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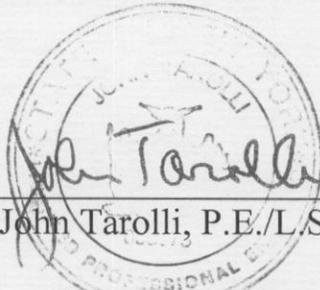
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**STORMWATER MANAGEMENT REPORT**  
  
for the  
  
**Subdivision of Lands of Louis & Janet Nowicki**

Town of New Windsor  
County of Orange  
State of New York

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## **I. Site Location**

The proposed subdivision of lands of Louis and Janet Nowicki is located on the easterly side of Station Road in the Town of New Windsor, Orange County, New York.

The project site consists of two tax map parcels: Section 57, Block 1, Lots 88.22 & 88.23, totaling 116.013 acres of land.

## **II. Site Characteristics and Drainage**

### **A. Existing Conditions**

The project site is currently occupied by an existing house and barn located near the common boundary lines between tax map parcels Section 57, Block 1, Lots 88.22 & 88.23. In addition to the house and barn, two silos and several other small outbuildings currently exist around the barn. The existing house, barn, outbuildings and driveway encumber 0.65 acres of land on the project site. Around the existing house and barn, approximately 1.97 acres of land is currently maintained as lawn. An aerial photo of the project site has been provided in Appendix A.

The project site currently contains eight (8) fields that are currently being farmed for hay. Three of the fields, totaling 14.69 acres, are located on tax map parcel 57-1-88.23. The remaining five (5) farm fields total 28.55 acres and are located on tax map parcel 57-1-88.22.

The project site currently contains two wetland areas regulated by the New York State Department of Environmental Conservation. State Wetland MD-29, located along Station Road, encumbers 10.75 acres of the project site. State wetland MB-59, located in the wooded area on the easterly portion of the site, encumbers 10.81 acres. An overgrown farm field currently exists south of the existing house. This field contains wetlands regulated by the United States Army corps of Engineers. The field is approximately 7.69 acres in size.

The remaining 40.90 acres of land is currently wooded. The wooded areas are primarily located along the easterly portion of the project site.

The project site is primarily made up of soils with hydrologic group "C". Two small portions of the site contain soils with hydrologic soils group "D". The areas with "D" classification are located in the areas of the two state wetlands. A map has been enclosed in Appendix A showing the existing soils types located on the project site and in the drainage area of the stream located along Station Road. The table below summarizes the soils located on the project site and within the aforementioned drainage areas.

Drainage Area Soils Information		
Symbol	Soils Name	HSG
Ab	Alden silt loam	D
AC	Alden extremely stoney soils	D
ErA	Erie gravelly silt loam, 0-3% slopes	C
ErB	Erie gravelly silt loam, 3-8% slopes	C
ESB	Erie extremely stony soils, gently sloping	C
MdB	Mardin gravelly silt loam, 3-8% slopes	C
MdC	Mardin gravelly silt loam, 8-15% slopes	C

The proposed development will be isolated to the land along Station Road. The portion of the site being developed is located along an upland ridge running in the north-south direction. The proposed homes are generally located on the ridge, with the land located to the west of the homes sloping down to Station Road. The land located to the east of the homes slopes from west to east draining to State Wetland MB-29 and the Army Corps of Engineer's Wetlands. All of the drainage from the proposed houses and driveways drains into State Wetland MB-29 and the existing unnamed Class "C" stream located in the wetland area.

B. Developed Conditions

The Nowicki subdivision is a proposed nine (9) lot single-family residential subdivision. The existing house and barn are located on proposed lot 9. Lots 1 through 8 are proposed to contain new single-family residential homes. The eight new lots will access Station Road. All of the new lots will access Station Road via individual driveways. The proposed homes will be located on the top of a north-south ridge located to the east of Station Road. The proposed improvements will add approximately 1.50 acres of impervious surface to the project site. The total impervious surface on the site will be approximately 2.15 acres, encumbering approximately 1.85% of the project site. For the post-development conditions, the fields that contain the proposed homes have been modeled as grassed lawn areas. This modeling represents the worst case for post-development drainage, if the homeowners converted all of the fields around their homes into lawn area.

C. Drainage Areas

To properly analyze the impacts of the proposed development on the receiving drainage courses, two (2) drainage areas have been analyzed. The drainage areas have been approximately based upon the topography for the project site and United States Geological Survey (USGS) Maybrook and Cornwall Quadrangles topographic maps. The study points utilized for each drainage area and brief descriptions of each drainage area are as follows:

Drainage Area "A"

Drainage Area "A" is approximately 186.39 acres and 186.32 acres in size for the pre- and post-development sites, respectively. The study point for this area is the

existing 42-inch corrugated metal pipe crossing Station Road at the approximate boundary between proposed Lots 4 & 5. Drainage area "A" encumbers a majority of the northern portion of the site and extends northward, receiving drainage from Sesame Street and the area to the east of Hill Road. The post-development drainage area will contain the proposed improvements for Lots 1, 2 3, 4, & 5.

Drainage Area "B"

Drainage Area "B" is approximately 3.96 acres and 4.03 acres in size for the pre- and post-development sites, respectively. The study point for this drainage area is the existing 18-inch high-density polyethylene culvert crossing Station Road approximately 300 feet south of the 42-inch pipe used in drainage area "A". Drainage area "B" includes the runoff from proposed Lots 6, 7 & 8. To properly analyze the post-development site, drainage area "B" was analyzed as four (4) drainage areas. The four drainage areas represent the three areas tributary to the proposed stormwater treatment facilities on Lots 6, 7 & 8 and the remaining area not collected by these facilities.

The following table summarizes the drainage areas analyzed:

<b>Pre-Development Drainage Areas</b>				
	<b>Area (Sq.ft.)</b>	<b>Area (Ac.)</b>	<b>CN</b>	<b>Tc (min.)</b>
A	8,119,165	186.390	74	82.3
B	172,630	3.963	72	12.8
<b>Post-Development Drainage Areas</b>				
	<b>Area (Sq.ft.)</b>	<b>Area (Ac.)</b>	<b>CN</b>	<b>Tc (min.)</b>
A	8,116,167	186.322	74	82.3
B-Total	175,628	4.032	78	-
Lot 6	45,195	1.038	78	13.7
Lot 7	24,470	0.562	80	7.1
Lot 8	18,665	0.428	79	11.6
Remaining	87,298	2.004	77	12.7

Drainage area maps for the pre-development site have been provided in Appendix B. Drainage area maps for the post-development site have been provided in Appendix C.

**III. Stormwater Treatment**

In accordance with New York State Department of Environmental Conservation SPDES General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-0-08-001), any single-family residential subdivision disturbing more than 5 acres of land requires the stormwater runoff be treated to remove pollutants from the water.

Due to the proposed site improvements not collecting any of the runoff and conveying it to one area of the site, stormwater treatment and detention facilities are required for each individual lot. The following summaries describe the treatment methods for each new lot in the proposed subdivision.

Lots 1 & 2

To provide an "incentive to implement better site design practices to help reduce the volume of stormwater runoff and minimize the pollutant loads from a site" (NYSDEC "The Use and Implementation of Stormwater Credits") the NYSDEC has developed the concept of stormwater credits. Credits allow for a reduction in the water quality treatment volume for a development site. Under "Credit 2: Stream and Wetland Buffers" of the NYSDEC's "The Use and Implementation of Stormwater Credits", portions of sites can be removed from the computation of water quality volume. For the proposed development on Lots 1 & 2, the proposed impervious areas will convey runoff via overland flow to the existing NYSDEC wetland buffer for wetland MB-29. The improvements on Lot 1 do not require any other improvements to qualify for the credit. The proposed improvements on Lot 2 are in steeper areas and require the construction of a level spreader. The level spreader will be constructed uphill of the wetland buffer and will receive the runoff from the proposed house. All documentation associated with Credit 2 has been enclosed in Appendix D.

Lot 3

To treat the stormwater runoff from the house and driveway on proposed Lot 3, a Dry Swale (N.Y.S. Stormwater Practice O-1) has been designed. For the drainage area tributary to the dry swale, the water quality volume (WQv) was calculated as follows:

$$WQv = \frac{(P)(Rv)(A)}{12}$$

$$Rv = 0.05 + 0.009 (I) \text{ [min. of 0.2 required]}$$

$$I = \text{Impervious cover \%} = \frac{4,677 \text{ sq. ft.}}{21,698 \text{ sq. ft.}} \times 100 = 21.55\%$$

$$P = 90\% \text{ rainfall event number} = 1.2 \text{ inches}$$

$$A = \text{Area in acres} = 0.498 \text{ acres}$$

$$WQv = \frac{(1.2) [0.05 + 0.009 * (21.55)] (0.498)}{12} = \frac{(1.2)(0.24)(0.498)}{12}$$

$$WQv = 0.012 \text{ ac. - ft.} = 529 \text{ cu. ft.}$$

In accordance with New York State Stormwater Management Design Manual, the following parameters are required to be met for treating the water quality volume:

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Lands of Nowicki

- Pre-Treatment & Treatment Volume = 529 cu. ft.
- Pre-Treatment Volume = min. 10% of WQv = 53 cu. ft.
- Treatment Volume = 476 cu. ft.

The dry swale for Lot 3 does not receive runoff from a swale or drainage pipe, therefore a pre-treatment area within the dry swale is not required. Due to the swale receiving lateral flows, a 12" wide by 24" deep pca gravel diaphragm will be installed along the uphill side of the swale for pre-treatment of the runoff.

The dry swale for Lot 3 has been designed to be 8 feet wide, 61 feet long with 3 (horizontal) on 1 (vertical) side slope. At a design depth of 12 inches, the dry swale will treat 707 cu. ft. of runoff, 133.5% of the required water quality volume.

As required by the New York State Stormwater Design Manual, the dry swale must be designed to safely convey the 10-year storm with a minimum of 6 inches of freeboard. The peak elevation in the dry swale for Lot 3 during a 10-year storm event in 382.25. The minimum berm elevation for the dry swale is 383.00. The dry swale has a minimum of 0.75 feet or 9.0 inches of freeboard during the 10-year storm. The HydroCAD 8.50 computer outputs for the proposed dry swale on Lot 3 have been provided in Appendix E.

Lot 4

To treat the stormwater runoff from the house and driveway on proposed Lot 4, a Dry Swale (N.Y.S. Stormwater Practice (O-1) has been designed. For the drainage area tributary to the dry swale, the water quality volume (WQv) was calculated as follows:

$$WQv = \frac{(P)(Rv)(A)}{12}$$

$$Rv = 0.05 + 0.009 (I) \text{ [min. of 0.2 required]}$$

$$I = \text{Impervious cover \%} = \frac{5,453 \text{ sq. ft.}}{32,661 \text{ sq. ft.}} \times 100 = 16.70\%$$

$$P = 90\% \text{ rainfall event number} = 1.2 \text{ inches}$$

$$A = \text{Area in acres} = 0.750 \text{ acres}$$

$$WQv = \frac{(1.2) [0.05 + 0.009 * (16.70)] (0.750)}{12} = \frac{(1.2)(0.20)(0.750)}{12}$$

$$WQv = 0.015 \text{ ac. - ft.} = 654 \text{ cu. ft.}$$

In accordance with New York State Stormwater Management Design Manual, the following parameters are required to be met for treating the water quality volume:

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Lands of Nowicki

- Pre-Treatment & Treatment Volume = 654 cu. ft.
- Pre-Treatment Volume = min. 10% of WQv = 66 cu. ft.
- Treatment Volume = 588 cu. ft.

The dry swale for Lot 4 has been designed to be 8 feet wide, 62.5 feet long with 3 on 1 side slopes. At a design depth of 12 inches, the dry swale will treat 724 cu. ft. of runoff, 110.7% of the required water quality volume. To provide pre-treatment, a check dam will be installed at the outlet of the 12" pipe. The check dam will be installed at the outlet of the 12" pipe. The check dam will be installed 6.25 feet from the outlet, treating approximately 72 cu. ft. of runoff (11.0% of WQv).

As required by the New York State Stormwater Design Manual, the dry swale must be designed to safely convey the 10-year storm with a minimum of 6 inches of freeboard. The peak elevation in the dry swale for Lot 4 during a 10-year storm event is 382.25. The minimum berm elevation for the dry swale is 383.00. The dry swale has a minimum of 0.73 feet or 8.8 inches of freeboard during the 10-year storm. The HydroCAD 8.50 computer outputs for the proposed dry swale on Lot 4 have been provided in Appendix F.

Lot 5

To treat the stormwater runoff from the house and driveway on proposed Lot 5, a Dry Swale (N.Y.S. Stormwater practice O-1) has been designed. For the drainage area tributary to the dry swale, the water quality volume (WQv) was calculated as follows:

$$WQv = \frac{(P)(Rv)(A)}{12}$$

$$Rv = 0.05 + 0.009 (I) \text{ [min. of 0.2 required]}$$

$$I = \text{Impervious cover \%} = \frac{4,127 \text{ sq. ft.}}{29,758 \text{ sq. ft.}} \times 100 = 13.87\%$$

$$P = 90\% \text{ rainfall event number} = 1.2 \text{ inches}$$

$$A = \text{Area in acres} = 0.683 \text{ acres}$$

$$WQv = \frac{(1.2) [0.05 + 0.009 * (13.87)] (0.683)}{12} = \frac{(1.2)(0.2)(0.683)}{12}$$

$$WQv = 0.014 \text{ ac. - ft.} = 595 \text{ cu. ft.}$$

In accordance with New York State Stormwater Management Design manual, the following parameters are required to be met for treating the water quality volume:

- Pre-Treatment & Treatment Volume = 595 cu. ft.
- Pre-Treatment Volume = min. 10% of WQv = 60 cu. ft.
- Treatment Volume = 535 cu. ft.

The dry swale for Lot 5 has been designed to be 8 ft. wide, 62.5 ft. long with 3 on 1 side slopes. At a design depth of 12 inches, the dry swale will treat 724 cu. ft. of runoff, 121.7% of the required water quality volume. To provide pre-treatment, a check dam will be installed at the outlet of the diversion swale and 12" pipe. The check dam will be installed 6.25 feet from the outlet, treating approximately 72 cu. ft. of runoff (12.1% of WQv).

As required by the New York State Stormwater Design Manual, the dry swale must be designed to safely convey the 10-year storm with a minimum of 6 inches of freeboard. The peak elevation in the dry swale for Lot 5 during a 10-year storm event is 375.26. The minimum berm elevation for the dry swale is 376.00. The dry swale has a minimum of 0.74 feet or 8.9 inches of freeboard during the 10-year storm. The HydroCAD 8.50 computer outputs for the proposed dry swale on Lot 5 have been provided in Appendix G.

#### Lot 6

To treat the stormwater runoff from the house and driveway on proposed Lot 6, a Dry Swale (N.Y.S. Stormwater Practice O-1) has been designed. For the drainage area tributary to the dry swale, the water quality volume (WQv) was calculated as follows:

$$WQv = \frac{(P)(Rv)(A)}{12}$$

$$Rv = 0.05 + 0.009 (I) \text{ [min. of 0.2 required]}$$

$$I = \text{Impervious cover \%} = \frac{7,559 \text{ sq. ft.}}{45,195 \text{ sq. ft.}} \times 100 = 16.73\%$$

$$P = 90\% \text{ rainfall event number} = 1.2 \text{ inches}$$

$$A = \text{Area in acres} = 1.038 \text{ acres}$$

$$WQv = \frac{(1.2) [0.05 + 0.009 * (16.73)] (1.038)}{12} = \frac{(1.2)(0.20)(1.038)}{12}$$

$$WQv = 0.021 \text{ ac. - ft.} = 906 \text{ cu. ft.}$$

In accordance with New York State Stormwater Management Design manual, the following parameters are required to be met for treating the water quality volume:

- Pre-Treatment & Treatment Volume = 906 cu. ft.
- Pre-Treatment Volume = min. 10% of WQv = 91 cu. ft.
- Treatment Volume = 815 cu. ft.

The dry swale for Lot 6 has been designed to be 8 feet wide, 76 feet long with 3 on 1 side slopes. At a design depth of 18 inches, the dry swale will treat 1,520 cu. ft. of runoff, 167.8% of the required water quality volume. To provide pre-treatment, a check dam will be installed at the outlet of the 12" pipe. The check dam will be

installed 7.6 feet from the outlet, treating approximately 153 cu. ft. of runoff (16.9% of WQv).

As required by the New York State Stormwater Design Manual, the dry swale must be designed to safely convey the 10-year storm with a minimum of 6 inches of freeboard. The peak elevation in the dry swale for Lot 6 during a 10-year storm event is 369.53. The minimum berm elevation for the dry swale is 370.50. The dry swale has a minimum of 0.97 feet or 11.6 inches of freeboard during the 10-year storm. The HydroCAD 8.50 computer outputs for the proposed dry swale on Lot 6 have been provided in Appendix H.

#### Lot 7

To treat the runoff from the house and driveway on proposed Lot 7, a dry swale (N.Y.S. Stormwater Practice O-1) has been designed. For the drainage area tributary to the dry swale, the water quality volume (WQv) was calculated as follows:

$$WQv = \frac{(P)(Rv)(A)}{12}$$

$$Rv = 0.05 + 0.009 (I) \text{ [min. of 0.2 required]}$$

$$I = \text{Impervious cover \%} = \frac{5,775 \text{ sq. ft.}}{24,470 \text{ sq. ft.}} \times 100 = 23.60\%$$

$$P = 90\% \text{ rainfall event number} = 1.2 \text{ inches}$$

$$A = \text{Area in acres} = 0.562 \text{ acres}$$

$$WQv = \frac{(1.2) [0.05 + 0.009 * (23.60)] (0.562)}{12} = \frac{(1.2)(0.26)(0.562)}{12}$$

$$WQv = 0.015 \text{ ac. - ft.} = 642 \text{ cu. ft.}$$

In accordance with New York State Stormwater Management Design manual, the following parameters are required to be met for treating the water quality volume:

- Pre-Treatment & Treatment Volume = 642 cu. ft.
- Pre-Treatment Volume = min. 10% of WQv = 65 cu. ft.
- Treatment Volume = 577 cu. ft.

The dry swale for Lot 7 has been designed to be 8 feet wide, 62.5 feet long with 3 on 1 side slopes. At a design depth of 18 inches, the dry swale will treat 1,266 cu. ft. of runoff, 197.2% of the required water quality volume. To provide pre-treatment, a check dam will be installed at the outlet of the 12" pipe. The check dam will be installed 6.25 feet from the outlet, treating approximately 127 cu. ft. of runoff (19.8% of WQv).

As required by the New York State Stormwater Design Manual, the dry swale must be designed to safely convey the 10-year storm with a minimum of 6 inches of freeboard. The peak elevation in the dry swale for Lot 7 during a 10-year storm event is 363.30. The minimum berm elevation for the dry swale is 364.00. The dry swale has a minimum of 0.7 feet or 8.4 inches of freeboard during the 10-year storm. The HydroCAD 8.50 computer outputs for the proposed dry swale on Lot 7 have been provided in Appendix I.

### Lot 8

To treat the runoff from the house and driveway on proposed Lot 8, a dry swale (N.Y.S. Stormwater Practice O-1) has been designed. For the drainage area tributary to the dry swale, the water quality volume (WQv) was calculated as follows:

$$WQv = \frac{(P)(Rv)(A)}{12}$$

$Rv = 0.05 + 0.009 (I)$  [min. of 0.2 required]

$I = \text{Impervious cover \%} = \frac{3,735 \text{ sq. ft.}}{18,665 \text{ sq. ft.}} \times 100 = 20.01\%$

$P = 90\%$  rainfall event number = 1.2 inches

$A = \text{Area in acres} = 0.428$  acres

$$WQv = \frac{(1.2) [0.05 + 0.009 * (20.01)] (0.428)}{12} = \frac{(1.2)(0.23)(0.428)}{12}$$

**WQv = 0.010 ac. - ft. = 430 cu. ft.**

In accordance with New York State Stormwater Management Design manual, the following parameters are required to be met for treating the water quality volume:

- Pre-Treatment & Treatment Volume = 430 cu. ft.
- Pre-Treatment Volume = min. 10% of WQv = 43 cu. ft.
- Treatment Volume = 387 cu. ft.

The dry swale for Lot 8 has been designed to be 8 feet wide, 62.5 feet long with 3 on 1 side slope. At a design depth of 18 inches, the dry swale will treat 1,266 cu. ft. of runoff, 294.4% of the required water quality volume. To provide pre-treatment, a check dam will be installed at the outlet of the 12" pipe. The check dam will be installed 6.25 feet from the outlet, treating approximately 127 cu. ft. of runoff (29.5% of WQv).

As required by the New York State Stormwater Design Manual, the dry swale must be designed to safely convey the 10-year storm with a minimum of 6 inches of freeboard. The peak elevation in the dry swale for Lot 8 during a 10-year storm event is 365.33. The minimum berm elevation for the dry swale is 366.00. The dry swale

has a minimum of 0.67 feet or 8.0 inches of freeboard during the 10-year storm. The HydroCAD 8.50 computer outputs for the proposed dry swale on Lot 8 have been provided in Appendix J.

#### Untreated Areas

Due to the on-site State regulated wetlands located along Station Road and the existing topography, the runoff from all proposed impervious areas cannot be treated. The stormwater treatment practices have been designed in locations that will allow the maximum amount of runoff to be treated. The practices have generally been oversized to treat more runoff than required by the NYS Stormwater regulations. The areas not being treated are not able to be treated due to existing conditions.

### **IV. Stormwater Quantity Controls**

As required by the New York State Stormwater Management Design Manual, August 2003 edition, stormwater detention facilities must be designed to detain the 1-, 10- and 100-year storms. The 1-year storm must be detained 24 hours and the 10- and 100-year storms must be detained to levels no greater than the peak flows from the existing project site.

Analysis was completed for drainage area “A” and “B” for stormwater quantity. The results are provided below:

#### **A. Drainage Area “A”**

##### **1. Stream Channel Protection Volume**

As required by the NYS Stormwater Design Manual, stream channel protection may be required for the site to protect stream channels from erosion. Stream channel protection is provided through the 24-hour detention of the 1-year, 24-hour storm event. The analysis of the 1-year, 24-hour storm event for drainage area “A” showed a pre-development peak flow of 54.04 cfs and a post-development peak flow of 54.02 cfs. The post-development peak flow is lower than the pre-development peak flow, despite the introduction of additional impervious surfaces, due to the following factors:

- The post-development drainage area is 2,998 sq. ft. smaller than the pre-development drainage area due to the grading for the driveway on Lot 6.
- The proposed improvements are located at the bottom of the drainage areas analyzed.
- The drainage area is large and the proposed improvements do not have any significant impacts to peak runoff.
- The time of concentration was not impacted by the installation of culvert pipes under the driveways for Lots 1, 2, 3 & 4.

Due to the decrease in post-development peak flows, stream channel protection is not required for drainage area "A". The HydroCAD reports for the analysis of drainage area "A" have been provided in Appendix K.

## 2. Overbank Flood Control & Extreme Flood Control

The NYS Stormwater Design Manual requires the peak flows from the post-development site be detained to levels less than or equal to the pre-development levels for the 10-year (overbank flood) and the 100-year (extreme flood), 24-hour storm events. The analysis of drainage area "A" for the 10-year and 100-year storms showed decreases in peak flows. The peak flow from the 10-year, 24-hour storm decreases from 164.79 cfs to 164.73 cfs. The peak flow from the 100-year, 24-hour storm decreases from 335.25 cfs to 335.12 cfs. The increases in peak flows can be attributed to the same reasons listed for the stream channel protection volume. The HydroCAD reports for the analysis of drainage area "A" have been provided in Appendix K.

### B. Drainage Area "B"

#### 1. Stream Channel Protection Volume

The runoff from impervious areas (houses and driveways) is proposed to be collected and conveyed to individual stormwater treatment facilities designed for each individual lot in drainage area "B". To analyze the peak flow from drainage area "B" for the 1-year, 24-hour storm event, four drainage areas were analyzed, the drainage areas tributary to each of the dry swales on Lots 6, 7 & 8 and the remaining area not collected by the stormwater treatment facilities. To determine if the stream channel protection can be provided for drainage area "B" for the 1-year, 24-hour storm event, the largest drainage area with the greatest amount of impervious area of the collected runoffs (Lot 6, 7 or 8) was analyzed. The drainage area for Lot 6 was analyzed to determine if stream channel protection could be provided.

The drainage area was routed into a 20' by 50' dry basin with 3 on 1 side slopes and a depth of 3 feet. The outlet of the basin is a 1-inch orifice, the minimum permitted by the N.Y.S. Stormwater Design Manual for orifices protected by a stand pipe. The 1-inch orifice would detain the runoff from Lot 6 for 931.3 minutes or 15.52 hours. The detention is greater than 8 hours, less than the required detention of 24 hours. The N.Y.S. Stormwater Design Manual states that stream channel protection is not required at sites where the resulting diameter of the extended detention, or low flow, orifice is too small to prevent clogging. The calculations show that stream channel protection is not required for the project site. The HydroCAD reports for the analysis of drainage area "Lot 6" and the routing through a 20' by 50' basin have been provided in Appendix "L".

Despite not being required to provide Stream Channel Protection, the stormwater treatment devices proposed for Lots 6, 7 & 8 will provide some detention of the 1-year, 24-hour storm event. The dry swales will provide center-of-mass detention of 120.4, 87.7 and 64.1 minutes for Lots 6, 7 & 8, respectively. The dry swales will also reduce the peak flow from the 1-year, 24-hour storm from 2.70 cfs for the existing site to 2.16 cfs for the post-development site.

2. Overbank Flood Control

As required by the August 2003 edition of the N.Y.S. Stormwater Design Manual, the overbank flood (10-year, 24-hour storm event) must be attenuated to pre-development rates. For drainage area "B", four drainage areas were analyzed with three of them being routed through the stormwater quality dry swales. The dry swales for Lots 6, 7 & 8 provide the detention necessary for drainage area "B" without any special design. The infiltration of stormwater through the sand with the 4-inch diameter under-drain and the overflow spillways limit the peak flows from Lots 6, 7 & 8. The peak flows for the 10-year, 24-hour storm event are summarized in the table below.

Resulting Peak Flow Comparison						
Storm Frequency	Pre-Development	Lot 6	Lot 7	Lot 8	Remaining	Post-Development
10-year	8.09	2.00	0.98	0.28	4.96	6.83
Resulting Change in Peak Flow (cfs)						
-1.26						

\*Peak flows for Lots 6, 7, and 8 are the peak flows discharging from the dry swales

The HydroCAD reports for the analysis of drainage area "B" for the pre- and post-development sites have been provided in Appendices M and N, respectively.

3. Extreme Flood Control

As required by the August 2003 edition of the N.Y.S. Stormwater Design Manual, the Extreme Flood (100-year, 24-hour storm event) must be attenuated to pre-development rates. Drainage area "B" was analyzed using four drainage areas, the three areas tributary to the dry swales on Lots 6, 7 & 8 and the remaining area not collected by the swales. The dry swales proposed on Lots 6, 7 & 8 provide the detention necessary for drainage area "B" without any special design. The infiltration of stormwater through the sand with the 4-inch diameter underdrain and the overflow spillways detain the peak flow from the site to levels less than existing peak flows. The table below summarizes the peak flow rates for the pre- and post-development site for the 100-year, 24-hour storm event.

Resulting Peak Flow Comparison						
Storm Frequency	Pre-Development	Lot 6	Lot 7	Lot 8	Remaining	Post-Development
100-year	16.85	4.53	2.89	1.66	9.59	16.80
Resulting Change in Peak Flow (cfs)						
-0.05						

\*Peak flows for Lots 6, 7, and 8 are the peak flows discharging from the dry swales

The HydroCAD reports for the analysis of drainage area “B” for the pre- and post-development sites have been provided in Appendices M and N, respectively.

#### **V. General Drainage Calculations**

The proposed subdivision will require the installation of culverts under the driveways for Lots 1, 2, 3, 4, 6 & 7. The proposed culverts have been sized to convey a greater amount of water than the culverts crossing Station Road. The existing 42” corrugated metal pipe used as the study point for drainage area “A” is capable of conveying 51.76 cfs of water without overtopping the road. The designed 30” culverts crossing the driveways of Lots 1 & 2 and the 30” culverts crossing the driveways of Lots 3 & 4 are capable of conveying 68.97 cfs and 54.01 cfs, respectively.

