================================
       ID = 3 (  0047):     4.63   0.228     3.58    28.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0043)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0000   |    0.1950      0.1050
                          0.0740      0.0500   |    0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0047)      4.631      0.228      3.58      28.94
   OUTFLOW: ID= 1 (  0043)      4.631      0.101      4.50      28.90

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 44.19
                  TIME SHIFT OF PEAK FLOW         (min)= 55.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0622

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| NASHYD   (  0040)|   Area    (ha)=   1.12   Curve Number   (CN)= 64.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.00   # of Linear Res.(N)= 3.00
-------------------   U.H. Tp(hrs)=   0.29

     Unit Hyd Qpeak  (cms)=   0.148

     PEAK FLOW       (cms)=   0.066 (i)
     TIME TO PEAK    (hrs)=   3.250
     RUNOFF VOLUME    (mm)=  22.351
     TOTAL RAINFALL   (mm)=  76.800
     RUNOFF COEFFICIENT   =   0.291

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

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-------------------
| ADD HYD  (  0038)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
-------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0040):     1.12   0.066     3.25    22.35
     + ID2= 2 (  0043):     4.63   0.101     4.50    28.90
       ================================================
       ID = 3 (  0038):     5.75   0.112     4.42    27.63

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