The existing 18” HDPE pipe used as the study point for drainage area “B” is capable of conveying 12.80 cfs of water without overtopping the road. The designed 18” ductile iron pipes crossing the driveways of Lots 6 & 7 are capable of conveying 14.22 cfs of water without overtopping.

The calculations for the aforementioned capacities have been provided in Appendix O.

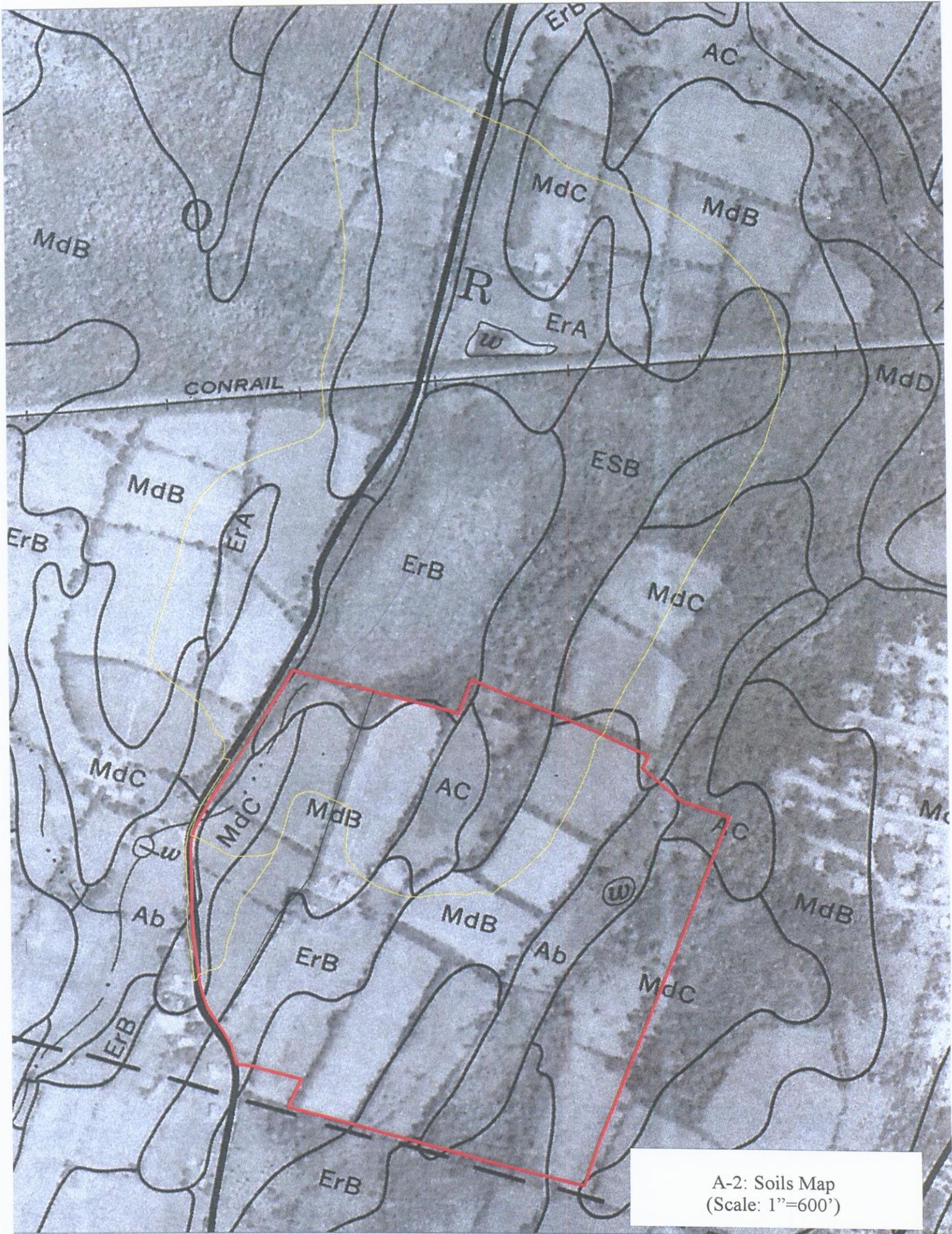
#### **VI. Sediment & Erosion Control**

The proposed construction is subject to an erosion and sediment control plan designed specifically for this development. To prevent erosion and control sediment pollution, the site has been designed to utilize stabilized construction entrances and silt fencing. The stabilized construction entrances will be installed at each driveway entrance to prevent the transportation of sediment. Silt fencing will be installed along cut and fill slopes and downhill of any disturbed areas to prevent soil erosion and sediment transportation. A full Stormwater Pollution Prevention Plan (SWPPP) will be provided to the Town of New Windsor and the NYSDEC for the proposed development prior to beginning construction.

# APPENDIX A

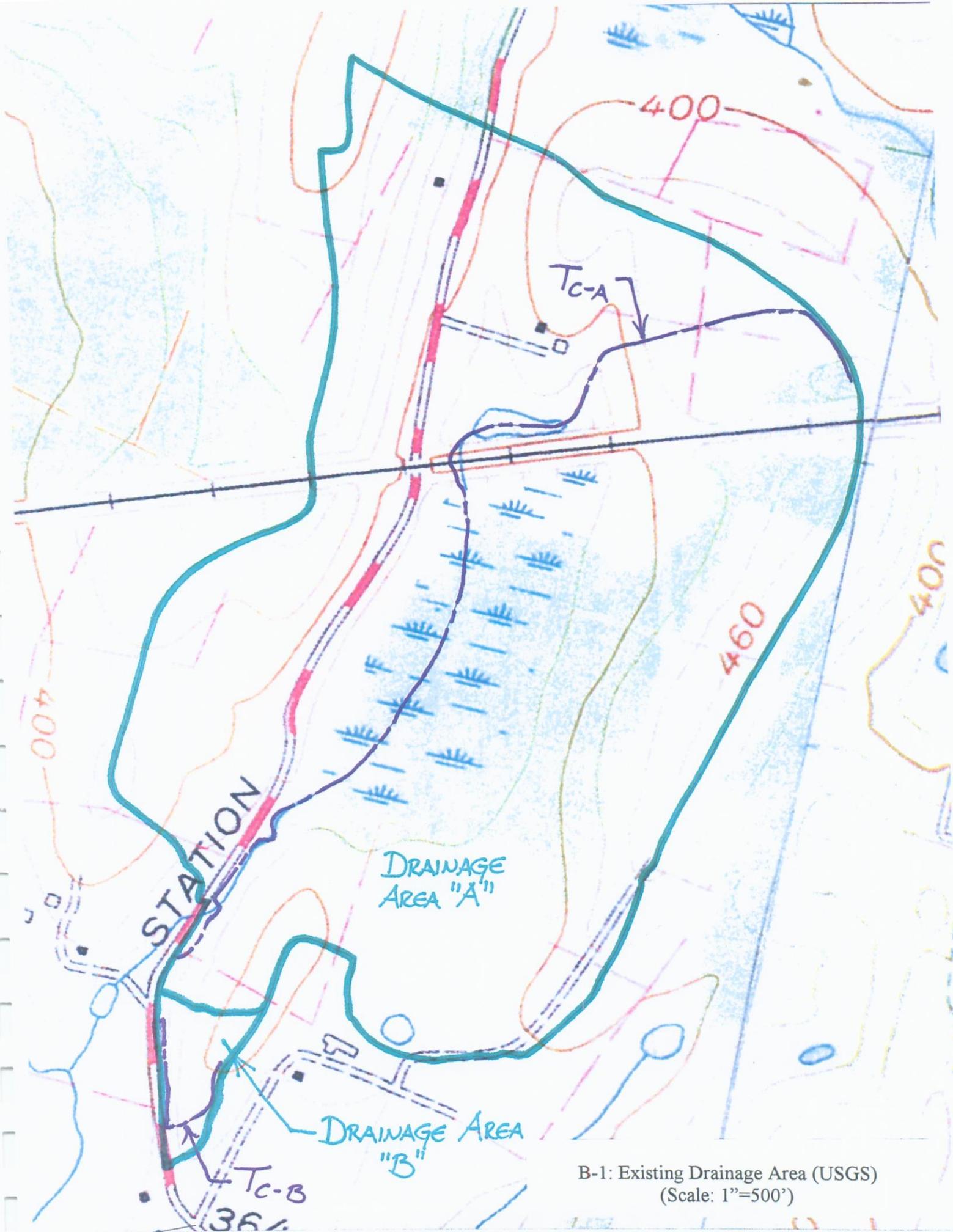


A-1: 2007 Aerial Photo  
(Scale: 1"=400')



A-2: Soils Map  
(Scale: 1"=600')

# APPENDIX B



B-1: Existing Drainage Area (USGS)  
(Scale: 1"=500')

# APPENDIX C

# APPENDIX D

## "Stormwater Credit 2: Stream and Wetland Buffer" Computation Form

1. Width of undisturbed buffer (feet): 100 FEET  
(not a valid credit if less than 50 feet). ±50 FT. FOR IMPERVIOUS
2. Length of contributing pervious and/or impervious area to buffer (feet): ±140 FT. FOR PERVIOUS  
(not a valid credit if greater than 150 feet for pervious areas; 75 feet for impervious areas).
3. Average slope of buffer (ft/ft or %): 15% (LEVEL SPREADER TO BE INSTALLED)  
(not a valid credit if greater than 3% without level spreader; not ever a valid credit for slopes greater than 15%).
4. Method for protection of buffer during construction: SILT FENCING

- 
5. Method for protection of buffer after construction: NYSDDEC WETLAND

### ADJACENT AREA

6. Enter Total Site Area (in acres or ft<sup>2</sup>): \*
7. Enter Site Impervious Area (in acres or ft<sup>2</sup>): \*
8. Calculate Volumetric Runoff Coefficient [ $R_v = 0.05 + 0.009(I)$ ], where I = % impervious area of site (unitless): \*

*To calculate storage requirements for Water Quality Volume (WQ<sub>v</sub>)* \*

9. Subtract Buffer Area from Total Site Area (in acres or ft<sup>2</sup>):
10. Using reduced site area, calculate required water quality treatment volume [ $WQ_v = P(R_v)(A)$ ], where P = 90% storm precipitation, R<sub>v</sub> = value from Step 8, above, and A is reduced site area value from Step 9, above. (WQ<sub>v</sub> in acre-feet or ft<sup>3</sup>).

*To calculate storage requirements for Channel Protection Volume (Cp<sub>v</sub>)*

11. Subtract the impervious area draining to the buffer from total site impervious, from Step 7, above:

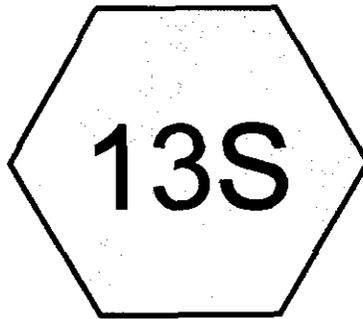
12. Recalculate  $R_v$  based on new impervious area ( $R_v = 0.05 + 0.009(I)$ , where  $I = (\text{new impervious area of site}) / (\text{original site area}) * 100$  (unitless):

13. Calculate new  $C_{p_v}$  using methods from *the New York State Stormwater Management Design Manual*. (see [www.dec.state.ny.us/website/dow/toolbox/swmanual/#Downloads](http://www.dec.state.ny.us/website/dow/toolbox/swmanual/#Downloads)).

Note: The disconnected impervious area is allowed to be reduced from site area for computation of  $C_{p_v}$ , while total site area is reduced for the computation of  $WQ_v$ . The original site area is used in the  $C_{p_v}$  computation in recognition that the 1-year frequency precipitation will usually generate runoff from pervious surfaces and is therefore included in this computation, however with a reduced volumetric runoff coefficient that reflects the benefits of disconnecting the impervious areas. Storms at and below the  $WQ_v$  precipitation frequency (i.e., the 90% event), will not typically produce runoff from pervious surfaces and the entire disconnected area can be reduced from the computation.

\* ALL IMPERVIOUS AREAS PROPOSED ON LOTS 1 & 2 QUALIFY FOR CREDIT #2. REMAINING LOTS IN SUBDIVISION WILL TREAT RUNOFF UTILIZING ONE OF THE APPROVED METHODS IN THE NYS STORMWATER DESIGN MANUAL.

# APPENDIX E



Lot 3



Lot 3 Dry Swale



**Summary for Subcatchment 13S: Lot 3**

Runoff = 0.69 cfs @ 12.17 hrs, Volume= 0.061 af, Depth= 1.13"

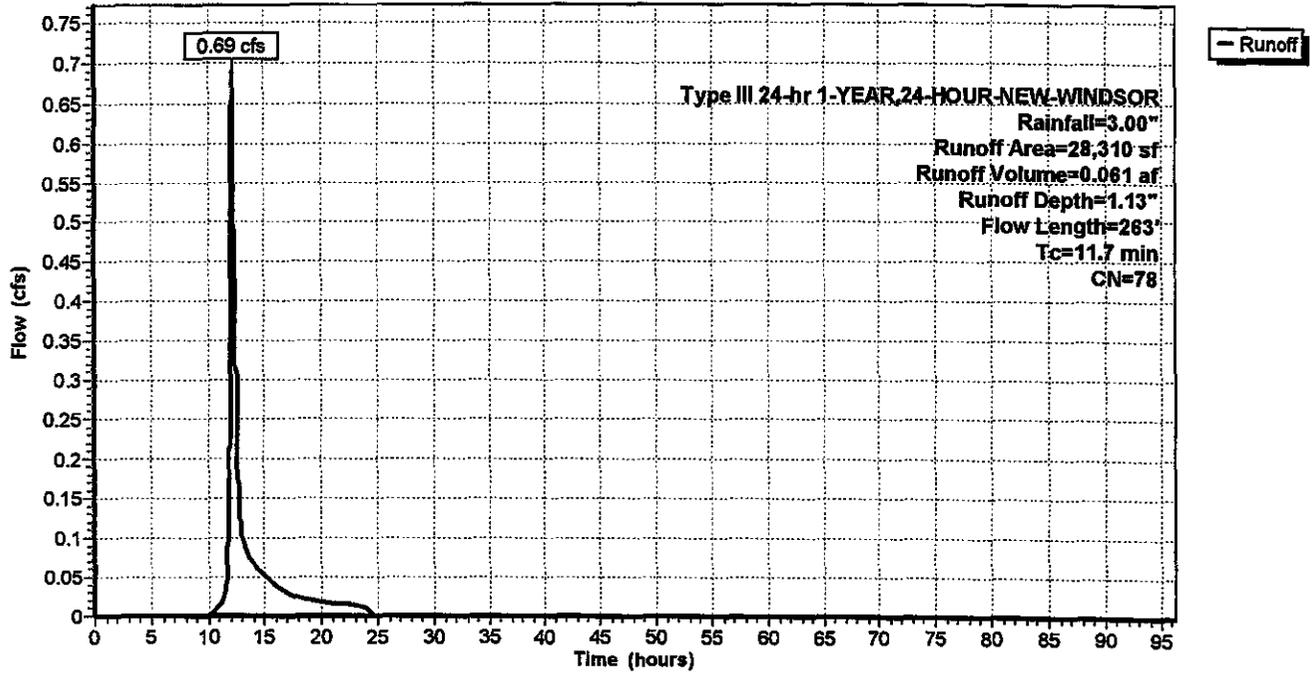
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-YEAR, 24-HOUR-NEW-WINDSOR Rainfall=3.00"

Area (sf)	CN	Description
* 2,615	98	Prop. Driveway
* 2,300	98	Prop. House
* 23,395	74	Prop. Lawn, >75% Grass cover, Good, HSG C
28,310	78	Weighted Average
23,395		Pervious Area
4,915		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.0330	0.15		<b>Sheet Flow, Sheet1</b>
					Grass: Dense n= 0.240 P2= 3.75"
0.8	115	0.1087	2.31		<b>Shallow Concentrated Flow, Shallow1</b>
					Short Grass Pasture Kv= 7.0 fps
0.0	8	0.2500	3.50		<b>Shallow Concentrated Flow, Shallow2</b>
					Short Grass Pasture Kv= 7.0 fps
0.0	18	0.1389	7.57		<b>Shallow Concentrated Flow, Shallow3</b>
					Paved Kv= 20.3 fps
0.1	22	0.1818	2.98		<b>Shallow Concentrated Flow, Shallow4</b>
					Short Grass Pasture Kv= 7.0 fps
11.7	263	Total			

### Subcatchment 13S: Lot 3

#### Hydrograph



**Summary for Pond 14P: Lot 3 Dry Swale**

Inflow Area = 0.650 ac, 17.36% Impervious, Inflow Depth = 1.13" for 1-YEAR,24-HOUR-NEW-WINDSC  
 Inflow = 0.69 cfs @ 12.17 hrs, Volume= 0.061 af  
 Outflow = 0.32 cfs @ 12.48 hrs, Volume= 0.061 af, Atten= 53%, Lag= 18.7 min  
 Primary = 0.09 cfs @ 12.48 hrs, Volume= 0.054 af  
 Secondary = 0.23 cfs @ 12.48 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 382.07' @ 12.48 hrs Surf.Area= 972 sf Storage= 774 cf

Plug-Flow detention time= 75.5 min calculated for 0.061 af (100% of inflow)  
 Center-of-Mass det. time= 75.4 min ( 933.5 - 858.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	381.00'	1,900 cf	8.00'W x 61.00'L x 2.00'H Prismaoid Z=3.0

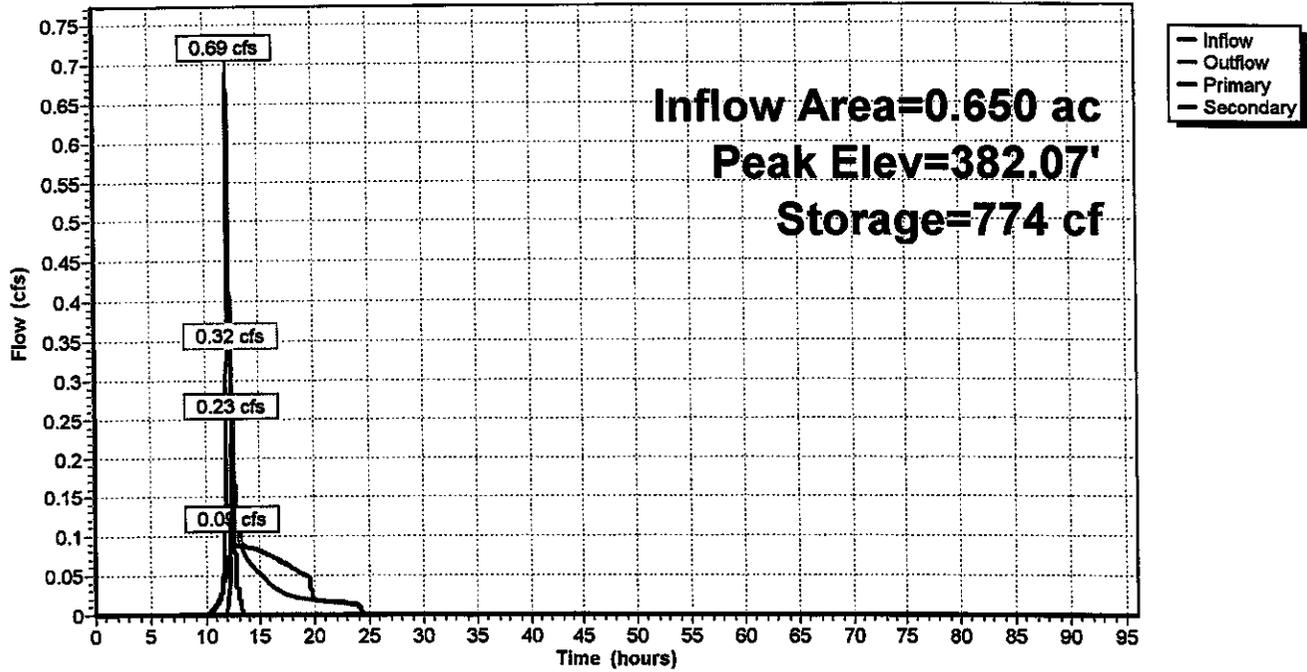
Device	Routing	Invert	Outlet Devices
#1	Primary	378.00'	4.0" x 35.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 377.50' S= 0.0143 '/' Cc= 0.900 n= 0.012
#2	Device 1	381.00'	4.000 in/hr Exfiltration over Horizontal area
#3	Secondary	382.00'	5.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.09 cfs @ 12.48 hrs HW=382.07' (Free Discharge)  
 ↑1=Culvert (Passes 0.09 cfs of 0.61 cfs potential flow)  
 ↑2=Exfiltration (Exfiltration Controls 0.09 cfs)

Secondary OutFlow Max=0.23 cfs @ 12.48 hrs HW=382.07' (Free Discharge)  
 ↑3=Broad-Crested Rectangular Weir (Weir Controls 0.23 cfs @ 0.66 fps)

Pond 14P: Lot 3 Dry Swale

Hydrograph



**Summary for Subcatchment 13S: Lot 3**

Runoff = 1.71 cfs @ 12.16 hrs, Volume= 0.147 af, Depth= 2.71"

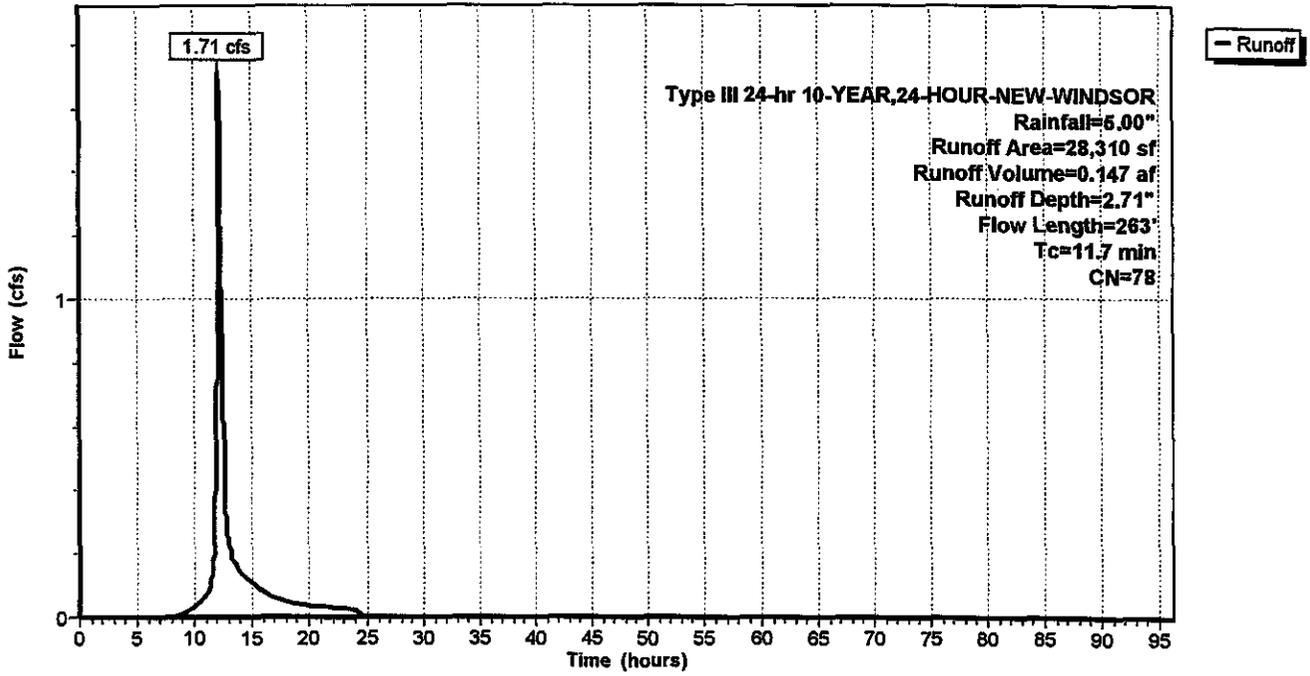
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-YEAR, 24-HOUR-NEW-WINDSOR Rainfall=5.00"

Area (sf)	CN	Description
* 2,615	98	Prop. Driveway
* 2,300	98	Prop. House
* 23,395	74	Prop. Lawn, >75% Grass cover, Good, HSG C
28,310	78	Weighted Average
23,395		Pervious Area
4,915		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	100	0.0330	0.15		Sheet Flow, Sheet1 Grass: Dense n= 0.240 P2= 3.75"
0.8	115	0.1087	2.31		Shallow Concentrated Flow, Shallow1 Short Grass Pasture Kv= 7.0 fps
0.0	8	0.2500	3.50		Shallow Concentrated Flow, Shallow2 Short Grass Pasture Kv= 7.0 fps
0.0	18	0.1389	7.57		Shallow Concentrated Flow, Shallow3 Paved Kv= 20.3 fps
0.1	22	0.1818	2.98		Shallow Concentrated Flow, Shallow4 Short Grass Pasture Kv= 7.0 fps
11.7	263	Total			

Subcatchment 13S: Lot 3

Hydrograph



**Summary for Pond 14P: Lot 3 Dry Swale**

Inflow Area = 0.650 ac, 17.36% Impervious, Inflow Depth = 2.71" for 10-YEAR,24-HOUR-NEW-WINDS  
 Inflow = 1.71 cfs @ 12.16 hrs, Volume= 0.147 af  
 Outflow = 1.64 cfs @ 12.20 hrs, Volume= 0.147 af, Atten= 4%, Lag= 2.2 min  
 Primary = 0.10 cfs @ 12.20 hrs, Volume= 0.082 af  
 Secondary = 1.54 cfs @ 12.20 hrs, Volume= 0.064 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 382.25' @ 12.20 hrs Surf.Area= 1,061 sf Storage= 954 cf

Plug-Flow detention time= 54.4 min calculated for 0.147 af (100% of inflow)  
 Center-of-Mass det. time= 54.4 min ( 886.8 - 832.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	381.00'	1,900 cf	8.00'W x 61.00'L x 2.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	378.00'	4.0" x 35.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 377.50' S= 0.0143 '/' Cc= 0.900 n= 0.012
#2	Device 1	381.00'	4.000 in/hr Exfiltration over Horizontal area
#3	Secondary	382.00'	5.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.10 cfs @ 12.20 hrs HW=382.25' (Free Discharge)

↑1=Culvert (Passes 0.10 cfs of 0.62 cfs potential flow)

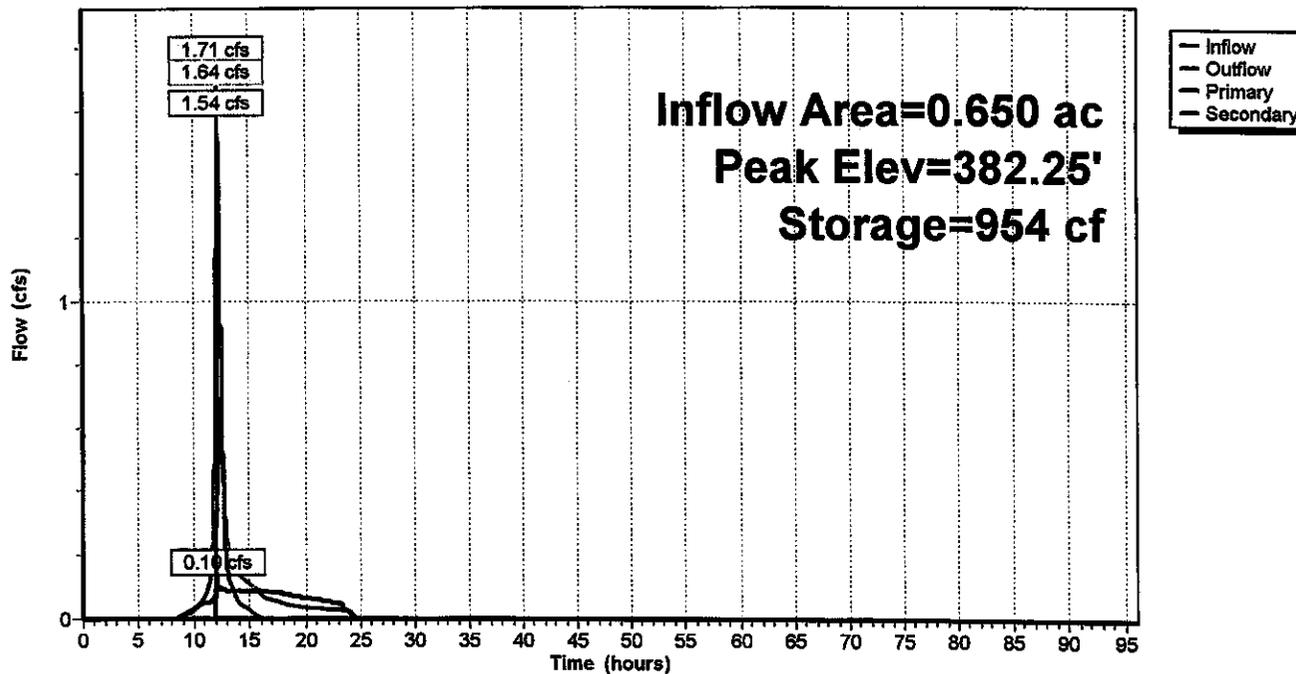
↑2=Exfiltration (Exfiltration Controls 0.10 cfs)

Secondary OutFlow Max=1.54 cfs @ 12.20 hrs HW=382.25' (Free Discharge)

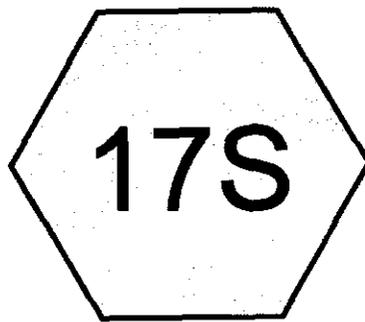
↑3=Broad-Crested Rectangular Weir (Weir Controls 1.54 cfs @ 1.25 fps)

### Pond 14P: Lot 3 Dry Swale

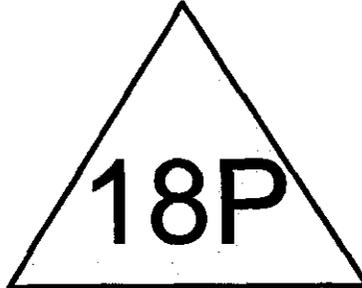
#### Hydrograph



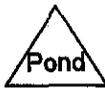
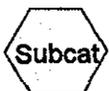
# APPENDIX F



Lot 4



Lot 4 Dry Swale



**Summary for Subcatchment 17S: Lot 4**

Runoff = 0.79 cfs @ 12.17 hrs, Volume= 0.071 af, Depth= 1.13"

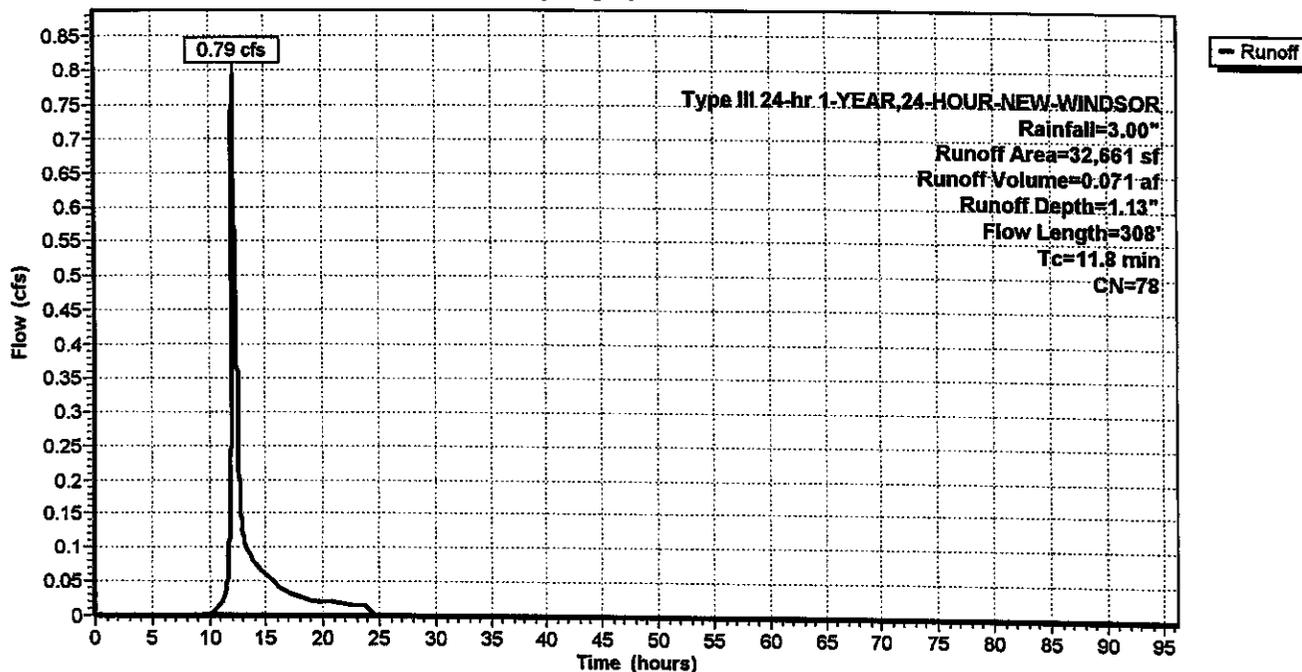
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-YEAR,24-HOUR-NEW-WINDSOR Rainfall=3.00"

Area (sf)	CN	Description
* 3,153	98	Prop. Driveway
* 2,300	98	Prop. House
* 27,208	74	Prop. Lawn, >75% Grass cover, Good, HSG C
32,661	78	Weighted Average
27,208		Pervious Area
5,453		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	85	0.0290	0.14		Sheet Flow, Sheet1 Grass: Dense n= 0.240 P2= 3.75"
0.2	15	0.0290	1.18		Sheet Flow, Sheet2 Smooth surfaces n= 0.011 P2= 3.75"
1.6	208	0.0937	2.14		Shallow Concentrated Flow, Shallow1 Short Grass Pasture Kv= 7.0 fps
11.8	308	Total			

**Subcatchment 17S: Lot 4**

Hydrograph



**Summary for Pond 18P: Lot 4 Dry Swale**

Inflow Area = 0.750 ac, 16.70% Impervious, Inflow Depth = 1.13" for 1-YEAR, 24-HOUR-NEW-WINDSC  
 Inflow = 0.79 cfs @ 12.17 hrs, Volume= 0.071 af  
 Outflow = 0.44 cfs @ 12.42 hrs, Volume= 0.071 af, Atten= 44%, Lag= 14.9 min  
 Primary = 0.09 cfs @ 12.42 hrs, Volume= 0.059 af  
 Secondary = 0.35 cfs @ 12.42 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 382.09' @ 12.42 hrs Surf.Area= 1,005 sf Storage= 814 cf

Plug-Flow detention time= 73.5 min calculated for 0.071 af (100% of inflow)  
 Center-of-Mass det. time= 73.5 min ( 931.7 - 858.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	381.00'	1,942 cf	8.00'W x 62.50'L x 2.00'H Prismatic Z=3.0

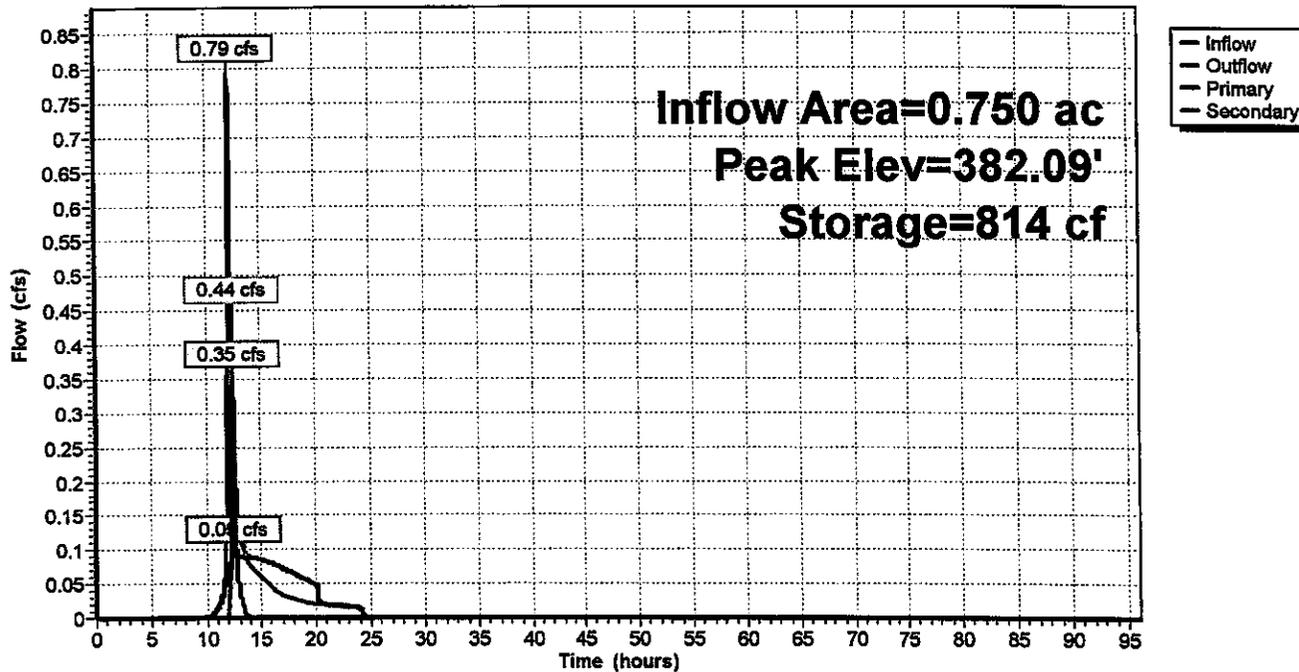
Device	Routing	Invert	Outlet Devices
#1	Primary	378.00'	4.0" x 35.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 377.50' S= 0.0143 ' S= 0.0143 ' Cc= 0.900 n= 0.012
#2	Device 1	381.00'	4.000 in/hr Exfiltration over Horizontal area
#3	Secondary	382.00'	5.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.09 cfs @ 12.42 hrs HW=382.09' (Free Discharge)  
 ↑1=Culvert (Passes 0.09 cfs of 0.61 cfs potential flow)  
 ↑2=Exfiltration (Exfiltration Controls 0.09 cfs)

Secondary OutFlow Max=0.35 cfs @ 12.42 hrs HW=382.09' (Free Discharge)  
 ↑3=Broad-Crested Rectangular Weir (Weir Controls 0.35 cfs @ 0.76 fps)

Pond 18P: Lot 4 Dry Swale

Hydrograph



**Summary for Subcatchment 17S: Lot 4**

Runoff = 1.97 cfs @ 12.16 hrs, Volume= 0.169 af, Depth= 2.71"

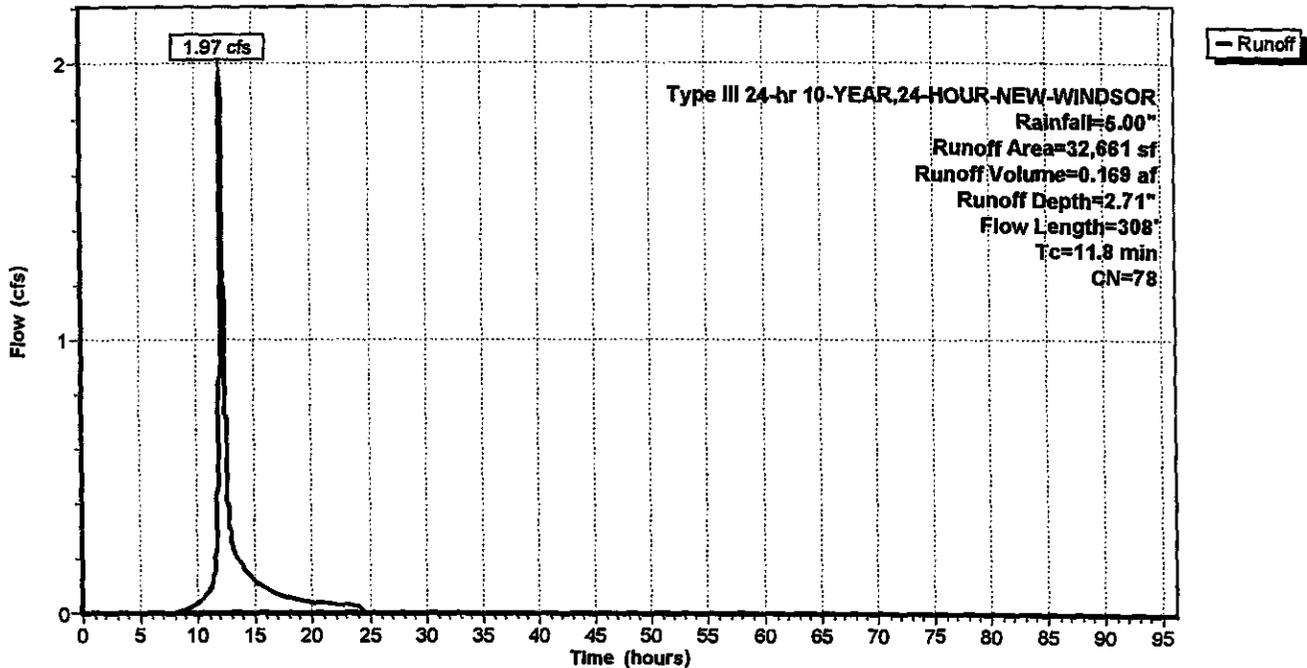
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-YEAR, 24-HOUR-NEW-WINDSOR Rainfall=5.00"

Area (sf)	CN	Description
* 3,153	98	Prop. Driveway
* 2,300	98	Prop. House
* 27,208	74	Prop. Lawn, >75% Grass cover, Good, HSG C
32,661	78	Weighted Average
27,208		Pervious Area
5,453		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	85	0.0290	0.14		Sheet Flow, Sheet1 Grass: Dense n= 0.240 P2= 3.75"
0.2	15	0.0290	1.18		Sheet Flow, Sheet2 Smooth surfaces n= 0.011 P2= 3.75"
1.6	208	0.0937	2.14		Shallow Concentrated Flow, Shallow1 Short Grass Pasture Kv= 7.0 fps
11.8	308	Total			

**Subcatchment 17S: Lot 4**

**Hydrograph**



**Summary for Pond 18P: Lot 4 Dry Swale**

Inflow Area = 0.750 ac, 16.70% Impervious, Inflow Depth = 2.71" for 10-YEAR,24-HOUR-NEW-WINDS  
 Inflow = 1.97 cfs @ 12.16 hrs, Volume= 0.169 af  
 Outflow = 1.90 cfs @ 12.20 hrs, Volume= 0.169 af, Atten= 3%, Lag= 2.0 min  
 Primary = 0.10 cfs @ 12.20 hrs, Volume= 0.089 af  
 Secondary = 1.80 cfs @ 12.20 hrs, Volume= 0.081 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 382.27' @ 12.20 hrs Surf.Area= 1,097 sf Storage= 1,005 cf

Plug-Flow detention time= 52.6 min calculated for 0.169 af (100% of inflow)  
 Center-of-Mass det. time= 52.6 min ( 885.1 - 832.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	381.00'	1,942 cf	8.00'W x 62.50'L x 2.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	378.00'	4.0" x 35.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 377.50' S= 0.0143 '/ Cc= 0.900 n= 0.012
#2	Device 1	381.00'	4.000 in/hr Exfiltration over Horizontal area
#3	Secondary	382.00'	5.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.10 cfs @ 12.20 hrs HW=382.27' (Free Discharge)

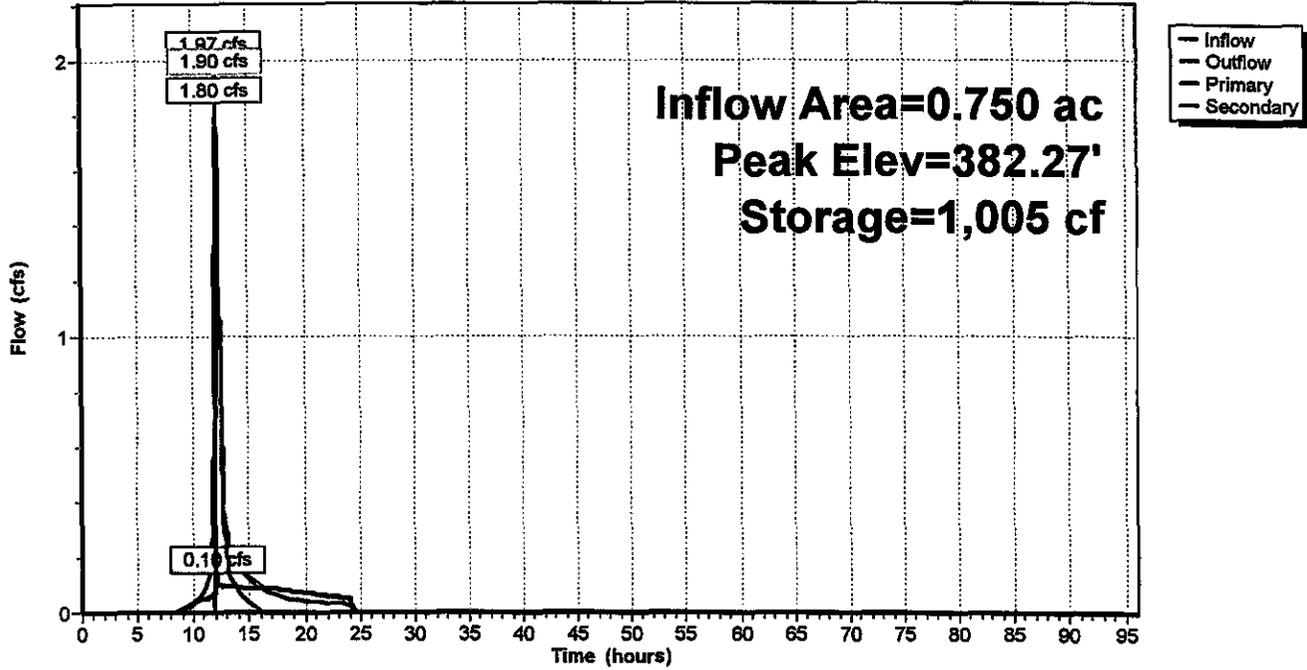
- ↑1=Culvert (Passes 0.10 cfs of 0.63 cfs potential flow)
- ↑2=Exfiltration (Exfiltration Controls 0.10 cfs)

Secondary OutFlow Max=1.80 cfs @ 12.20 hrs HW=382.27' (Free Discharge)

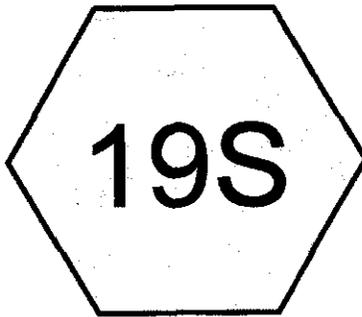
- ↑3=Broad-Crested Rectangular Weir (Weir Controls 1.80 cfs @ 1.32 fps)

Pond 18P: Lot 4 Dry Swale

Hydrograph



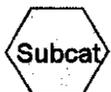
# APPENDIX G



Lot 5



Lot 5 Dry Swale



**Summary for Subcatchment 19S: Lot 5**

Runoff = 0.72 cfs @ 12.15 hrs, Volume= 0.061 af, Depth= 1.07"

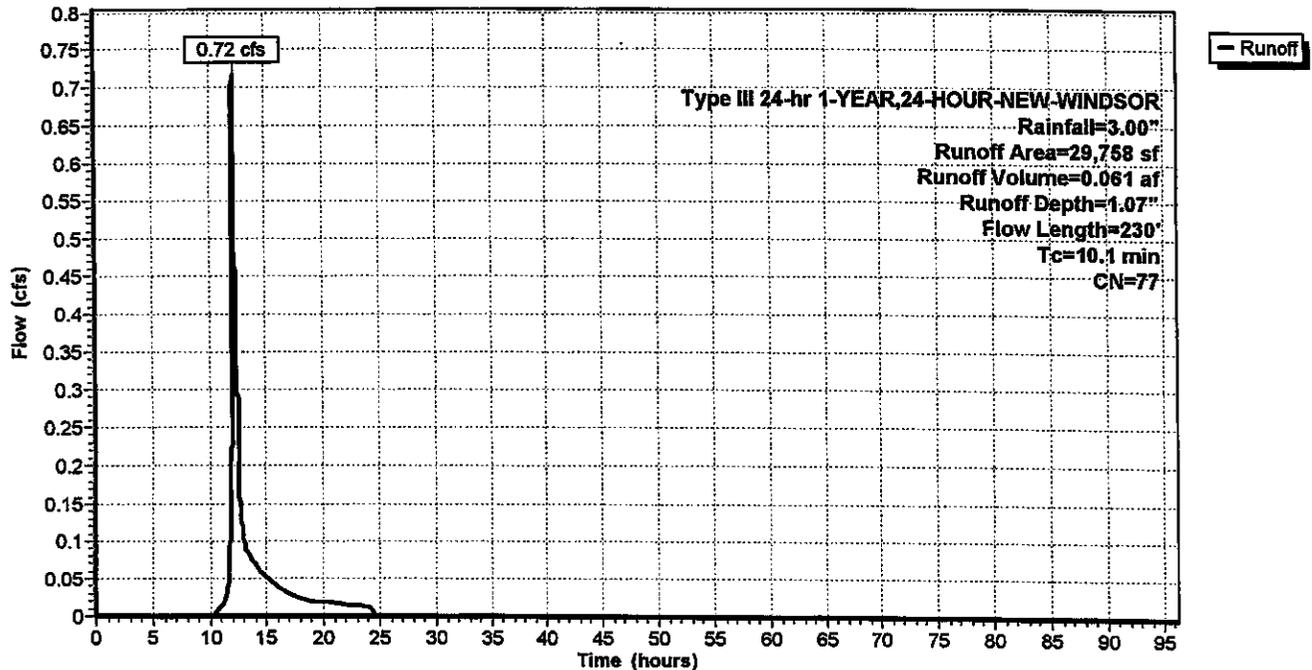
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-YEAR,24-HOUR-NEW-WINDSOR Rainfall=3.00"

Area (sf)	CN	Description
* 2,977	98	Prop. Driveway
* 1,150	98	Prop. House
* 25,631	74	Prop. Lawn, >75% Grass cover, Good, HSG C
29,758	77	Weighted Average
25,631		Pervious Area
4,127		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0525	0.19		Sheet Flow, Sheet1 Grass: Dense n= 0.240 P2= 3.75"
1.0	94	0.0481	1.54		Shallow Concentrated Flow, Shallow1 Short Grass Pasture Kv= 7.0 fps
0.1	36	0.3889	4.37		Shallow Concentrated Flow, Shallow2 Short Grass Pasture Kv= 7.0 fps
10.1	230	Total			

**Subcatchment 19S: Lot 5**

Hydrograph



**Summary for Pond 20P: Lot 5 Dry Swale**

Inflow Area = 0.683 ac, 13.87% Impervious, Inflow Depth = 1.07" for 1-YEAR, 24-HOUR-NEW-WINDSC  
 Inflow = 0.72 cfs @ 12.15 hrs, Volume= 0.061 af  
 Outflow = 0.30 cfs @ 12.48 hrs, Volume= 0.061 af, Atten= 58%, Lag= 20.0 min  
 Primary = 0.09 cfs @ 12.48 hrs, Volume= 0.055 af  
 Secondary = 0.21 cfs @ 12.48 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 375.07' @ 12.48 hrs Surf.Area= 992 sf Storage= 787 cf

Plug-Flow detention time= 76.7 min calculated for 0.061 af (100% of inflow)  
 Center-of-Mass det. time= 76.7 min ( 936.6 - 859.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	374.00'	1,942 cf	8.00'W x 62.50'L x 2.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	371.00'	4.0" x 50.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 370.00' S= 0.0200 '/' Cc= 0.900 n= 0.012
#2	Device 1	374.00'	4.000 in/hr Exfiltration over Horizontal area
#3	Secondary	375.00'	5.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.09 cfs @ 12.48 hrs HW=375.07' (Free Discharge)

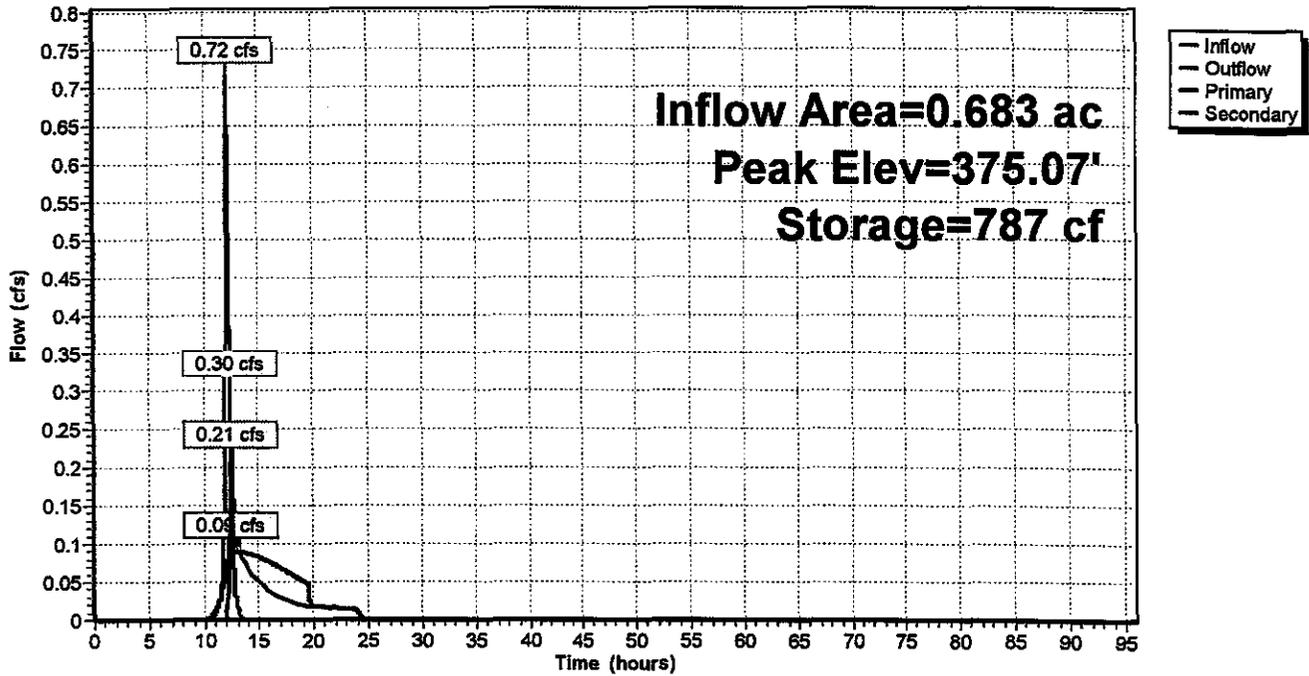
- ↑1=Culvert (Passes 0.09 cfs of 0.56 cfs potential flow)
- ↑2=Exfiltration (Exfiltration Controls 0.09 cfs)

Secondary OutFlow Max=0.21 cfs @ 12.48 hrs HW=375.07' (Free Discharge)

- ↑3=Broad-Crested Rectangular Weir (Weir Controls 0.21 cfs @ 0.64 fps)

Pond 20P: Lot 5 Dry Swale

Hydrograph



**Summary for Subcatchment 19S: Lot 5**

Runoff = 1.83 cfs @ 12.14 hrs, Volume= 0.149 af, Depth= 2.62"

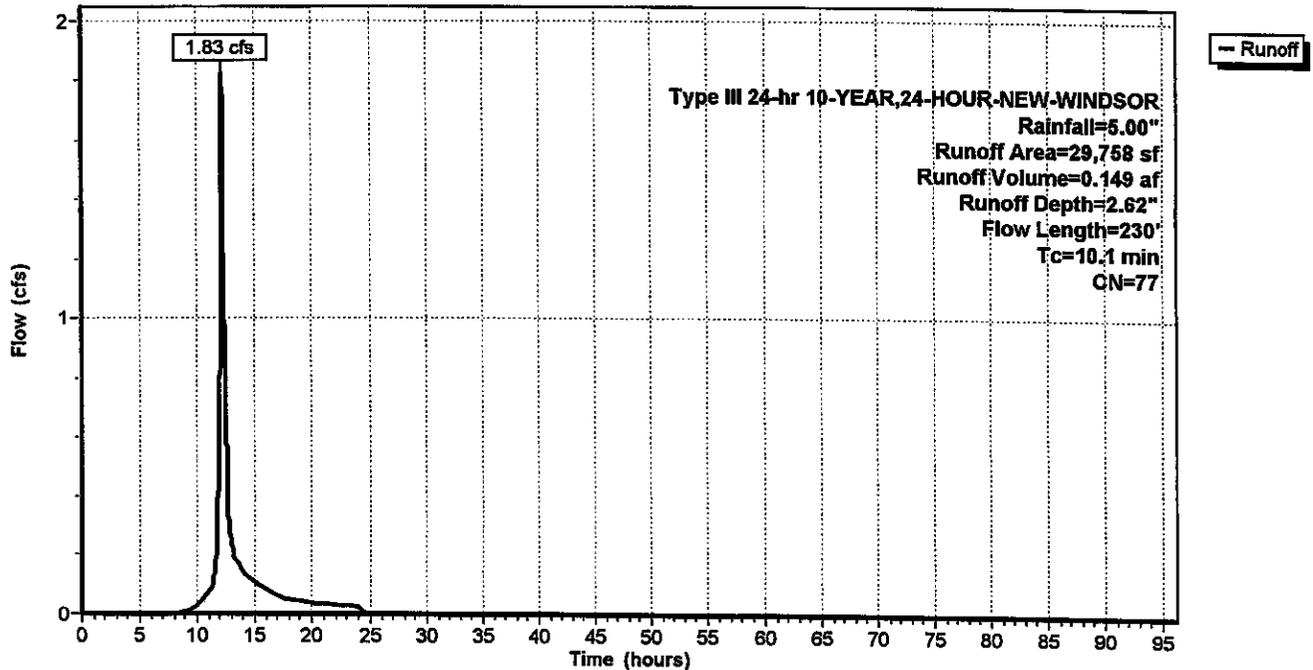
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-YEAR,24-HOUR-NEW-WINDSOR Rainfall=5.00"

Area (sf)	CN	Description
* 2,977	98	Prop. Driveway
* 1,150	98	Prop. House
* 25,631	74	Prop. Lawn, >75% Grass cover, Good, HSG C
29,758	77	Weighted Average
25,631		Pervious Area
4,127		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0525	0.19		Sheet Flow, Sheet1
					Grass: Dense n= 0.240 P2= 3.75"
1.0	94	0.0481	1.54		Shallow Concentrated Flow, Shallow1
					Short Grass Pasture Kv= 7.0 fps
0.1	36	0.3889	4.37		Shallow Concentrated Flow, Shallow2
					Short Grass Pasture Kv= 7.0 fps
10.1	230	Total			

**Subcatchment 19S: Lot 5**

Hydrograph



**Summary for Pond 20P: Lot 5 Dry Swale**

Inflow Area = 0.683 ac, 13.87% Impervious, Inflow Depth = 2.62" for 10-YEAR,24-HOUR-NEW-WINDS  
 Inflow = 1.83 cfs @ 12.14 hrs, Volume= 0.149 af  
 Outflow = 1.74 cfs @ 12.18 hrs, Volume= 0.149 af, Atten= 5%, Lag= 2.1 min  
 Primary = 0.10 cfs @ 12.18 hrs, Volume= 0.084 af  
 Secondary = 1.64 cfs @ 12.18 hrs, Volume= 0.065 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 375.26' @ 12.18 hrs Surf.Area= 1,089 sf Storage= 987 cf

Plug-Flow detention time= 54.9 min calculated for 0.149 af (100% of inflow)  
 Center-of-Mass det. time= 54.9 min ( 888.4 - 833.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	374.00'	1,942 cf	8.00'W x 62.50'L x 2.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	371.00'	4.0" x 50.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 370.00' S= 0.0200 '/' Cc= 0.900 n= 0.012
#2	Device 1	374.00'	4.000 in/hr Exfiltration over Horizontal area
#3	Secondary	375.00'	5.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.10 cfs @ 12.18 hrs HW=375.26' (Free Discharge)

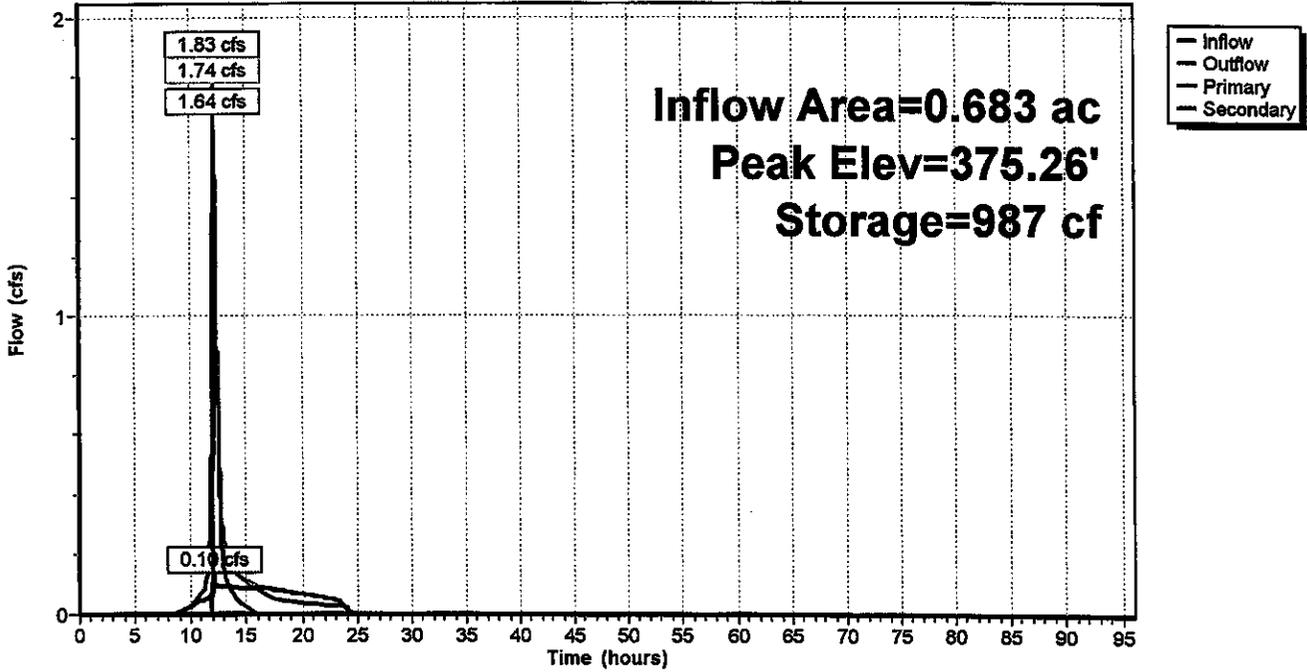
- ↑1=Culvert (Passes 0.10 cfs of 0.58 cfs potential flow)
- ↑2=Exfiltration (Exfiltration Controls 0.10 cfs)

Secondary OutFlow Max=1.63 cfs @ 12.18 hrs HW=375.26' (Free Discharge)

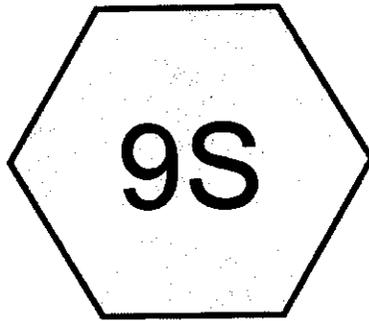
- ↑3=Broad-Crested Rectangular Weir (Weir Controls 1.63 cfs @ 1.27 fps)

### Pond 20P: Lot 5 Dry Swale

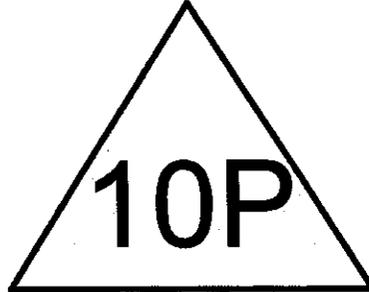
#### Hydrograph



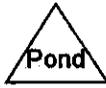
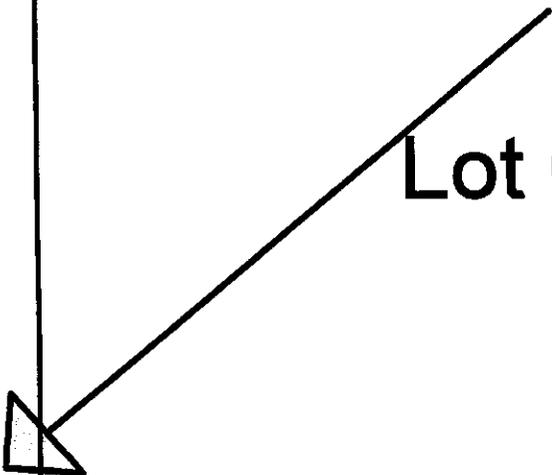
# APPENDIX H



Lot 6



Lot 6 Dry Swale



Drainage Diagram for 3104 - Nowicki

Prepared by Mercurio-Norton-Tarolli, Printed 01/29/2009  
HydroCAD® 8.50 s/n 003983 © 2007 HydroCAD Software Solutions LLC

**Summary for Subcatchment 9S: Lot 6**

Runoff = 1.04 cfs @ 12.20 hrs, Volume= 0.098 af, Depth= 1.13"

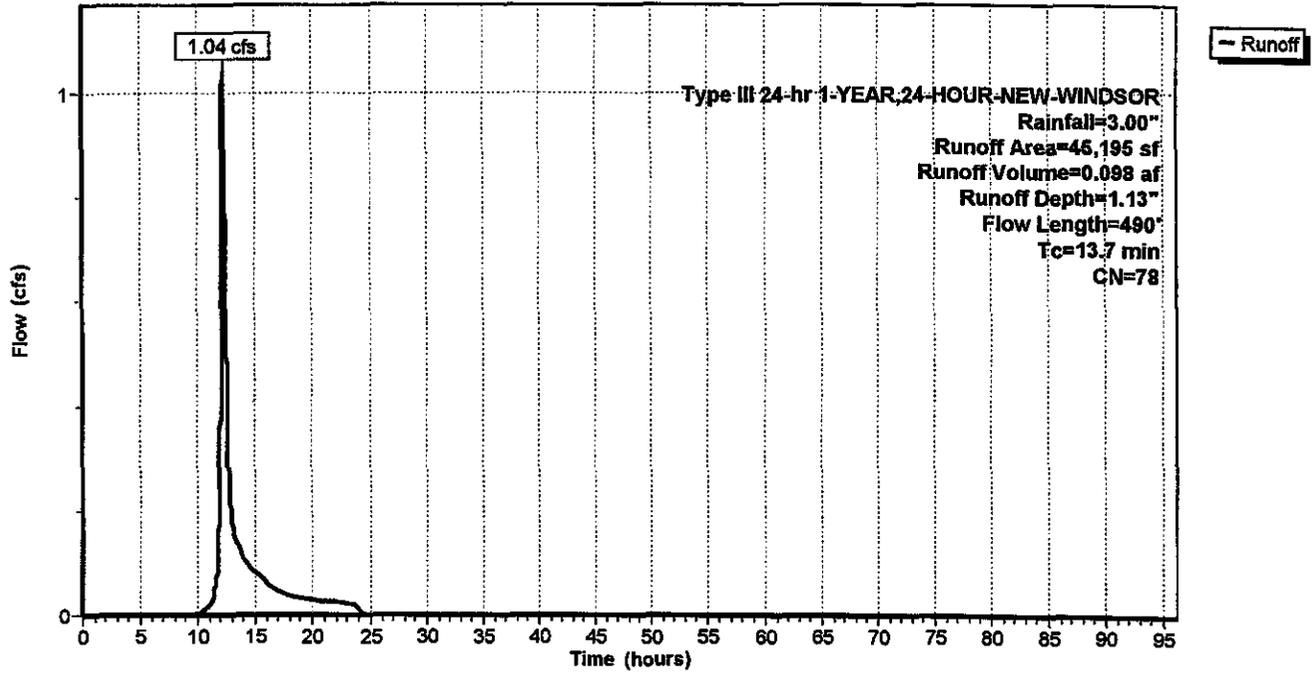
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-YEAR,24-HOUR-NEW-WINDSOR Rainfall=3.00"

Area (sf)	CN	Description
* 4,109	98	Prop. Driveway
* 3,450	98	Prop. House
* 35,991	74	Prop. Lawn, >75% Grass cover, Good, HSG C
1,645	73	Woods, Fair, HSG C
45,195	78	Weighted Average
37,636		Pervious Area
7,559		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0280	0.14		Sheet Flow, Sheet1
1.8	192	0.0635	1.76		Grass: Dense n= 0.240 P2= 3.75" Shallow Concentrated Flow, Shallow1
0.2	135	0.1128	9.69	19.38	Short Grass Pasture Kv= 7.0 fps Channel Flow, Driveway Ditch
0.1	18	0.0100	4.91	3.86	Area= 2.0 sf Perim= 4.5' r= 0.44' n= 0.030 Earth, clean & winding Circular Channel (pipe), 12" Pipe
0.1	45	0.1200	9.99	19.99	Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Channel Flow, Driveway Ditch
					Area= 2.0 sf Perim= 4.5' r= 0.44' n= 0.030 Earth, clean & winding
13.7	490	Total			

Subcatchment 9S: Lot 6

Hydrograph



**Summary for Pond 10P: Lot 6 Dry Swale**

Inflow Area = 1.038 ac, 16.73% Impervious, Inflow Depth = 1.13" for 1-YEAR,24-HOUR-NEW-WINDSC  
 Inflow = 1.04 cfs @ 12.20 hrs, Volume= 0.098 af  
 Outflow = 0.14 cfs @ 13.22 hrs, Volume= 0.098 af, Atten= 86%, Lag= 61.6 min  
 Primary = 0.14 cfs @ 13.22 hrs, Volume= 0.098 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 369.09' @ 13.22 hrs Surf.Area= 1,499 sf Storage= 1,649 cf

Plug-Flow detention time= 127.4 min calculated for 0.098 af (100% of inflow)  
 Center-of-Mass det. time= 127.4 min ( 987.3 - 859.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	367.50'	3,283 cf	8.00'W x 76.00'L x 2.50'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	364.00'	4.0" x 105.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 350.00' S= 0.1333 '/' Cc= 0.900 n= 0.012
#2	Device 1	367.50'	4.000 in/hr Exfiltration over Wetted area
#3	Secondary	369.10'	2.5' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.14 cfs @ 13.22 hrs HW=369.09' (Free Discharge)

↑1=Culvert (Passes 0.14 cfs of 0.82 cfs potential flow)

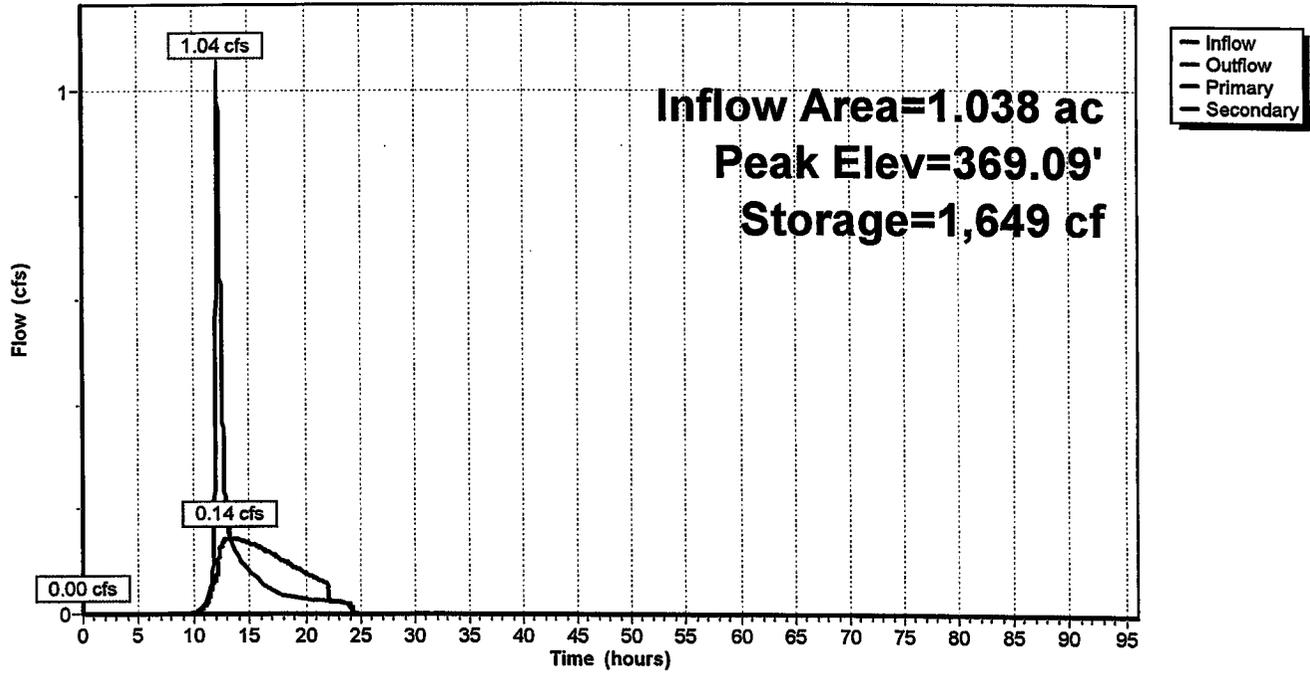
↑2=Exfiltration (Exfiltration Controls 0.14 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=367.50' (Free Discharge)

↑3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

### Pond 10P: Lot 6 Dry Swale

#### Hydrograph



**Summary for Subcatchment 9S: Lot 6**

Runoff = 2.58 cfs @ 12.19 hrs, Volume= 0.234 af, Depth= 2.71"

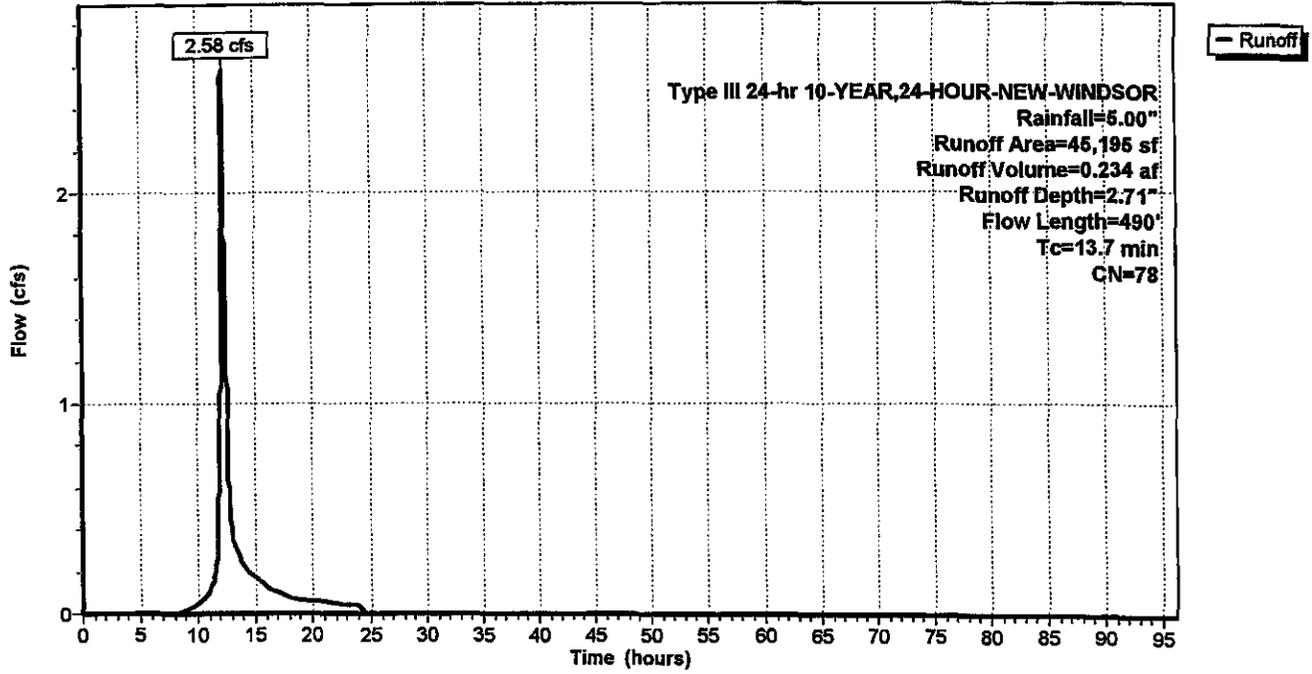
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-YEAR, 24-HOUR-NEW-WINDSOR Rainfall=5.00"

Area (sf)	CN	Description
* 4,109	98	Prop. Driveway
* 3,450	98	Prop. House
* 35,991	74	Prop. Lawn, >75% Grass cover, Good, HSG C
1,645	73	Woods, Fair, HSG C
45,195	78	Weighted Average
37,636		Pervious Area
7,559		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0280	0.14		<b>Sheet Flow, Sheet1</b> Grass: Dense n= 0.240 P2= 3.75"
1.8	192	0.0635	1.76		<b>Shallow Concentrated Flow, Shallow1</b> Short Grass Pasture Kv= 7.0 fps
0.2	135	0.1128	9.69	19.38	<b>Channel Flow, Driveway Ditch</b> Area= 2.0 sf Perim= 4.5' r= 0.44' n= 0.030 Earth, clean & winding
0.1	18	0.0100	4.91	3.86	<b>Circular Channel (pipe), 12" Pipe</b> Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.1	45	0.1200	9.99	19.99	<b>Channel Flow, Driveway Ditch</b> Area= 2.0 sf Perim= 4.5' r= 0.44' n= 0.030 Earth, clean & winding
13.7	490	Total			

Subcatchment 9S: Lot 6

Hydrograph



**Summary for Pond 10P: Lot 6 Dry Swale**

Inflow Area = 1.038 ac, 16.73% Impervious, Inflow Depth = 2.71" for 10-YEAR, 24-HOUR-NEW-WINDS  
 Inflow = 2.58 cfs @ 12.19 hrs, Volume= 0.234 af  
 Outflow = 2.00 cfs @ 12.31 hrs, Volume= 0.234 af, Atten= 23%, Lag= 7.3 min  
 Primary = 0.17 cfs @ 12.31 hrs, Volume= 0.145 af  
 Secondary = 1.83 cfs @ 12.31 hrs, Volume= 0.090 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 369.53' @ 12.31 hrs Surf.Area= 1,780 sf Storage= 2,375 cf

Plug-Flow detention time= 91.1 min calculated for 0.234 af (100% of inflow)  
 Center-of-Mass det. time= 91.1 min ( 925.3 - 834.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	367.50'	3,283 cf	8.00'W x 76.00'L x 2.50'H Prismatic Z=3.0

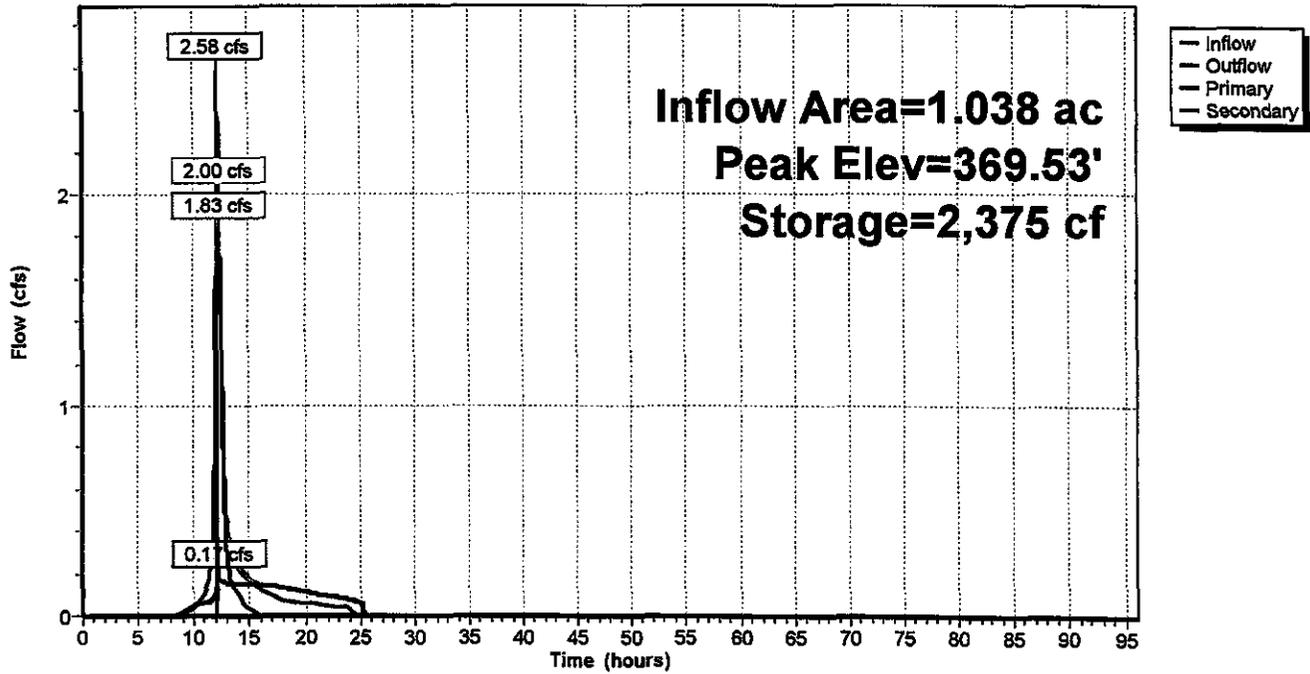
Device	Routing	Invert	Outlet Devices
#1	Primary	364.00'	4.0" x 105.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 350.00' S= 0.1333 '/ Cc= 0.900 n= 0.012
#2	Device 1	367.50'	4.000 in/hr Exfiltration over Wetted area
#3	Secondary	369.10'	2.5' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.17 cfs @ 12.31 hrs HW=369.53' (Free Discharge)  
 ↑1=Culvert (Passes 0.17 cfs of 0.83 cfs potential flow)  
 ↑2=Exfiltration (Exfiltration Controls 0.17 cfs)

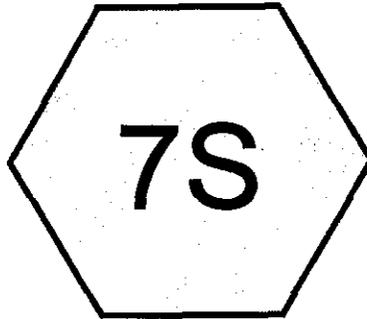
Secondary OutFlow Max=1.82 cfs @ 12.31 hrs HW=369.53' (Free Discharge)  
 ↑3=Broad-Crested Rectangular Weir (Weir Controls 1.82 cfs @ 1.69 fps)

### Pond 10P: Lot 6 Dry Swale

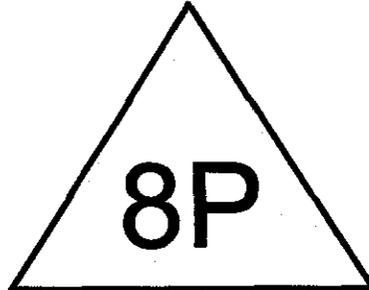
Hydrograph



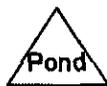
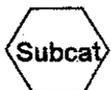
# APPENDIX I



Lot 7



Lot 7 Dry Swale



**Summary for Subcatchment 7S: Lot 7**

Runoff = 0.78 cfs @ 12.11 hrs, Volume= 0.059 af, Depth= 1.25"

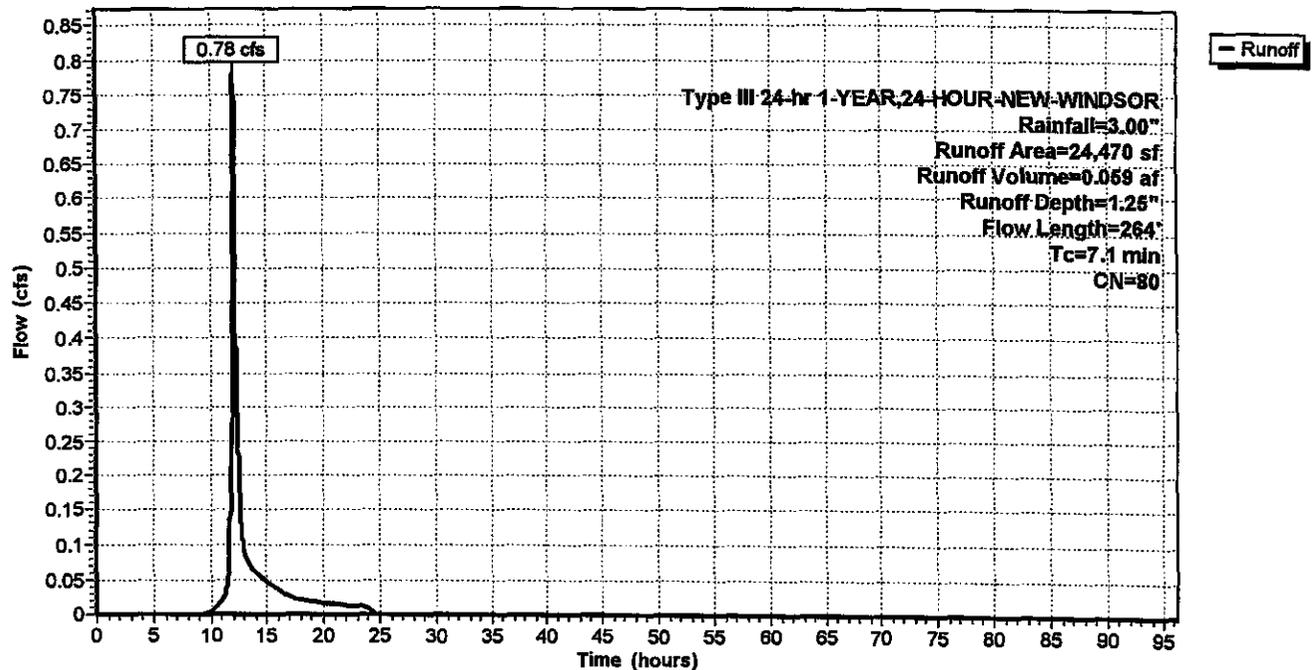
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-YEAR,24-HOUR-NEW-WINDSOR Rainfall=3.00"

Area (sf)	CN	Description
* 3,475	98	Prop. Driveway
* 2,300	98	Prop. House
* 18,695	74	Prop. Lawn, >75% Grass cover, Good, HSG C
24,470	80	Weighted Average
18,695		Pervious Area
5,775		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100	0.0550	0.28		Sheet Flow, Sheet1 Grass: Short n= 0.150 P2= 3.75"
1.0	120	0.0792	1.97		Shallow Concentrated Flow, Shallow1 Short Grass Pasture Kv= 7.0 fps
0.1	24	0.5000	4.95		Shallow Concentrated Flow, Shallow2 Short Grass Pasture Kv= 7.0 fps
0.0	20	0.0200	6.95	5.46	Circular Channel (pipe), 12" Culvert Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
7.1	264	Total			

**Subcatchment 7S: Lot 7**

**Hydrograph**



**Summary for Pond 8P: Lot 7 Dry Swale**

Inflow Area = 0.562 ac, 23.60% Impervious, Inflow Depth = 1.25" for 1-YEAR, 24-HOUR-NEW-WINDSC  
 Inflow = 0.78 cfs @ 12.11 hrs, Volume= 0.059 af  
 Outflow = 0.10 cfs @ 12.93 hrs, Volume= 0.059 af, Atten= 87%, Lag= 49.1 min  
 Primary = 0.10 cfs @ 12.93 hrs, Volume= 0.059 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 362.71' @ 12.93 hrs Surf.Area= 1,067 sf Storage= 940 cf

Plug-Flow detention time= 96.3 min calculated for 0.059 af (100% of inflow)  
 Center-of-Mass det. time= 96.3 min ( 943.4 - 847.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	361.50'	2,759 cf	8.00'W x 62.50'L x 2.50'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	358.00'	4.0" x 35.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 352.50' S= 0.1571 '/ Cc= 0.900 n= 0.009 PVC, smooth interior
#2	Device 1	361.50'	4.000 in/hr Exfiltration over Horizontal area
#3	Secondary	363.00'	2.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.10 cfs @ 12.93 hrs HW=362.71' (Free Discharge)

↑1=Culvert (Passes 0.10 cfs of 0.90 cfs potential flow)

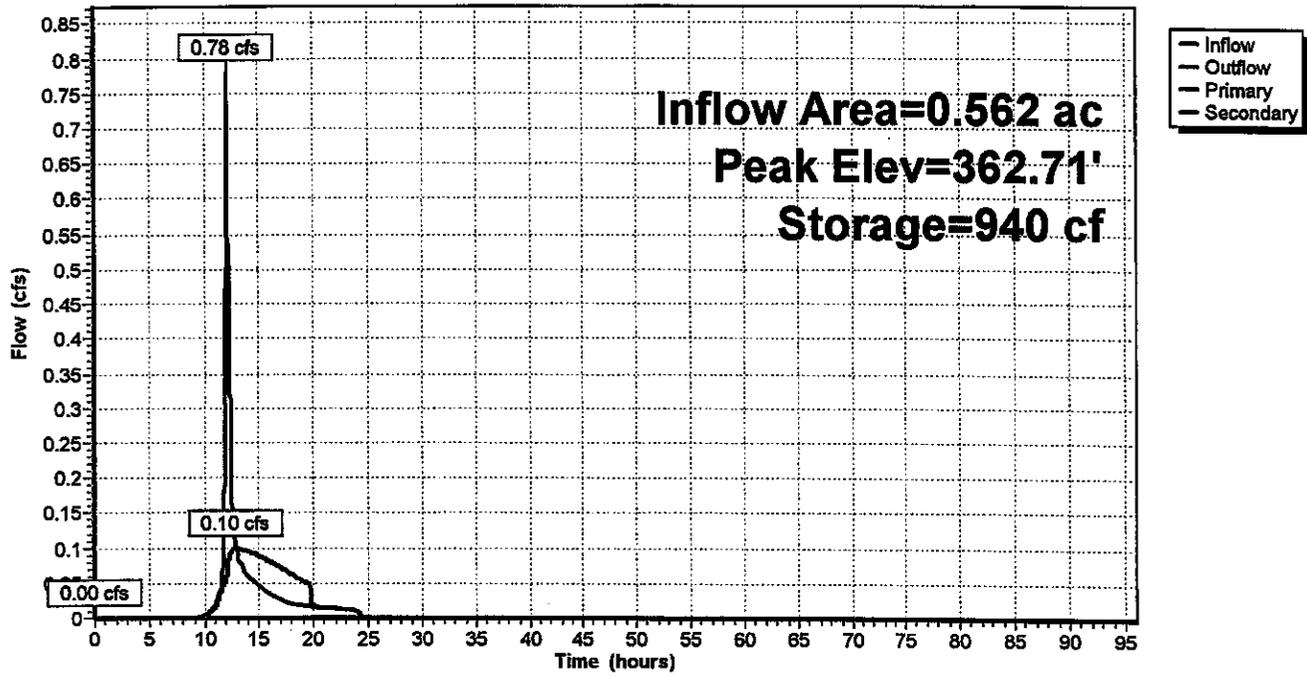
↑2=Exfiltration (Exfiltration Controls 0.10 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=361.50' (Free Discharge)

↑3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

### Pond 8P: Lot 7 Dry Swale

#### Hydrograph



**Summary for Subcatchment 7S: Lot 7**

Runoff = 1.83 cfs @ 12.10 hrs, Volume= 0.135 af, Depth= 2.89"

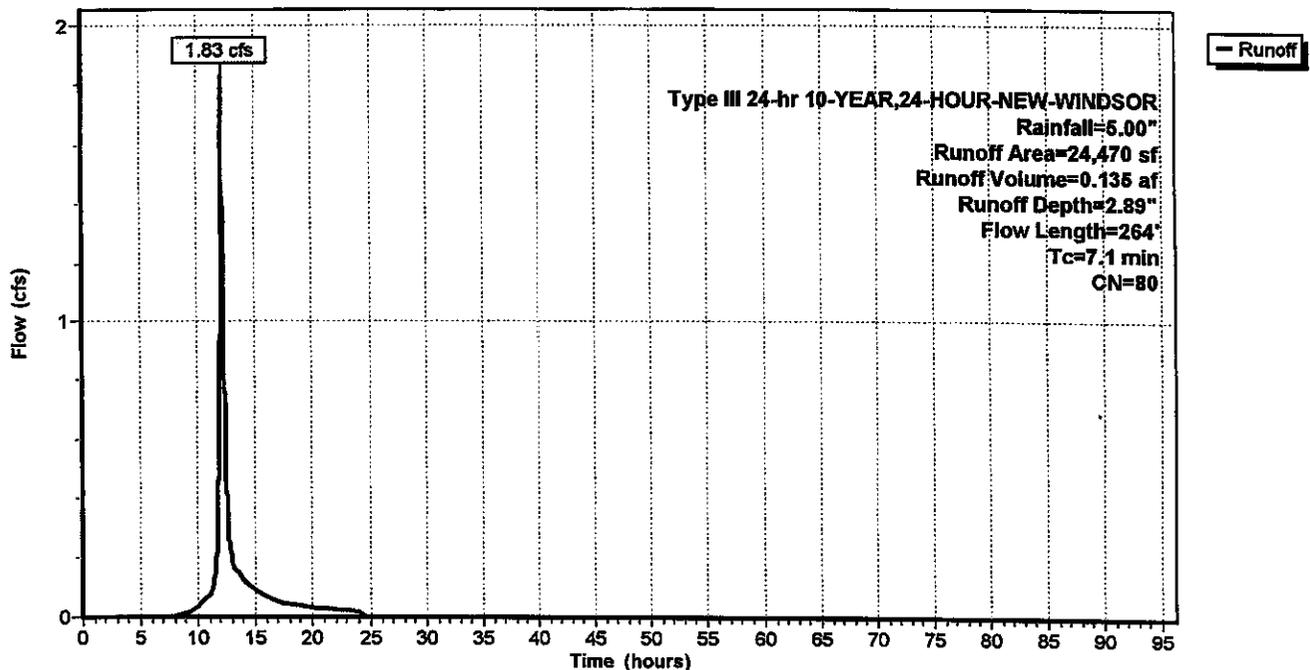
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-YEAR,24-HOUR-NEW-WINDSOR Rainfall=5.00"

Area (sf)	CN	Description
* 3,475	98	Prop. Driveway
* 2,300	98	Prop. House
* 18,695	74	Prop. Lawn, >75% Grass cover, Good, HSG C
24,470	80	Weighted Average
18,695		Pervious Area
5,775		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100	0.0550	0.28		<b>Sheet Flow, Sheet1</b> Grass: Short n= 0.150 P2= 3.75"
1.0	120	0.0792	1.97		<b>Shallow Concentrated Flow, Shallow1</b> Short Grass Pasture Kv= 7.0 fps
0.1	24	0.5000	4.95		<b>Shallow Concentrated Flow, Shallow2</b> Short Grass Pasture Kv= 7.0 fps
0.0	20	0.0200	6.95	5.46	<b>Circular Channel (pipe), 12" Culvert</b> Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
7.1	264	Total			

**Subcatchment 7S: Lot 7**

Hydrograph



**Summary for Pond 8P: Lot 7 Dry Swale**

Inflow Area = 0.562 ac, 23.60% Impervious, Inflow Depth = 2.89" for 10-YEAR, 24-HOUR-NEW-WINDS  
 Inflow = 1.83 cfs @ 12.10 hrs, Volume= 0.135 af  
 Outflow = 0.98 cfs @ 12.26 hrs, Volume= 0.135 af, Atten= 47%, Lag= 9.4 min  
 Primary = 0.13 cfs @ 12.26 hrs, Volume= 0.099 af  
 Secondary = 0.85 cfs @ 12.26 hrs, Volume= 0.037 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 363.30' @ 12.26 hrs Surf.Area= 1,380 sf Storage= 1,661 cf

Plug-Flow detention time= 95.9 min calculated for 0.135 af (100% of inflow)  
 Center-of-Mass det. time= 95.9 min ( 918.7 - 822.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	361.50'	2,759 cf	8.00'W x 62.50'L x 2.50'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	358.00'	4.0" x 35.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 352.50' S= 0.1571 ' /' Cc= 0.900 n= 0.009 PVC, smooth interior
#2	Device 1	361.50'	4.000 in/hr Exfiltration over Horizontal area
#3	Secondary	363.00'	2.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.13 cfs @ 12.26 hrs HW=363.30' (Free Discharge)

↑1=Culvert (Passes 0.13 cfs of 0.95 cfs potential flow)

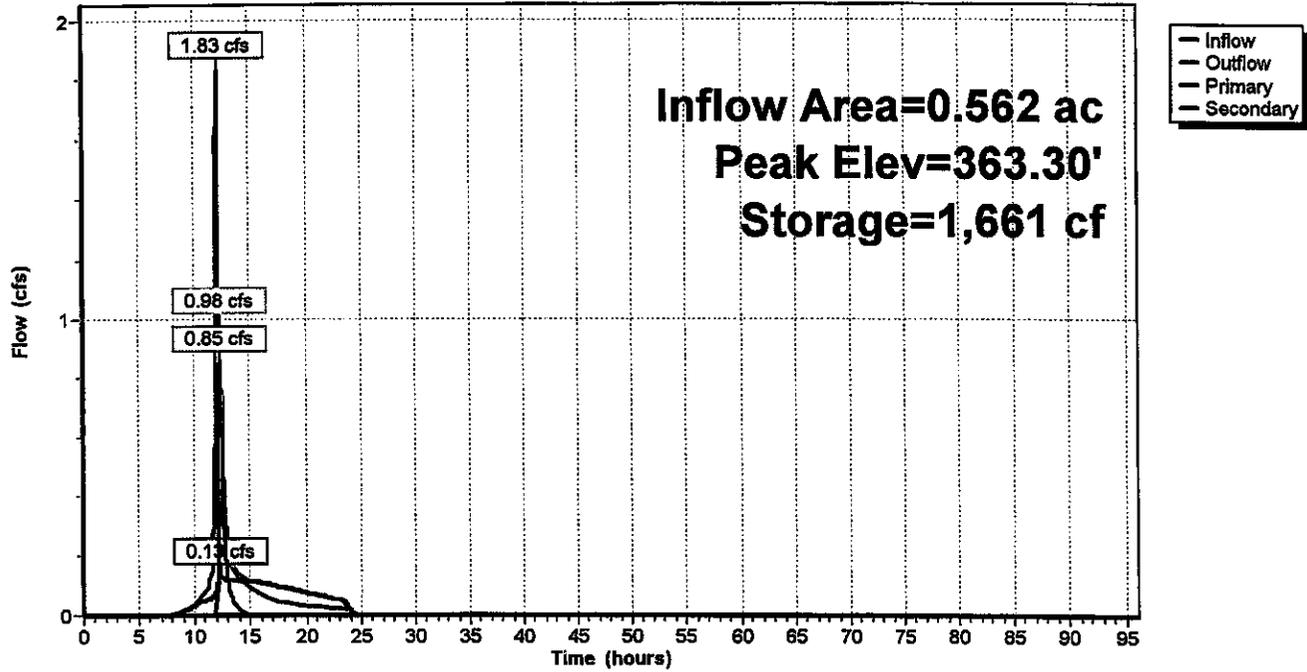
↑2=Exfiltration (Exfiltration Controls 0.13 cfs)

Secondary OutFlow Max=0.85 cfs @ 12.26 hrs HW=363.30' (Free Discharge)

↑3=Broad-Crested Rectangular Weir (Weir Controls 0.85 cfs @ 1.39 fps)

**Pond 8P: Lot 7 Dry Swale**

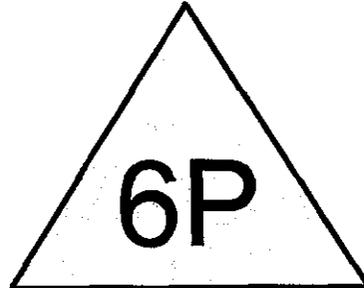
**Hydrograph**



# APPENDIX J



Lot 8



Lot 8 Dry Swale



**Summary for Subcatchment 5S: Lot 8**

Runoff = 0.48 cfs @ 12.17 hrs, Volume= 0.042 af, Depth= 1.19"

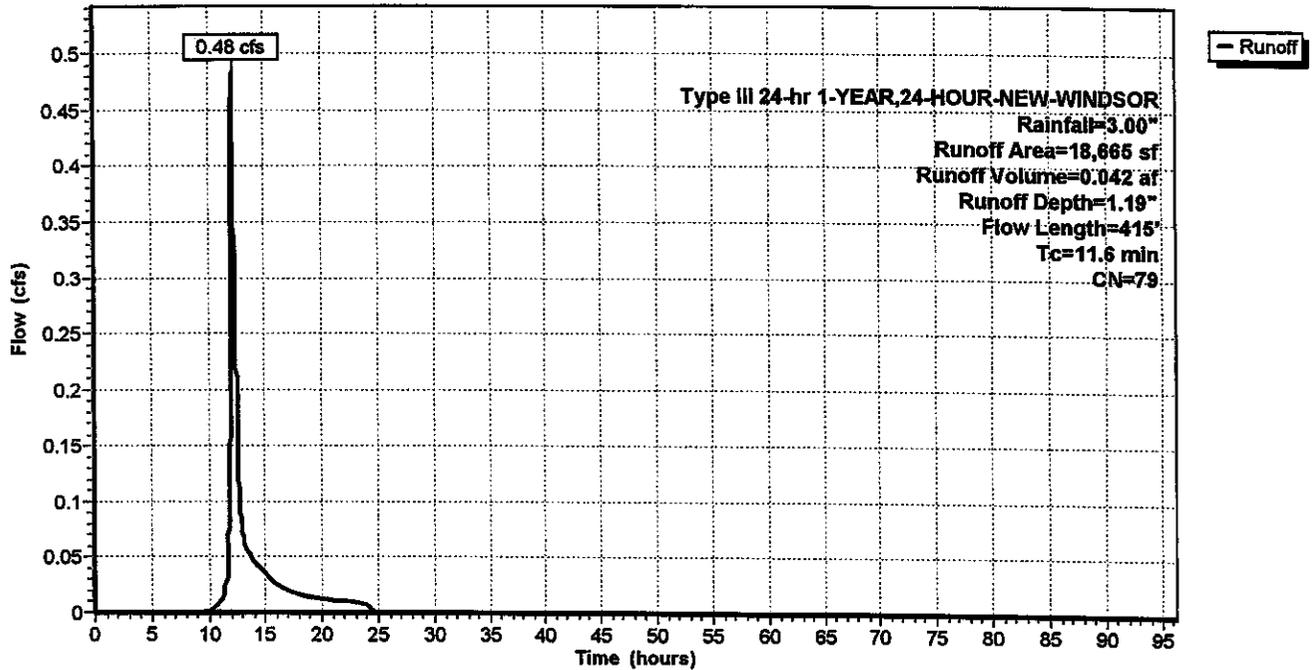
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-YEAR,24-HOUR-NEW-WINDSOR Rainfall=3.00"

Area (sf)	CN	Description
* 14,930	74	Prop. Lawn, >75% Grass cover, Good, HSG C
* 1,435	98	Prop. Driveways
* 2,300	98	Prop. Houses
18,665	79	Weighted Average
14,930		Pervious Area
3,735		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0625	0.20		Sheet Flow, Sheet1 Grass: Dense n= 0.240 P2= 3.75"
3.1	300	0.0533	1.62		Shallow Concentrated Flow, Shallow1 Short Grass Pasture Kv= 7.0 fps
0.1	15	0.3000	3.83		Shallow Concentrated Flow, Shallow2 Short Grass Pasture Kv= 7.0 fps
11.6	415	Total			

**Subcatchment 5S: Lot 8**

Hydrograph



**Summary for Pond 6P: Lot 8 Dry Swale**

Inflow Area = 0.428 ac, 20.01% Impervious, Inflow Depth = 1.19" for 1-YEAR, 24-HOUR-NEW-WINDSC  
 Inflow = 0.48 cfs @ 12.17 hrs, Volume= 0.042 af  
 Outflow = 0.08 cfs @ 12.86 hrs, Volume= 0.042 af, Atten= 83%, Lag= 41.3 min  
 Primary = 0.08 cfs @ 12.86 hrs, Volume= 0.042 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 364.39' @ 12.86 hrs Surf.Area= 905 sf Storage= 621 cf

Plug-Flow detention time= 68.8 min calculated for 0.042 af (100% of inflow)  
 Center-of-Mass det. time= 68.8 min ( 923.5 - 854.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	363.50'	2,759 cf	8.00'W x 62.50'L x 2.50'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	360.00'	4.0" x 50.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 359.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior
#2	Device 1	363.50'	4.000 in/hr Exfiltration over Horizontal area
#3	Secondary	365.25'	2.5' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.08 cfs @ 12.86 hrs HW=364.39' (Free Discharge)

↑1=Culvert (Passes 0.08 cfs of 0.64 cfs potential flow)

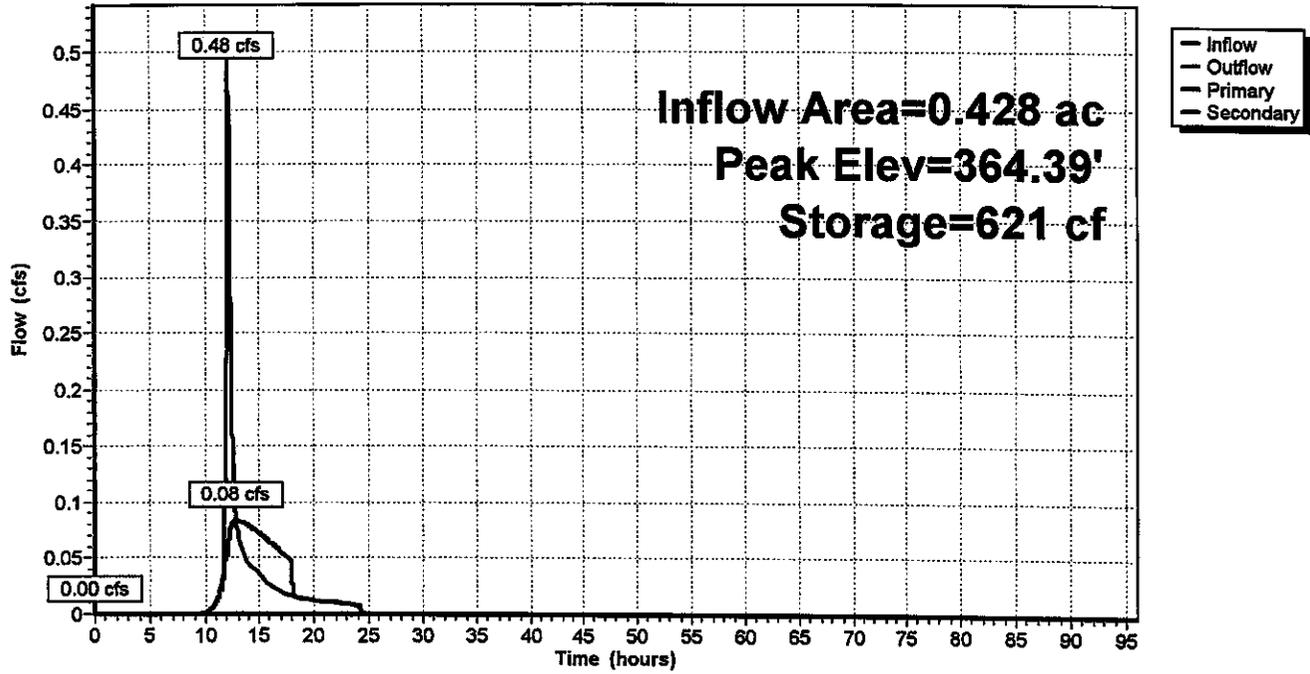
↑2=Exfiltration (Exfiltration Controls 0.08 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=363.50' (Free Discharge)

↑3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

### Pond 6P: Lot 8 Dry Swale

#### Hydrograph



**Summary for Subcatchment 5S: Lot 8**

Runoff = 1.17 cfs @ 12.16 hrs, Volume= 0.100 af, Depth= 2.80"

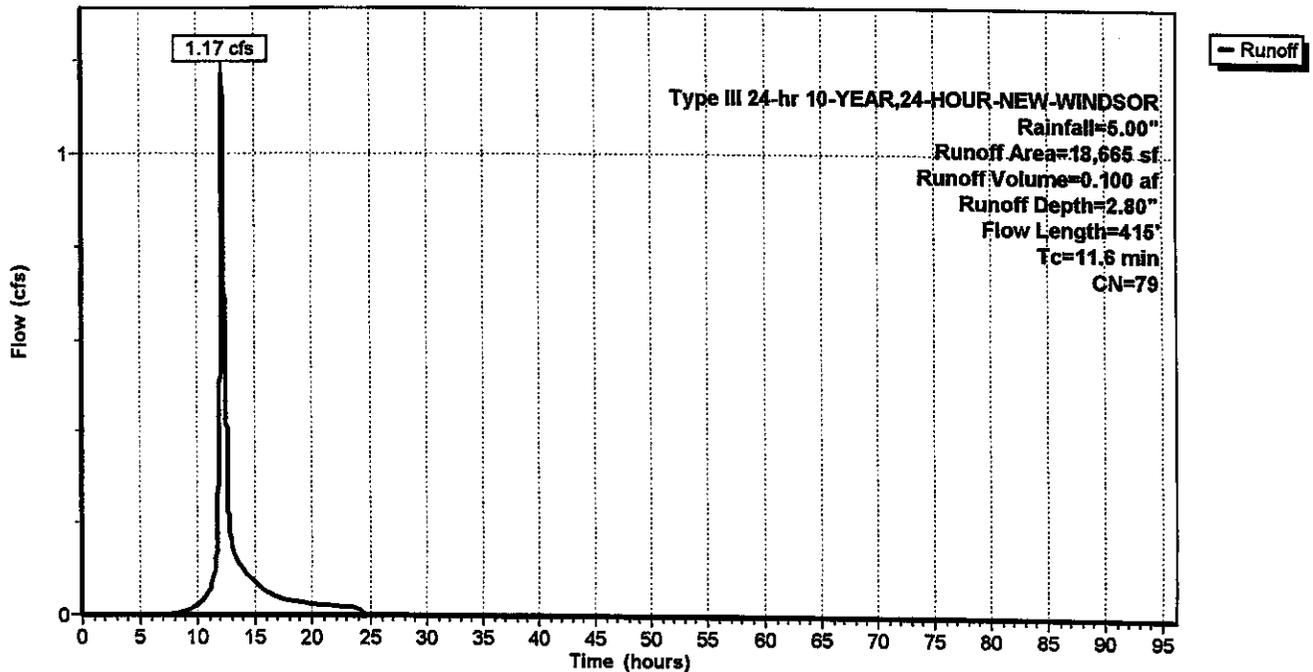
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-YEAR,24-HOUR-NEW-WINDSOR Rainfall=5.00"

Area (sf)	CN	Description
* 14,930	74	Prop. Lawn, >75% Grass cover, Good, HSG C
* 1,435	98	Prop. Driveways
* 2,300	98	Prop. Houses
18,665	79	Weighted Average
14,930		Pervious Area
3,735		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0625	0.20		Sheet Flow, Sheet1 Grass: Dense n= 0.240 P2= 3.75"
3.1	300	0.0533	1.62		Shallow Concentrated Flow, Shallow1 Short Grass Pasture Kv= 7.0 fps
0.1	15	0.3000	3.83		Shallow Concentrated Flow, Shallow2 Short Grass Pasture Kv= 7.0 fps
11.6	415	Total			

**Subcatchment 5S: Lot 8**

Hydrograph



**Summary for Pond 6P: Lot 8 Dry Swale**

Inflow Area = 0.428 ac, 20.01% Impervious, Inflow Depth = 2.80" for 10-YEAR, 24-HOUR-NEW-WINDS  
 Inflow = 1.17 cfs @ 12.16 hrs, Volume= 0.100 af  
 Outflow = 0.28 cfs @ 12.63 hrs, Volume= 0.100 af, Atten= 76%, Lag= 28.4 min  
 Primary = 0.13 cfs @ 12.63 hrs, Volume= 0.094 af  
 Secondary = 0.15 cfs @ 12.63 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 365.33' @ 12.63 hrs Surf.Area= 1,397 sf Storage= 1,702 cf

Plug-Flow detention time= 131.5 min calculated for 0.100 af (100% of inflow)  
 Center-of-Mass det. time= 131.5 min ( 961.1 - 829.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	363.50'	2,759 cf	8.00'W x 62.50'L x 2.50'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	360.00'	4.0" x 50.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 359.50' S= 0.0100 /' Cc= 0.900 n= 0.010 PVC, smooth interior
#2	Device 1	363.50'	4.000 in/hr Exfiltration over Horizontal area
#3	Secondary	365.25'	2.5' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.13 cfs @ 12.63 hrs HW=365.33' (Free Discharge)

↑1=Culvert (Passes 0.13 cfs of 0.70 cfs potential flow)

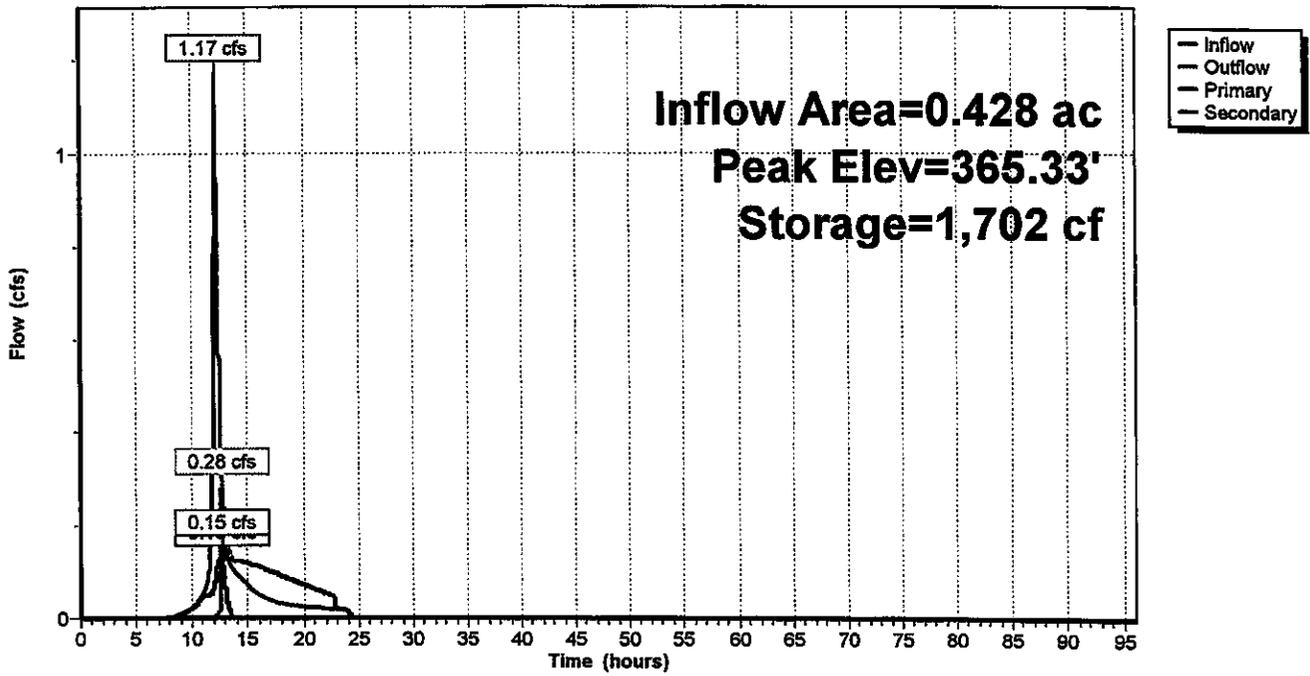
↑2=Exfiltration (Exfiltration Controls 0.13 cfs)

Secondary OutFlow Max=0.15 cfs @ 12.63 hrs HW=365.33' (Free Discharge)

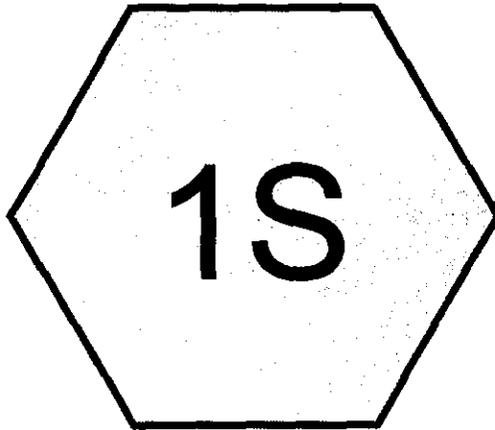
↑3=Broad-Crested Rectangular Weir (Weir Controls 0.15 cfs @ 0.72 fps)

### Pond 6P: Lot 8 Dry Swale

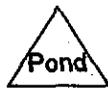
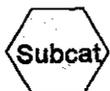
Hydrograph



# APPENDIX K



# Area - A - Existing



**Summary for Subcatchment 1S: Area - A - Existing**

Runoff = 58.60 cfs @ 13.19 hrs, Volume= 12.346 af, Depth> 0.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 1-YEAR,24-HOUR-NEW-WINDSOR Rainfall=3.00"

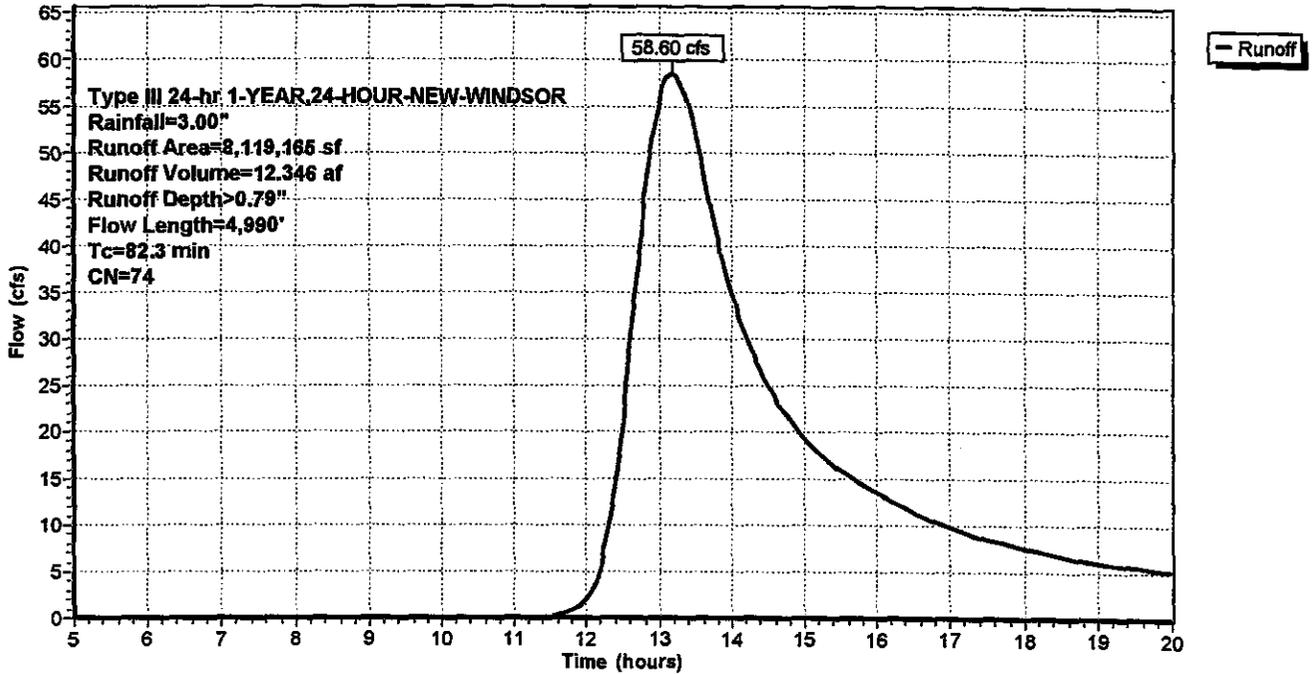
Area (sf)	CN	Description
* 131,407	98	Ex. Buildings/Drives - Offsite
* 258,377	74	Ex. Lawn - >75% Grass cover, Good, HSG C
* 1,373,687	74	Ex. Fields - Pasture/grassland/range, Good, HSG C
* 83,978	98	Station Road
* 46,800	98	Railroad Bed
* 517,941	71	Ex. Fields - Lots1-8, Meadow, non-grazed, HSG C
* 18,955	80	Ex. Fields - Pasture/grassland/range, Good, HSG D
* 508,949	73	Ex. Woods - Lots 1-8 - Fair, HSG C
* 205,474	79	Ex. Woods - Lots 1-8 - Fair, HSG D
* 4,973,597	73	Ex. Woods - Offsite - Fair, HSG C
8,119,165	74	Weighted Average
7,856,980		Pervious Area
262,185		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0202	0.08		Sheet Flow, Sheet1
23.2	990	0.0202	0.71		Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	80	0.2500	2.50		Shallow Concentrated Flow, Shallow1
1.9	270	0.1176	2.40		Woodland Kv= 5.0 fps
2.6	170	0.0471	1.09		Shallow Concentrated Flow, Shallow2
2.4	580		4.01		Woodland Kv= 5.0 fps
0.2	55	0.0100	3.74	11.76	Shallow Concentrated Flow, Shallow3
0.4	130	0.0100	5.28	63.37	Short Grass Pasture Kv= 7.0 fps
28.3	1,575	0.0025	0.93	486.36	Shallow Concentrated Flow, Shallow4
2.1	980	0.0162	7.67	153.43	Woodland Kv= 5.0 fps
0.2	60	0.0143	6.50	62.56	Lake or Reservoir, Wetland1
					Mean Depth= 0.50'
					Circular Channel (pipe), Pipe
					Diam= 24.0" Area= 3.1 sf Perim= 6.3' r= 0.50'
					n= 0.025 Corrugated metal
					Channel Flow, Channel1
					Area= 12.0 sf Perim= 10.9' r= 1.10'
					n= 0.030 Earth, grassed & winding
					Channel Flow, Swamp
					Area= 525.0 sf Perim= 527.0' r= 1.00'
					n= 0.080 Earth, long dense weeds
					Channel Flow, Stream1
					Area= 20.0 sf Perim= 14.9' r= 1.34'
					n= 0.030 Earth, clean & winding
					Circular Channel (pipe), 42" Pipe
					Diam= 42.0" Area= 9.6 sf Perim= 11.0' r= 0.88'
					n= 0.025 Corrugated metal

82.3 4,990 Total

### Subcatchment 1S: Area - A - Existing

Hydrograph



**Summary for Subcatchment 1S: Area - A - Existing**

Runoff = 164.79 cfs @ 13.11 hrs, Volume= 32.999 af, Depth> 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 10-YEAR,24-HOUR-NEW-WINDSOR Rainfall=5.00"

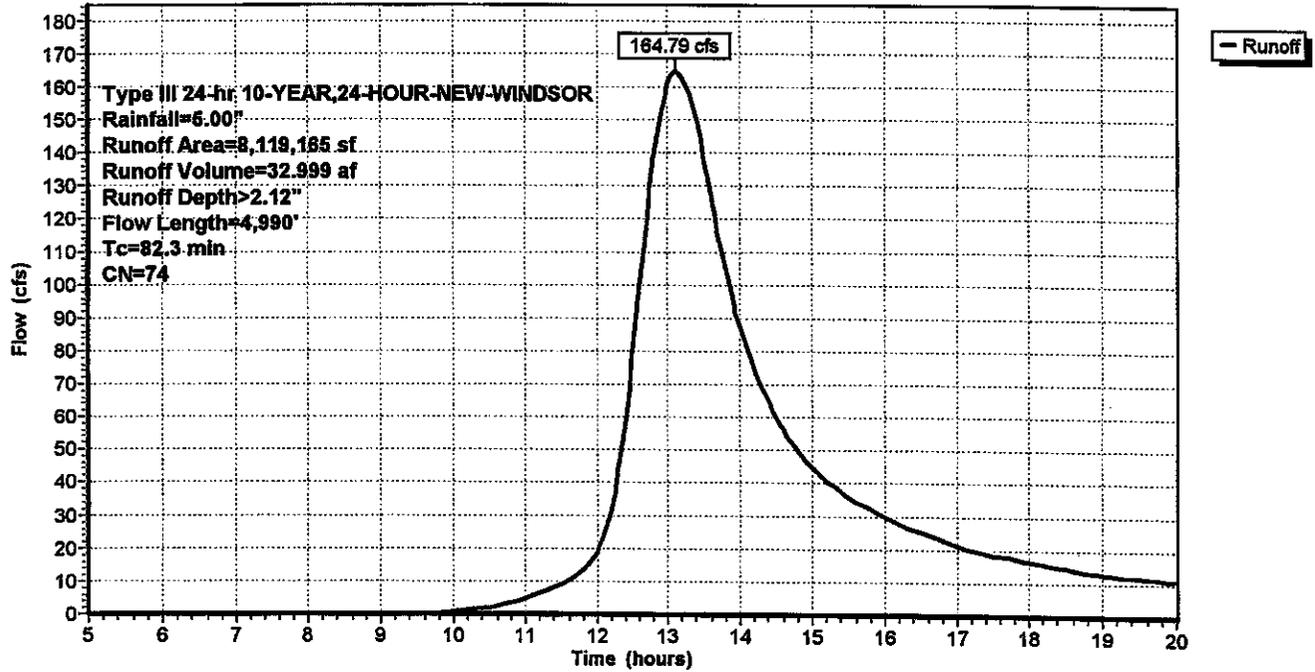
Area (sf)	CN	Description
* 131,407	98	Ex. Buildings/Drives - Offsite
* 258,377	74	Ex. Lawn - >75% Grass cover, Good, HSG C
* 1,373,687	74	Ex. Fields - Pasture/grassland/range, Good, HSG C
* 83,978	98	Station Road
* 46,800	98	Railroad Bed
* 517,941	71	Ex. Fields - Lots1-8, Meadow, non-grazed, HSG C
* 18,955	80	Ex. Fields - Pasture/grassland/range, Good, HSG D
* 508,949	73	Ex. Woods - Lots 1-8 - Fair, HSG C
* 205,474	79	Ex. Woods - Lots 1-8 - Fair, HSG D
* 4,973,597	73	Ex. Woods - Offsite - Fair, HSG C
8,119,165	74	Weighted Average
7,856,980		Pervious Area
262,185		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0202	0.08		Sheet Flow, Sheet1
23.2	990	0.0202	0.71		Woods: Light underbrush n= 0.400 P2= 3.50" Shallow Concentrated Flow, Shallow1 Woodland Kv= 5.0 fps
0.5	80	0.2500	2.50		Shallow Concentrated Flow, Shallow2 Woodland Kv= 5.0 fps
1.9	270	0.1176	2.40		Shallow Concentrated Flow, Shallow3 Short Grass Pasture Kv= 7.0 fps
2.6	170	0.0471	1.09		Shallow Concentrated Flow, Shallow4 Woodland Kv= 5.0 fps
2.4	580		4.01		Lake or Reservoir, Wetland1 Mean Depth= 0.50'
0.2	55	0.0100	3.74	11.76	Circular Channel (pipe), Pipe Diam= 24.0" Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
0.4	130	0.0100	5.28	63.37	Channel Flow, Channel1 Area= 12.0 sf Perim= 10.9' r= 1.10' n= 0.030 Earth, grassed & winding
28.3	1,575	0.0025	0.93	486.36	Channel Flow, Swamp Area= 525.0 sf Perim= 527.0' r= 1.00' n= 0.080 Earth, long dense weeds
2.1	980	0.0162	7.67	153.43	Channel Flow, Stream1 Area= 20.0 sf Perim= 14.9' r= 1.34' n= 0.030 Earth, clean & winding
0.2	60	0.0143	6.50	62.56	Circular Channel (pipe), 42" Pipe Diam= 42.0" Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.025 Corrugated metal

82.3 4,990 Total

### Subcatchment 1S: Area - A - Existing

Hydrograph



**Summary for Subcatchment 1S: Area - A - Existing**

Runoff = 239.17 cfs @ 13.10 hrs, Volume= 47.781 af, Depth> 3.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-YEAR,24-HOUR-NEW-WINDSOR Rainfall=6.25"

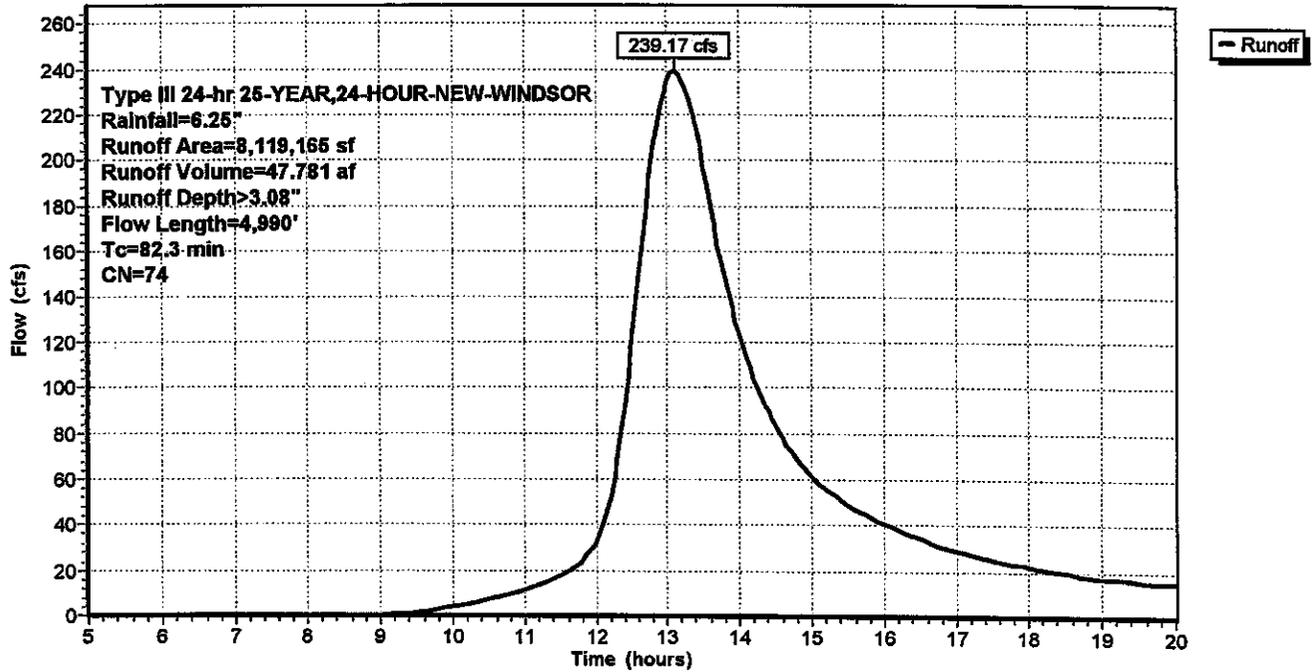
Area (sf)	CN	Description
* 131,407	98	Ex. Buildings/Drives - Offsite
* 258,377	74	Ex. Lawn - >75% Grass cover, Good, HSG C
* 1,373,687	74	Ex. Fields - Pasture/grassland/range, Good, HSG C
* 83,978	98	Station Road
* 46,800	98	Railroad Bed
* 517,941	71	Ex. Fields - Lots1-8, Meadow, non-grazed, HSG C
* 18,955	80	Ex. Fields - Pasture/grassland/range, Good, HSG D
* 508,949	73	Ex. Woods - Lots 1-8 - Fair, HSG C
* 205,474	79	Ex. Woods - Lots 1-8 - Fair, HSG D
* 4,973,597	73	Ex. Woods - Offsite - Fair, HSG C
8,119,165	74	Weighted Average
7,856,980		Pervious Area
262,185		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0202	0.08		Sheet Flow, Sheet1
23.2	990	0.0202	0.71		Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	80	0.2500	2.50		Shallow Concentrated Flow, Shallow1
1.9	270	0.1176	2.40		Woodland Kv= 5.0 fps
2.6	170	0.0471	1.09		Shallow Concentrated Flow, Shallow2
2.4	580		4.01		Woodland Kv= 5.0 fps
0.2	55	0.0100	3.74	11.76	Shallow Concentrated Flow, Shallow3
0.4	130	0.0100	5.28	63.37	Short Grass Pasture Kv= 7.0 fps
28.3	1,575	0.0025	0.93	486.36	Shallow Concentrated Flow, Shallow4
2.1	980	0.0162	7.67	153.43	Woodland Kv= 5.0 fps
0.2	60	0.0143	6.50	62.56	Lake or Reservoir, Wetland1
					Mean Depth= 0.50'
					Circular Channel (pipe), Pipe
					Diam= 24.0" Area= 3.1 sf Perim= 6.3' r= 0.50"
					n= 0.025 Corrugated metal
					Channel Flow, Channel1
					Area= 12.0 sf Perim= 10.9' r= 1.10'
					n= 0.030 Earth, grassed & winding
					Channel Flow, Swamp
					Area= 525.0 sf Perim= 527.0' r= 1.00'
					n= 0.080 Earth, long dense weeds
					Channel Flow, Stream1
					Area= 20.0 sf Perim= 14.9' r= 1.34'
					n= 0.030 Earth, clean & winding
					Circular Channel (pipe), 42" Pipe
					Diam= 42.0" Area= 9.6 sf Perim= 11.0' r= 0.88"
					n= 0.025 Corrugated metal

82.3 4,990 Total

### Subcatchment 1S: Area - A - Existing

Hydrograph



**Summary for Subcatchment 1S: Area - A - Existing**

Runoff = 335.25 cfs @ 13.09 hrs, Volume= 67.221 af, Depth> 4.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 100-YEAR,24-HOUR-NEW-WINDSOR Rainfall=7.80"

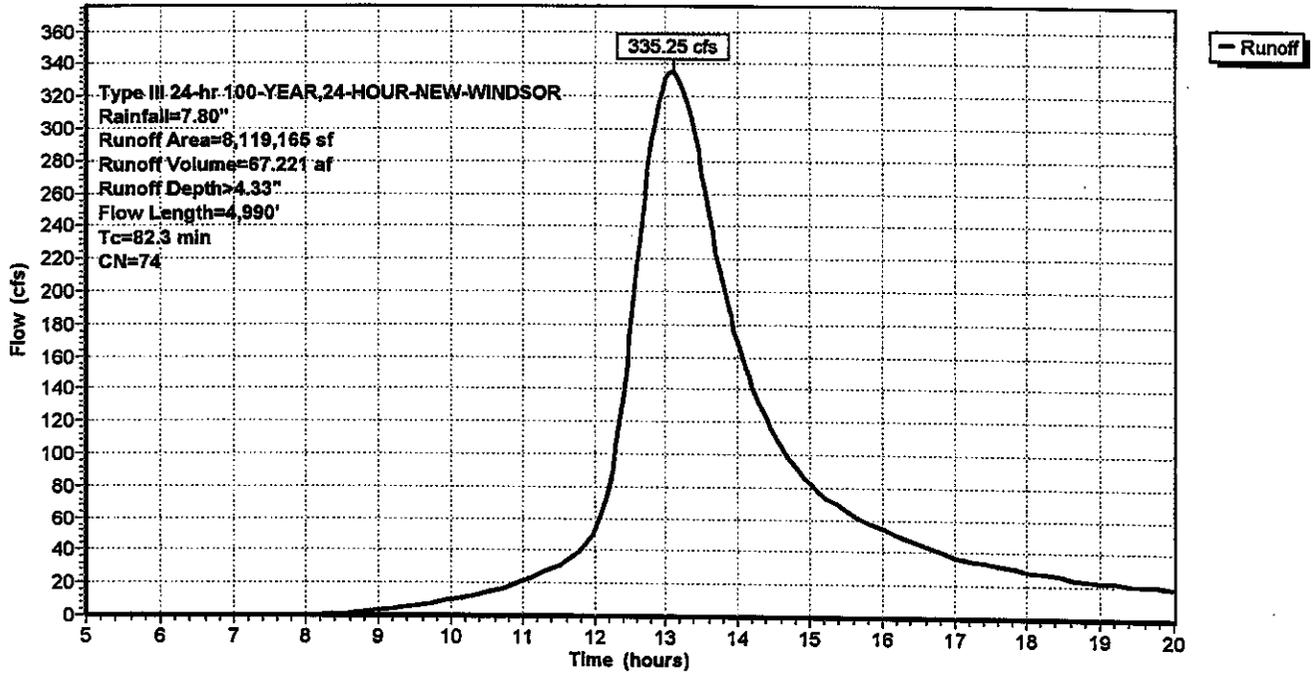
Area (sf)	CN	Description
* 131,407	98	Ex. Buildings/Drives - Offsite
* 258,377	74	Ex. Lawn - >75% Grass cover, Good, HSG C
* 1,373,687	74	Ex. Fields - Pasture/grassland/range, Good, HSG C
* 83,978	98	Station Road
* 46,800	98	Railroad Bed
* 517,941	71	Ex. Fields - Lots1-8, Meadow, non-grazed, HSG C
* 18,955	80	Ex. Fields - Pasture/grassland/range, Good, HSG D
* 508,949	73	Ex. Woods - Lots 1-8 - Fair, HSG C
* 205,474	79	Ex. Woods - Lots 1-8 - Fair, HSG D
* 4,973,597	73	Ex. Woods - Offsite - Fair, HSG C
8,119,165	74	Weighted Average
7,856,980		Pervious Area
262,185		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0202	0.08		Sheet Flow, Sheet1
23.2	990	0.0202	0.71		Woods: Light underbrush n= 0.400 P2= 3.50"
0.5	80	0.2500	2.50		Shallow Concentrated Flow, Shallow1
1.9	270	0.1176	2.40		Woodland Kv= 5.0 fps
2.6	170	0.0471	1.09		Shallow Concentrated Flow, Shallow2
2.4	580		4.01		Woodland Kv= 5.0 fps
0.2	55	0.0100	3.74	11.76	Shallow Concentrated Flow, Shallow3
0.4	130	0.0100	5.28	63.37	Short Grass Pasture Kv= 7.0 fps
28.3	1,575	0.0025	0.93	486.36	Shallow Concentrated Flow, Shallow4
2.1	980	0.0162	7.67	153.43	Woodland Kv= 5.0 fps
0.2	60	0.0143	6.50	62.56	Lake or Reservoir, Wetland1
					Mean Depth= 0.50'
					Circular Channel (pipe), Pipe
					Diam= 24.0" Area= 3.1 sf Perim= 6.3' r= 0.50'
					n= 0.025 Corrugated metal
					Channel Flow, Channel1
					Area= 12.0 sf Perim= 10.9' r= 1.10'
					n= 0.030 Earth, grassed & winding
					Channel Flow, Swamp
					Area= 525.0 sf Perim= 527.0' r= 1.00'
					n= 0.080 Earth, long dense weeds
					Channel Flow, Stream1
					Area= 20.0 sf Perim= 14.9' r= 1.34'
					n= 0.030 Earth, clean & winding
					Circular Channel (pipe), 42" Pipe
					Diam= 42.0" Area= 9.6 sf Perim= 11.0' r= 0.88'
					n= 0.025 Corrugated metal

82.3 4,990 Total

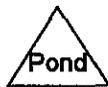
### Subcatchment 1S: Area - A - Existing

Hydrograph





# Area - A - Proposed



Summary for Subcatchment 2S: Area - A - Proposed

Runoff = 58.58 cfs @ 13.19 hrs, Volume= 12.341 af, Depth> 0.79"

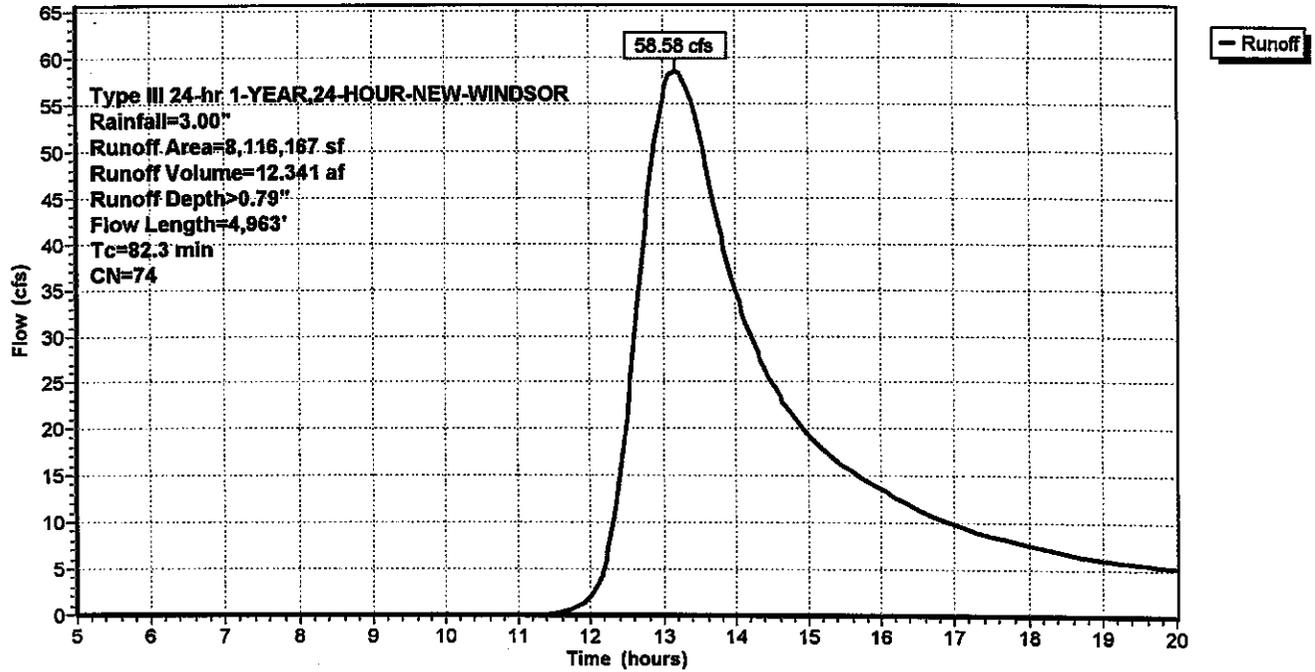
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 1-YEAR,24-HOUR-NEW-WINDSOR Rainfall=3.00"

Area (sf)	CN	Description
* 131,407	98	Ex. Buildings/Drives - Offsite
* 258,377	74	Ex. Lawn - >75% Grass cover, Good, HSG C
* 1,373,687	74	Ex. Fields - Pasture/grassland/range, Good, HSG C
* 83,978	98	Station Road
* 46,800	98	Railroad Bed
* 482,433	74	Prop. Lawn - Lots1-8 - Pasture/grassland/range, Good, HSG C
* 18,955	80	Ex. Fields - Pasture/grassland/range, Good, HSG D
* 508,949	73	Ex. Woods - Lots 1-8 - Fair, HSG C
* 194,244	79	Ex. Woods - Lots 1-8 - Fair, HSG D
* 4,973,597	73	Ex. Woods - Offsite - Fair, HSG C
* 11,500	98	Prop. Houses
* 32,240	98	Prop. Driveways
8,116,167	74	Weighted Average
7,810,242		Pervious Area
305,925		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0202	0.08		<b>Sheet Flow, Sheet1</b> Woods: Light underbrush n= 0.400 P2= 3.50"
23.2	990	0.0202	0.71		<b>Shallow Concentrated Flow, Shallow1</b> Woodland Kv= 5.0 fps
0.5	80	0.2500	2.50		<b>Shallow Concentrated Flow, Shallow2</b> Woodland Kv= 5.0 fps
1.9	270	0.1176	2.40		<b>Shallow Concentrated Flow, Shallow3</b> Short Grass Pasture Kv= 7.0 fps
2.6	170	0.0471	1.09		<b>Shallow Concentrated Flow, Shallow4</b> Woodland Kv= 5.0 fps
2.4	580		4.01		<b>Lake or Reservoir, Wetland1</b> Mean Depth= 0.50'
0.2	55	0.0100	3.74	11.76	<b>Circular Channel (pipe), Pipe</b> Diam= 24.0" Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
0.4	130	0.0100	5.28	63.37	<b>Channel Flow, Channel1</b> Area= 12.0 sf Perim= 10.9' r= 1.10' n= 0.030 Earth, grassed & winding
28.3	1,575	0.0025	0.93	486.36	<b>Channel Flow, Swamp</b> Area= 525.0 sf Perim= 527.0' r= 1.00' n= 0.080 Earth, long dense weeds
0.7	316	0.0162	7.67	153.43	<b>Channel Flow, Stream1</b> Area= 20.0 sf Perim= 14.9' r= 1.34' n= 0.030 Earth, clean & winding
0.1	56	0.0071	6.27	219.52	<b>Channel Flow, Bridge1</b> Area= 35.0 sf Perim= 19.0' r= 1.84' n= 0.030
0.8	348	0.0162	7.67	153.43	<b>Channel Flow, Stream2</b> Area= 20.0 sf Perim= 14.9' r= 1.34' n= 0.030 Earth, clean & winding
0.1	50	0.0100	7.44	260.52	<b>Channel Flow, Bridge2</b> Area= 35.0 sf Perim= 19.0' r= 1.84' n= 0.030
0.4	183	0.0162	7.67	153.43	<b>Channel Flow, Stream3</b> Area= 20.0 sf Perim= 14.9' r= 1.34' n= 0.030 Earth, clean & winding
0.2	60	0.0143	6.50	62.56	<b>Circular Channel (pipe), 42" Pipe</b> Diam= 42.0" Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.025 Corrugated metal
82.3	4,963	Total			

### Subcatchment 2S: Area - A - Proposed

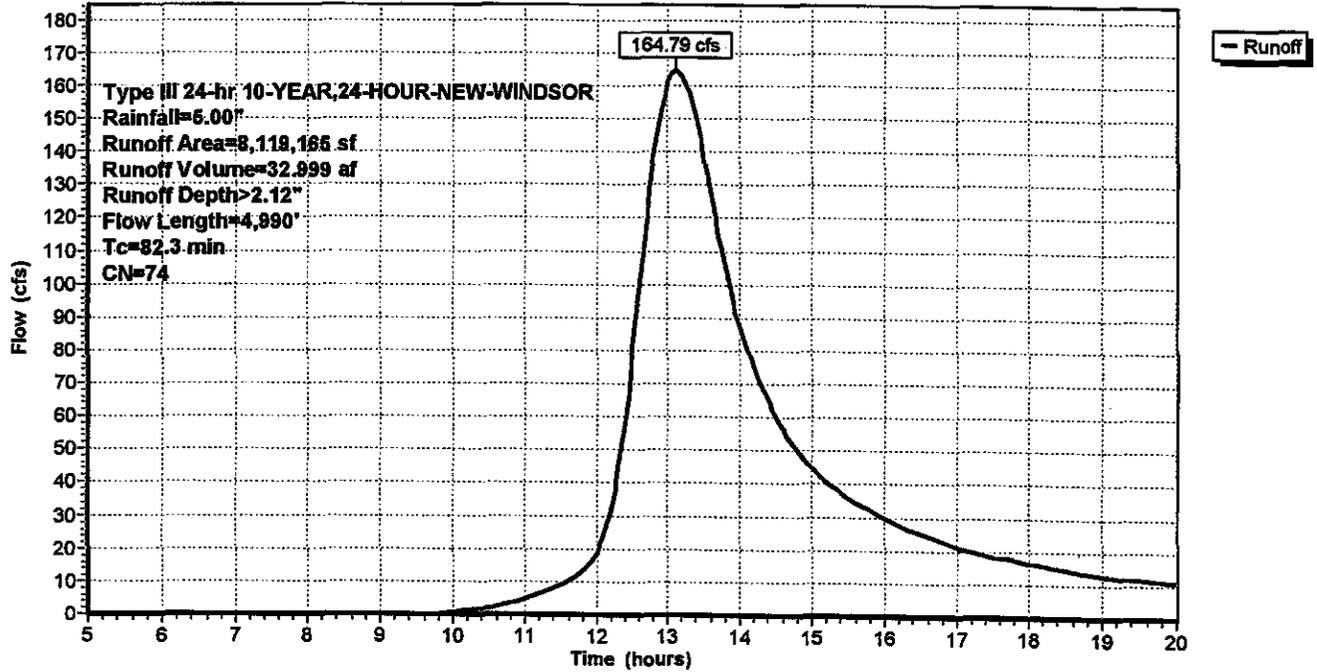
Hydrograph



82.3 4,990 Total

### Subcatchment 1S: Area - A - Existing

Hydrograph



**Summary for Subcatchment 1S: Area - A - Existing**

Runoff = 239.17 cfs @ 13.10 hrs, Volume= 47.781 af, Depth> 3.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-YEAR, 24-HOUR-NEW-WINDSOR Rainfall=6.25"

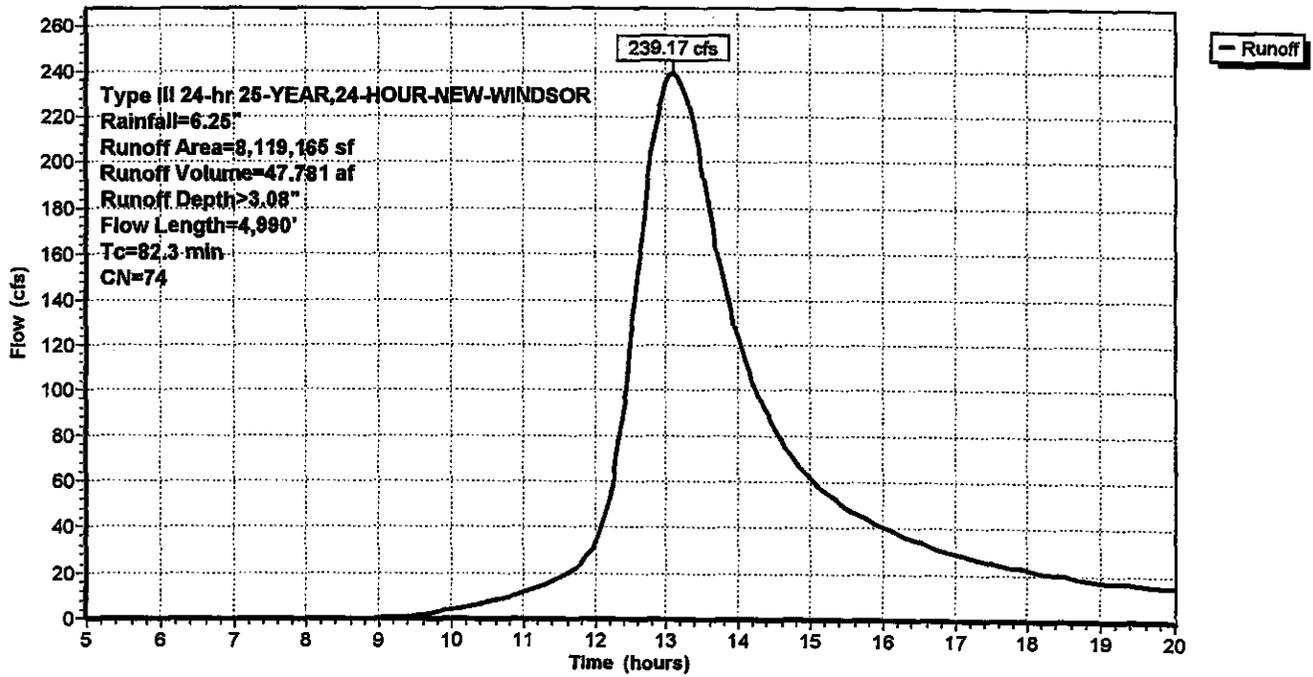
Area (sf)	CN	Description
* 131,407	98	Ex. Buildings/Drives - Offsite
* 258,377	74	Ex. Lawn - >75% Grass cover, Good, HSG C
* 1,373,687	74	Ex. Fields - Pasture/grassland/range, Good, HSG C
* 83,978	98	Station Road
* 46,800	98	Railroad Bed
* 517,941	71	Ex. Fields - Lots1-8, Meadow, non-grazed, HSG C
* 18,955	80	Ex. Fields - Pasture/grassland/range, Good, HSG D
* 508,949	73	Ex. Woods - Lots 1-8 - Fair, HSG C
* 205,474	79	Ex. Woods - Lots 1-8 - Fair, HSG D
* 4,973,597	73	Ex. Woods - Offsite - Fair, HSG C
8,119,165	74	Weighted Average
7,856,980		Pervious Area
262,185		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0202	0.08		Sheet Flow, Sheet1
					Woods: Light underbrush n= 0.400 P2= 3.50"
23.2	990	0.0202	0.71		Shallow Concentrated Flow, Shallow1
					Woodland Kv= 5.0 fps
0.5	80	0.2500	2.50		Shallow Concentrated Flow, Shallow2
					Woodland Kv= 5.0 fps
1.9	270	0.1176	2.40		Shallow Concentrated Flow, Shallow3
					Short Grass Pasture Kv= 7.0 fps
2.6	170	0.0471	1.09		Shallow Concentrated Flow, Shallow4
					Woodland Kv= 5.0 fps
2.4	580		4.01		Lake or Reservoir, Wetland1
					Mean Depth= 0.50'
0.2	55	0.0100	3.74	11.76	Circular Channel (pipe), Pipe
					Diam= 24.0" Area= 3.1 sf Perim= 6.3' r= 0.50'
					n= 0.025 Corrugated metal
0.4	130	0.0100	5.28	63.37	Channel Flow, Channel1
					Area= 12.0 sf Perim= 10.9' r= 1.10'
					n= 0.030 Earth, grassed & winding
28.3	1,575	0.0025	0.93	486.36	Channel Flow, Swamp
					Area= 525.0 sf Perim= 527.0' r= 1.00'
					n= 0.080 Earth, long dense weeds
2.1	980	0.0162	7.67	153.43	Channel Flow, Stream1
					Area= 20.0 sf Perim= 14.9' r= 1.34'
					n= 0.030 Earth, clean & winding
0.2	60	0.0143	6.50	62.56	Circular Channel (pipe), 42" Pipe
					Diam= 42.0" Area= 9.6 sf Perim= 11.0' r= 0.88'
					n= 0.025 Corrugated metal

82.3 4,990 Total

### Subcatchment 1S: Area - A - Existing

Hydrograph



**Summary for Subcatchment 2S: Area - A - Proposed**

Runoff = 239.08 cfs @ 13.10 hrs, Volume= 47.763 af, Depth> 3.08"

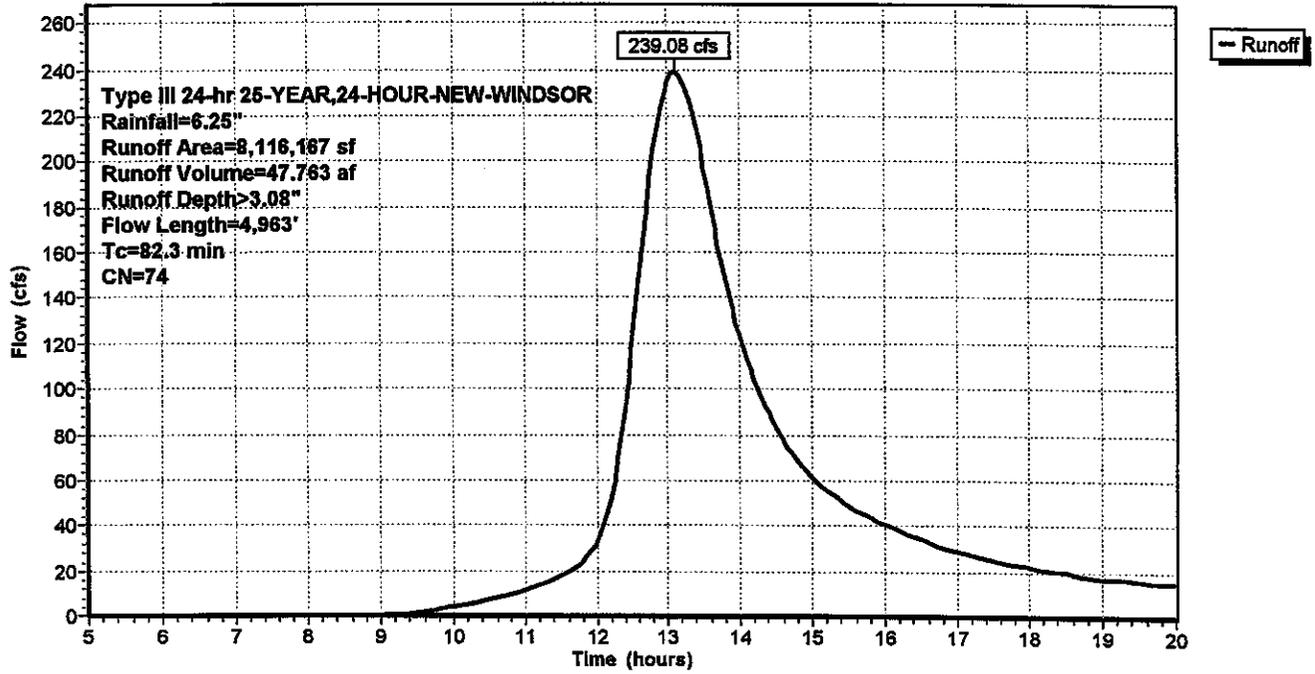
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25-YEAR,24-HOUR-NEW-WINDSOR Rainfall=6.25"

	Area (sf)	CN	Description
*	131,407	98	Ex. Buildings/Drives - Offsite
*	258,377	74	Ex. Lawn - >75% Grass cover, Good, HSG C
*	1,373,687	74	Ex. Fields - Pasture/grassland/range, Good, HSG C
*	83,978	98	Station Road
*	46,800	98	Railroad Bed
*	482,433	74	Prop. Lawn - Lots1-8 - Pasture/grassland/range, Good, HSG C
*	18,955	80	Ex. Fields - Pasture/grassland/range, Good, HSG D
*	508,949	73	Ex. Woods - Lots 1-8 - Fair, HSG C
*	194,244	79	Ex. Woods - Lots 1-8 - Fair, HSG D
*	4,973,597	73	Ex. Woods - Offsite - Fair, HSG C
*	11,500	98	Prop. Houses
*	32,240	98	Prop. Driveways
	8,116,167	74	Weighted Average
	7,810,242		Pervious Area
	305,925		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0202	0.08		<b>Sheet Flow, Sheet1</b> Woods: Light underbrush n= 0.400 P2= 3.50"
23.2	990	0.0202	0.71		<b>Shallow Concentrated Flow, Shallow1</b> Woodland Kv= 5.0 fps
0.5	80	0.2500	2.50		<b>Shallow Concentrated Flow, Shallow2</b> Woodland Kv= 5.0 fps
1.9	270	0.1176	2.40		<b>Shallow Concentrated Flow, Shallow3</b> Short Grass Pasture Kv= 7.0 fps
2.6	170	0.0471	1.09		<b>Shallow Concentrated Flow, Shallow4</b> Woodland Kv= 5.0 fps
2.4	580		4.01		<b>Lake or Reservoir, Wetland1</b> Mean Depth= 0.50'
0.2	55	0.0100	3.74	11.76	<b>Circular Channel (pipe), Pipe</b> Diam= 24.0" Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
0.4	130	0.0100	5.28	63.37	<b>Channel Flow, Channel1</b> Area= 12.0 sf Perim= 10.9' r= 1.10' n= 0.030 Earth, grassed & winding
28.3	1,575	0.0025	0.93	486.36	<b>Channel Flow, Swamp</b> Area= 525.0 sf Perim= 527.0' r= 1.00' n= 0.080 Earth, long dense weeds
0.7	316	0.0162	7.67	153.43	<b>Channel Flow, Stream1</b> Area= 20.0 sf Perim= 14.9' r= 1.34' n= 0.030 Earth, clean & winding
0.1	56	0.0071	6.27	219.52	<b>Channel Flow, Bridge1</b> Area= 35.0 sf Perim= 19.0' r= 1.84' n= 0.030
0.8	348	0.0162	7.67	153.43	<b>Channel Flow, Stream2</b> Area= 20.0 sf Perim= 14.9' r= 1.34' n= 0.030 Earth, clean & winding
0.1	50	0.0100	7.44	260.52	<b>Channel Flow, Bridge2</b> Area= 35.0 sf Perim= 19.0' r= 1.84' n= 0.030
0.4	183	0.0162	7.67	153.43	<b>Channel Flow, Stream3</b> Area= 20.0 sf Perim= 14.9' r= 1.34' n= 0.030 Earth, clean & winding
0.2	60	0.0143	6.50	62.56	<b>Circular Channel (pipe), 42" Pipe</b> Diam= 42.0" Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.025 Corrugated metal
82.3	4,963	Total			

### Subcatchment 2S: Area - A - Proposed

Hydrograph



**Summary for Subcatchment 2S: Area - A - Proposed**

Runoff = 335.12 cfs @ 13.09 hrs, Volume= 67.196 af, Depth> 4.33"

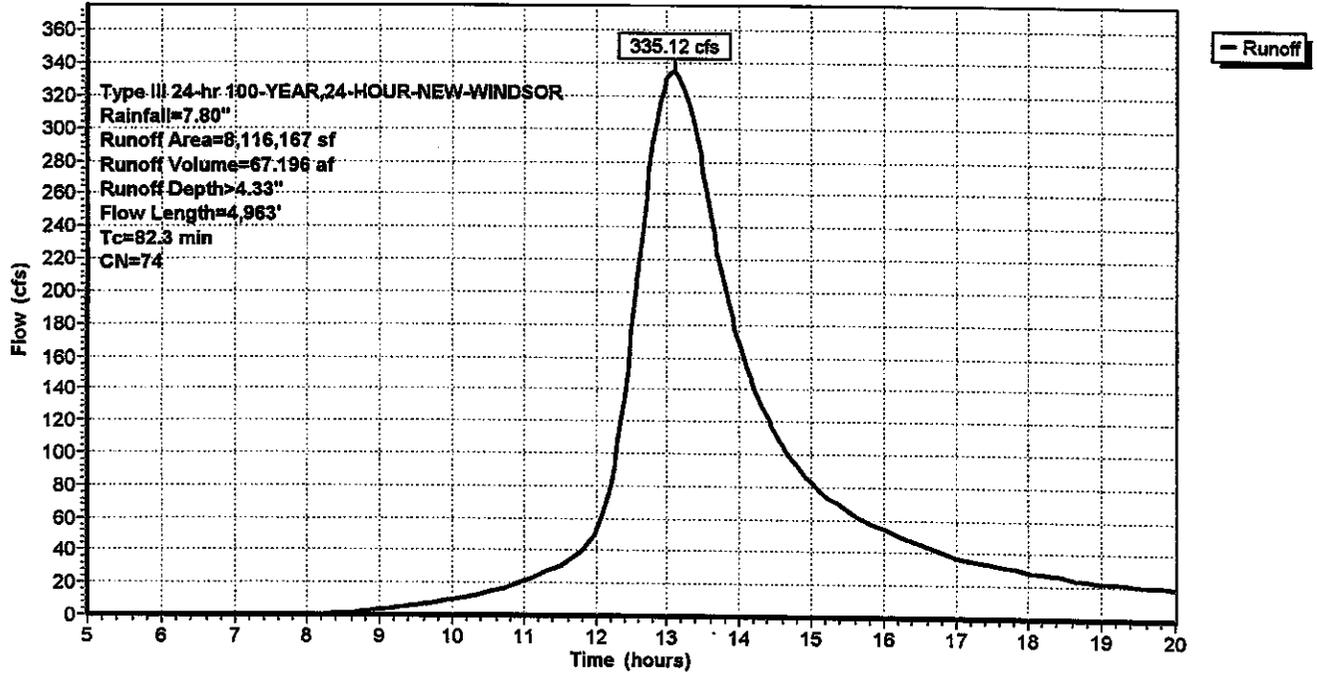
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 100-YEAR,24-HOUR-NEW-WINDSOR Rainfall=7.80"

	Area (sf)	CN	Description
*	131,407	98	Ex. Buildings/Drives - Offsite
*	258,377	74	Ex. Lawn - >75% Grass cover, Good, HSG C
*	1,373,687	74	Ex. Fields - Pasture/grassland/range, Good, HSG C
*	83,978	98	Station Road
*	46,800	98	Railroad Bed
*	482,433	74	Prop. Lawn - Lots1-8 - Pasture/grassland/range, Good, HSG C
*	18,955	80	Ex. Fields - Pasture/grassland/range, Good, HSG D
*	508,949	73	Ex. Woods - Lots 1-8 - Fair, HSG C
*	194,244	79	Ex. Woods - Lots 1-8 - Fair, HSG D
*	4,973,597	73	Ex. Woods - Offsite - Fair, HSG C
*	11,500	98	Prop. Houses
*	32,240	98	Prop. Driveways
	8,116,167	74	Weighted Average
	7,810,242		Pervious Area
	305,925		Impervious Area

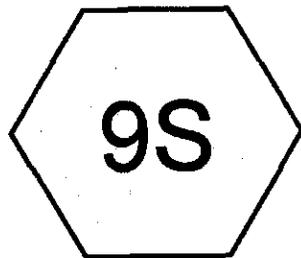
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0202	0.08		<b>Sheet Flow, Sheet1</b> Woods: Light underbrush n= 0.400 P2= 3.50"
23.2	990	0.0202	0.71		<b>Shallow Concentrated Flow, Shallow1</b> Woodland Kv= 5.0 fps
0.5	80	0.2500	2.50		<b>Shallow Concentrated Flow, Shallow2</b> Woodland Kv= 5.0 fps
1.9	270	0.1176	2.40		<b>Shallow Concentrated Flow, Shallow3</b> Short Grass Pasture Kv= 7.0 fps
2.6	170	0.0471	1.09		<b>Shallow Concentrated Flow, Shallow4</b> Woodland Kv= 5.0 fps
2.4	580		4.01		<b>Lake or Reservoir, Wetland1</b> Mean Depth= 0.50'
0.2	55	0.0100	3.74	11.76	<b>Circular Channel (pipe), Pipe</b> Diam= 24.0" Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
0.4	130	0.0100	5.28	63.37	<b>Channel Flow, Channel1</b> Area= 12.0 sf Perim= 10.9' r= 1.10' n= 0.030 Earth, grassed & winding
28.3	1,575	0.0025	0.93	486.36	<b>Channel Flow, Swamp</b> Area= 525.0 sf Perim= 527.0' r= 1.00' n= 0.080 Earth, long dense weeds
0.7	316	0.0162	7.67	153.43	<b>Channel Flow, Stream1</b> Area= 20.0 sf Perim= 14.9' r= 1.34' n= 0.030 Earth, clean & winding
0.1	56	0.0071	6.27	219.52	<b>Channel Flow, Bridge1</b> Area= 35.0 sf Perim= 19.0' r= 1.84' n= 0.030
0.8	348	0.0162	7.67	153.43	<b>Channel Flow, Stream2</b> Area= 20.0 sf Perim= 14.9' r= 1.34' n= 0.030 Earth, clean & winding
0.1	50	0.0100	7.44	260.52	<b>Channel Flow, Bridge2</b> Area= 35.0 sf Perim= 19.0' r= 1.84' n= 0.030
0.4	183	0.0162	7.67	153.43	<b>Channel Flow, Stream3</b> Area= 20.0 sf Perim= 14.9' r= 1.34' n= 0.030 Earth, clean & winding
0.2	60	0.0143	6.50	62.56	<b>Circular Channel (pipe), 42" Pipe</b> Diam= 42.0" Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.025 Corrugated metal
82.3	4,963	Total			

### Subcatchment 2S: Area - A - Proposed

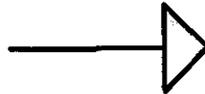
Hydrograph



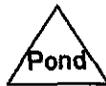
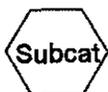
# APPENDIX L



Lot 6



Detention



Drainage Diagram for 3104 - Nowicki  
Prepared by Mercurio-Norton-Tarolli, Printed 11/11/2008  
HydroCAD® 8.50 s/n 003983 © 2007 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.038	73	Woods, Fair, HSG C (9S)
0.826	74	>75% Grass cover, Good, HSG C (9S)
0.094	98	Prop. Driveway (9S)
0.079	98	Prop. House (9S)

**Summary for Subcatchment 9S: Lot 6**

Runoff = 0.97 cfs @ 12.20 hrs, Volume= 0.091 af, Depth= 1.06"

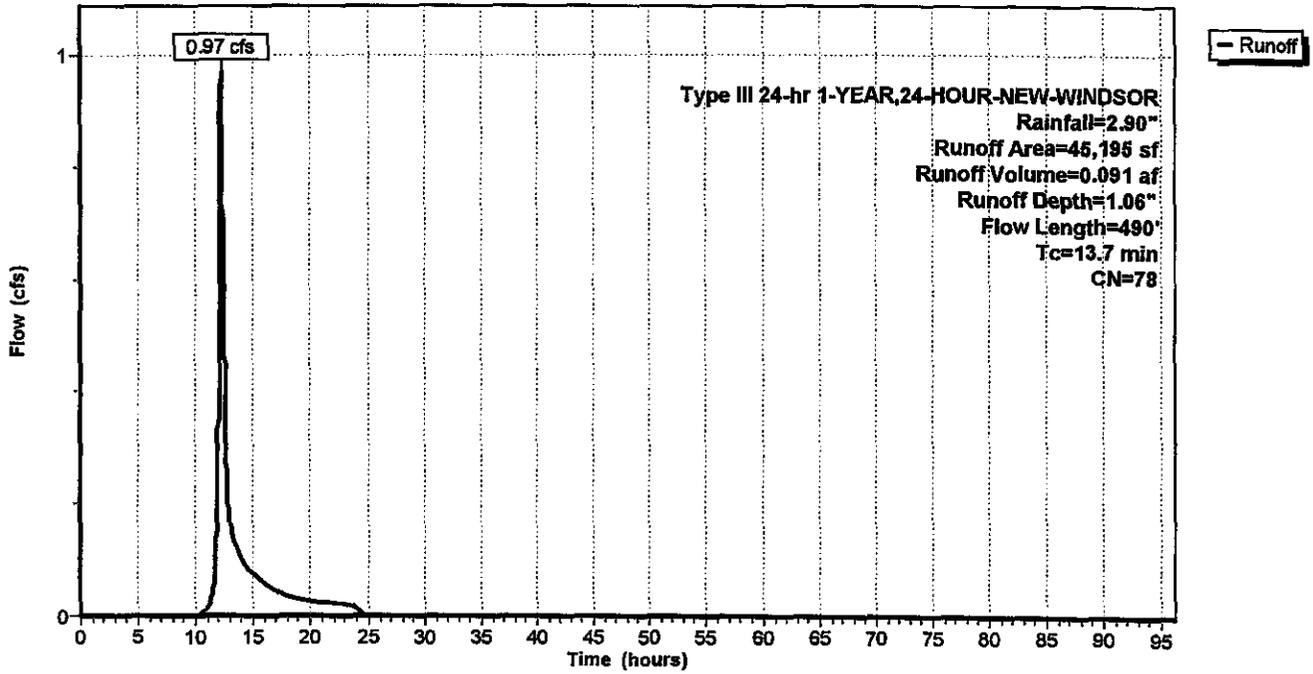
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-YEAR,24-HOUR-NEW-WINDSOR Rainfall=2.90"

Area (sf)	CN	Description
* 4,109	98	Prop. Driveway
* 3,450	98	Prop. House
35,991	74	>75% Grass cover, Good, HSG C
1,645	73	Woods, Fair, HSG C
45,195	78	Weighted Average
37,636		Pervious Area
7,559		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0280	0.14		<b>Sheet Flow, Sheet1</b> Grass: Dense n= 0.240 P2= 3.75"
1.8	192	0.0635	1.76		<b>Shallow Concentrated Flow, Shallow1</b> Short Grass Pasture Kv= 7.0 fps
0.2	135	0.1128	9.69	19.38	<b>Channel Flow, Driveway Ditch</b> Area= 2.0 sf Perim= 4.5' r= 0.44' n= 0.030 Earth, clean & winding
0.1	18	0.0100	4.91	3.86	<b>Circular Channel (pipe), 12" Pipe</b> Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.1	45	0.1200	9.99	19.99	<b>Channel Flow, Driveway Ditch</b> Area= 2.0 sf Perim= 4.5' r= 0.44' n= 0.030 Earth, clean & winding
13.7	490	Total			

Subcatchment 9S: Lot 6

Hydrograph



**Summary for Pond 22P: Detention**

Inflow Area = 1.038 ac, 16.73% Impervious, Inflow Depth = 1.06" for 1-YEAR, 24-HOUR-NEW-WINDSC  
 Inflow = 0.97 cfs @ 12.20 hrs, Volume= 0.091 af  
 Outflow = 0.04 cfs @ 17.93 hrs, Volume= 0.091 af, Atten= 96%, Lag= 344.1 min  
 Primary = 0.04 cfs @ 17.93 hrs, Volume= 0.091 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 501.87' @ 17.93 hrs Surf.Area= 1,912 sf Storage= 2,686 cf

Plug-Flow detention time= 931.4 min calculated for 0.091 af (100% of inflow)  
 Center-of-Mass det. time= 931.3 min ( 1,793.2 - 861.9 )

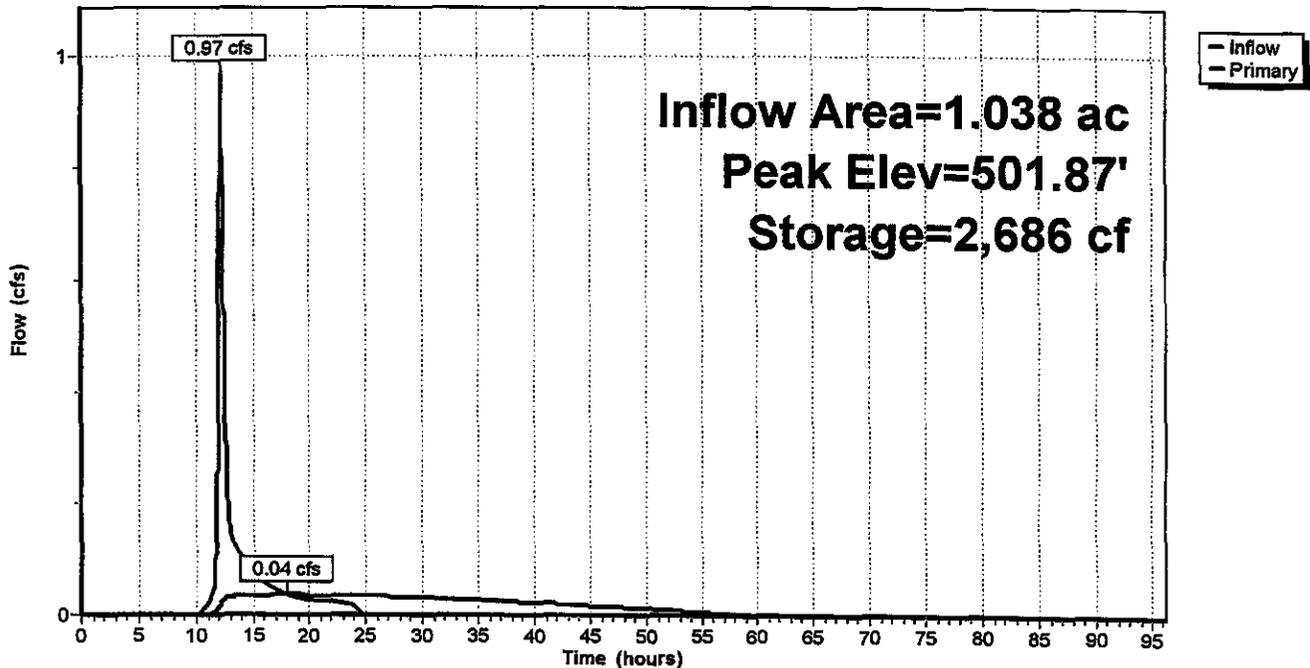
Volume	Invert	Avail.Storage	Storage Description
#1	500.00'	5,214 cf	20.00'W x 50.00'L x 3.00'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	500.00'	1.0" Vert. Orifice/Grate C= 0.600

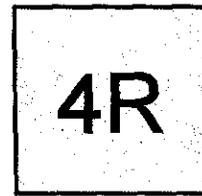
Primary OutFlow Max=0.04 cfs @ 17.93 hrs HW=501.87' (Free Discharge)  
 ↑1=Orifice/Grate (Orifice Controls 0.04 cfs @ 6.51 fps)

**Pond 22P: Detention**

Hydrograph

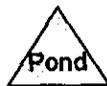


# APPENDIX M



Area - B - Existing

18" Pipe - Pre



**Summary for Subcatchment 3S: Area - B - Existing**

Runoff = 2.70 cfs @ 12.19 hrs, Volume= 0.267 af, Depth= 0.81"

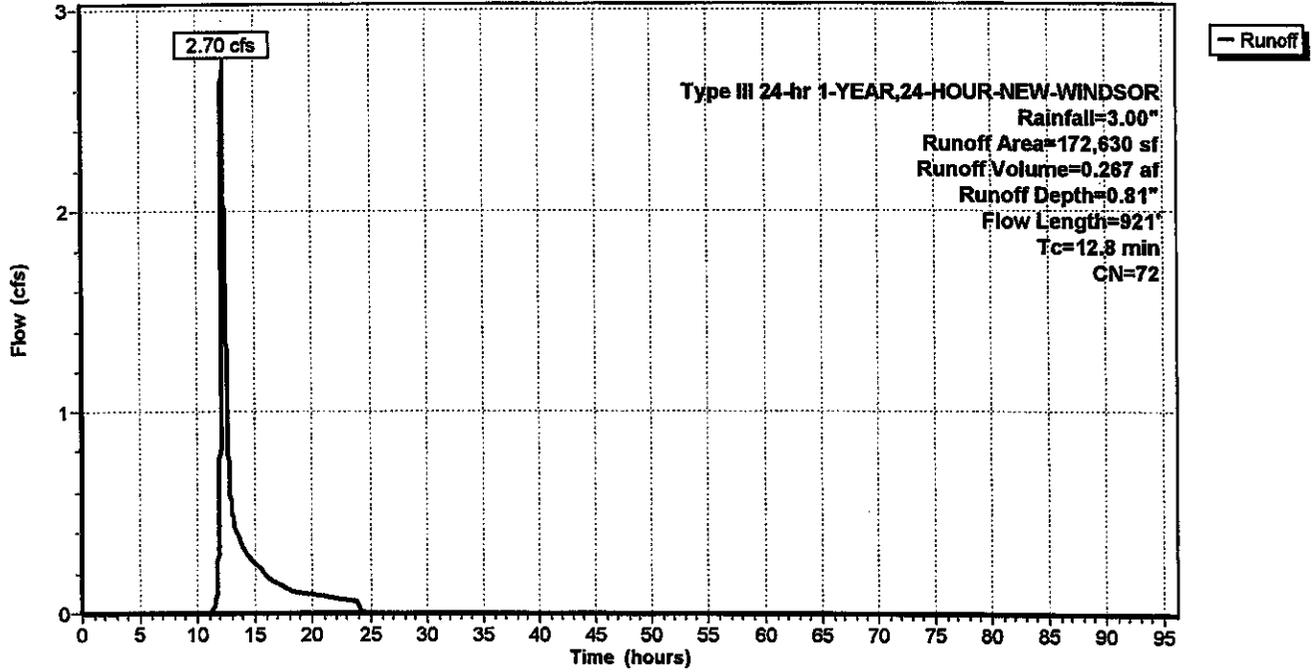
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-YEAR,24-HOUR-NEW-WINDSOR Rainfall=3.00"

Area (sf)	CN	Description
14,815	73	Woods, Fair, HSG C
* 7,402	98	Station Road
150,413	71	Meadow, non-grazed, HSG C
172,630	72	Weighted Average
165,228		Pervious Area
7,402		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.0640	0.20		<b>Sheet Flow, Sheet1</b> Grass: Dense n= 0.240 P2= 3.75"
3.3	325	0.0541	1.63		<b>Shallow Concentrated Flow, Shallow1</b> Short Grass Pasture Kv= 7.0 fps
0.1	12	0.3574	2.99		<b>Shallow Concentrated Flow, Shallow2</b> Woodland Kv= 5.0 fps
1.1	484	0.0323	7.15	28.61	<b>Channel Flow, Roadside Ditch</b> Area= 4.0 sf Perim= 7.3' r= 0.55' n= 0.025 Earth, grassed & winding
12.8	921	Total			

### Subcatchment 3S: Area - B - Existing

Hydrograph



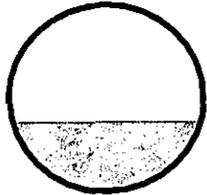
Summary for Reach 4R: 18" Pipe - Pre

Inflow Area = 3.963 ac, 4.29% Impervious, Inflow Depth = 0.81" for 1-YEAR,24-HOUR-NEW-WINDSOR  
 Inflow = 2.70 cfs @ 12.19 hrs, Volume= 0.267 af  
 Outflow = 2.70 cfs @ 12.20 hrs, Volume= 0.267 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Max. Velocity= 4.61 fps, Min. Travel Time= 0.1 min  
 Avg. Velocity = 1.98 fps, Avg. Travel Time= 0.3 min

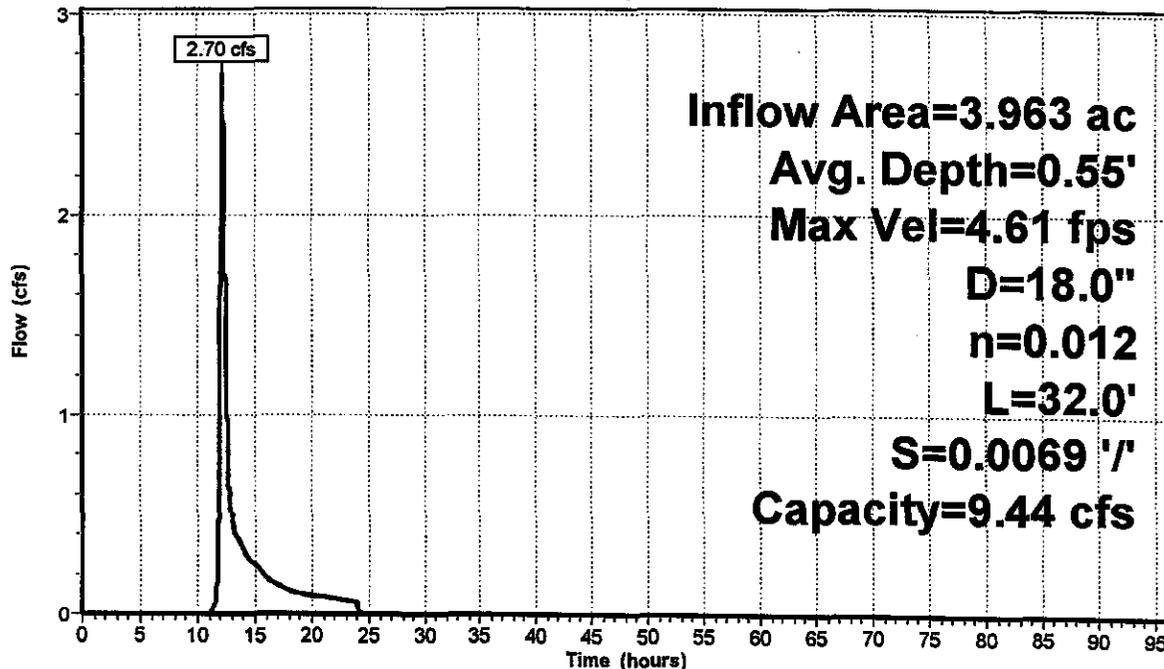
Peak Storage= 19 cf @ 12.19 hrs, Average Depth at Peak Storage= 0.55'  
 Defined Flood Depth= 350.10', Capacity at Flood Depth= -9,191.99 cfs  
 Bank-Full Depth= 1.50', Capacity at Bank-Full= 9.44 cfs

18.0" Diameter Pipe, n= 0.012  
 Length= 32.0' Slope= 0.0069 '/'  
 Inlet Invert= 346.39', Outlet Invert= 346.17'



Reach 4R: 18" Pipe - Pre

Hydrograph



- Inflow  
 - Outflow

**Inflow Area=3.963 ac**  
**Avg. Depth=0.55'**  
**Max Vel=4.61 fps**  
**D=18.0"**  
**n=0.012**  
**L=32.0'**  
**S=0.0069 '/'**  
**Capacity=9.44 cfs**

**Summary for Subcatchment 3S: Area - B - Existing**

Runoff = 8.09 cfs @ 12.18 hrs, Volume= 0.726 af, Depth= 2.20"

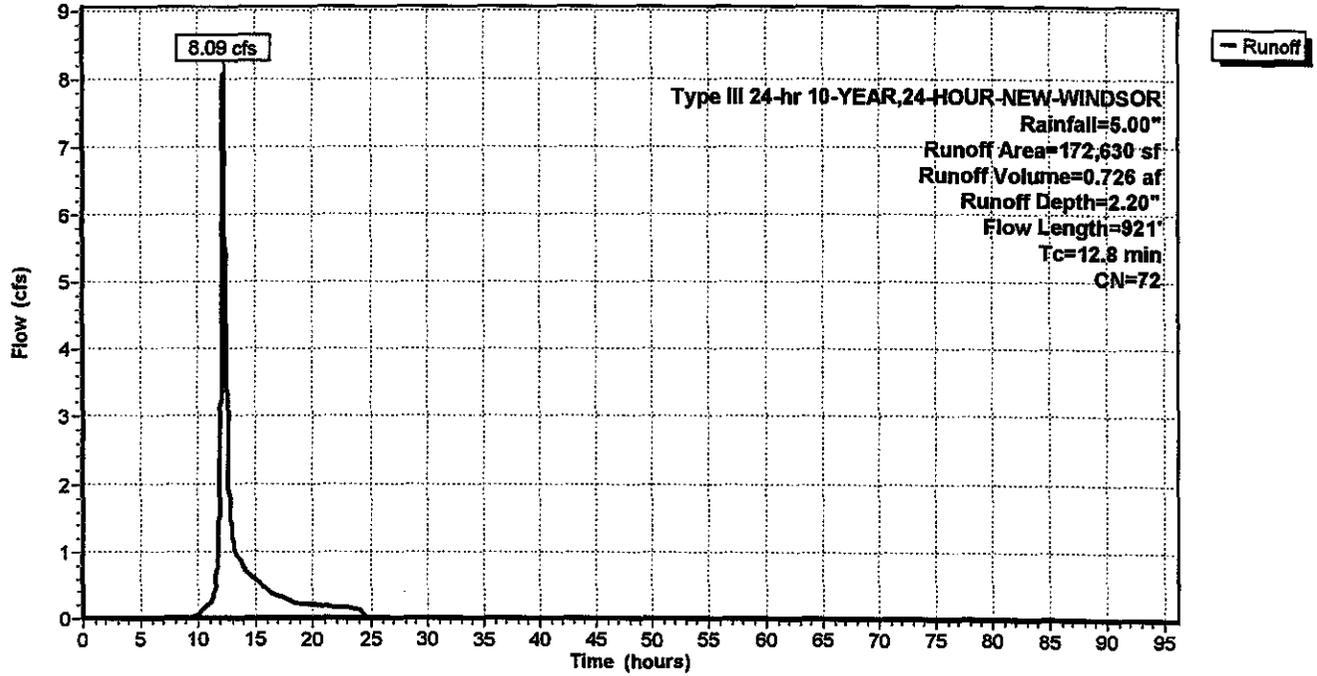
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-YEAR,24-HOUR-NEW-WINDSOR Rainfall=5.00"

Area (sf)	CN	Description
14,815	73	Woods, Fair, HSG C
* 7,402	98	Station Road
150,413	71	Meadow, non-grazed, HSG C
172,630	72	Weighted Average
165,228		Pervious Area
7,402		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.0640	0.20		<b>Sheet Flow, Sheet1</b>
					Grass: Dense n= 0.240 P2= 3.75"
3.3	325	0.0541	1.63		<b>Shallow Concentrated Flow, Shallow1</b>
					Short Grass Pasture Kv= 7.0 fps
0.1	12	0.3574	2.99		<b>Shallow Concentrated Flow, Shallow2</b>
					Woodland Kv= 5.0 fps
1.1	484	0.0323	7.15	28.61	<b>Channel Flow, Roadside Ditch</b>
					Area= 4.0 sf Perim= 7.3' r= 0.55'
					n= 0.025 Earth, grassed & winding
12.8	921	Total			

### Subcatchment 3S: Area - B - Existing

Hydrograph



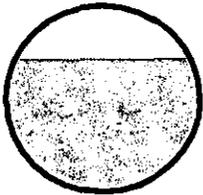
Summary for Reach 4R: 18" Pipe - Pre

Inflow Area = 3.963 ac, 4.29% Impervious, Inflow Depth = 2.20" for 10-YEAR, 24-HOUR-NEW-WINDSOR  
 Inflow = 8.09 cfs @ 12.18 hrs, Volume= 0.726 af  
 Outflow = 8.09 cfs @ 12.19 hrs, Volume= 0.726 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Max. Velocity= 6.00 fps, Min. Travel Time= 0.1 min  
 Avg. Velocity = 2.48 fps, Avg. Travel Time= 0.2 min

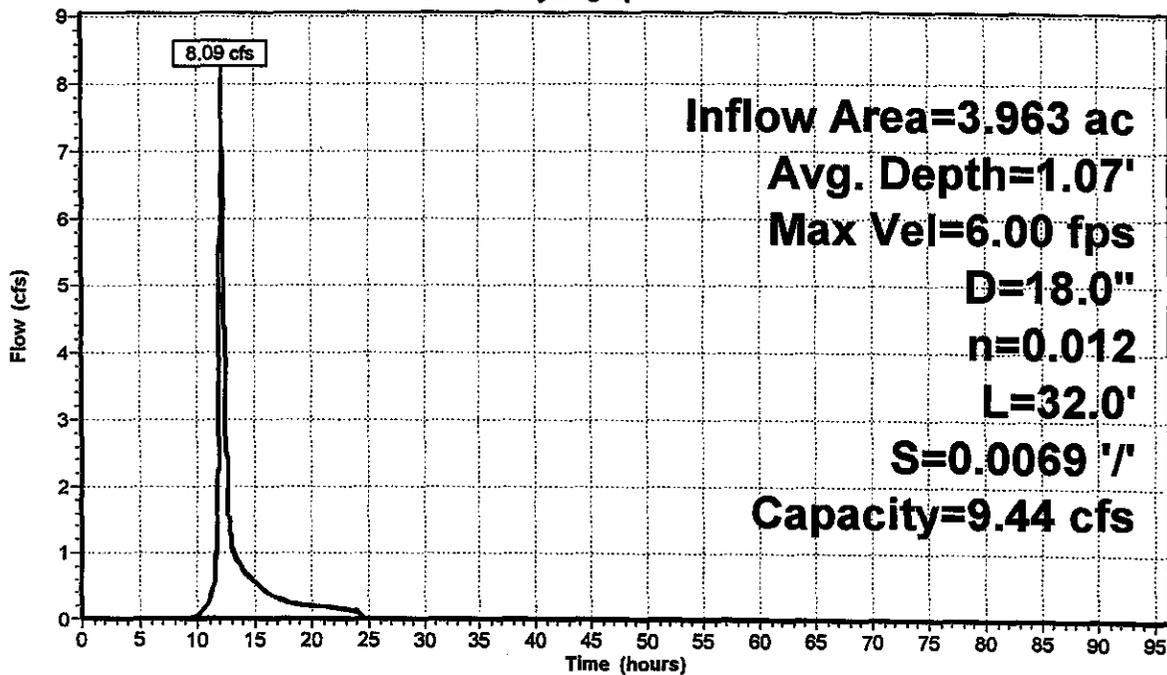
Peak Storage= 43 cf @ 12.19 hrs, Average Depth at Peak Storage= 1.07'  
 Defined Flood Depth= 350.10', Capacity at Flood Depth= -9,191.99 cfs  
 Bank-Full Depth= 1.50', Capacity at Bank-Full= 9.44 cfs

18.0" Diameter Pipe, n= 0.012  
 Length= 32.0' Slope= 0.0069 1/  
 Inlet Invert= 346.39', Outlet Invert= 346.17'



Reach 4R: 18" Pipe - Pre

Hydrograph



**Summary for Subcatchment 3S: Area - B - Existing**

Runoff = 16.85 cfs @ 12.18 hrs, Volume= 1.493 af, Depth= 4.52"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

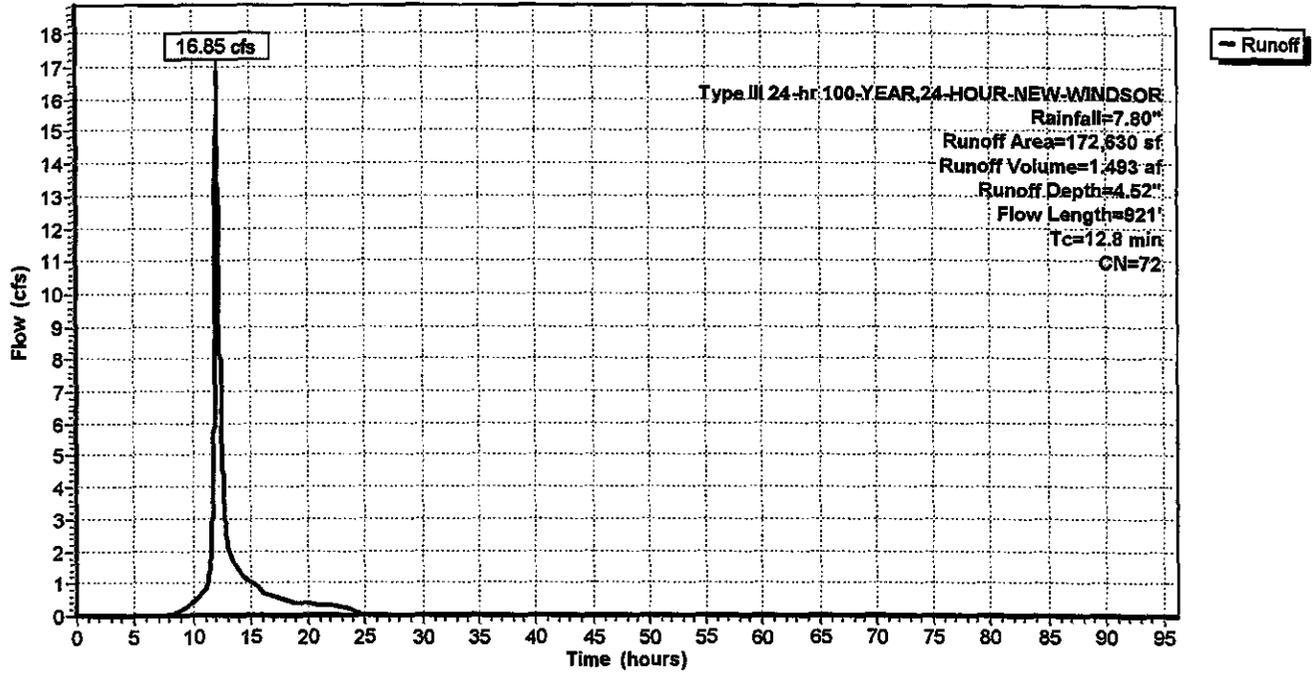
Type III 24-hr 100-YEAR,24-HOUR-NEW-WINDSOR Rainfall=7.80"

Area (sf)	CN	Description
14,815	73	Woods, Fair, HSG C
* 7,402	98	Station Road
150,413	71	Meadow, non-grazed, HSG C
172,630	72	Weighted Average
165,228		Pervious Area
7,402		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.0640	0.20		Sheet Flow, Sheet1 Grass: Dense n= 0.240 P2= 3.75"
3.3	325	0.0541	1.63		Shallow Concentrated Flow, Shallow1 Short Grass Pasture Kv= 7.0 fps
0.1	12	0.3574	2.99		Shallow Concentrated Flow, Shallow2 Woodland Kv= 5.0 fps
1.1	484	0.0323	7.15	28.61	Channel Flow, Roadside Ditch Area= 4.0 sf Perim= 7.3' r= 0.55' n= 0.025 Earth, grassed & winding
12.8	921	Total			

### Subcatchment 3S: Area - B - Existing

Hydrograph



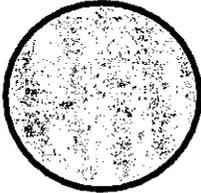
Summary for Reach 4R: 18" Pipe - Pre

Inflow Area = 3.963 ac, 4.29% Impervious, Inflow Depth = 4.52" for 100-YEAR,24-HOUR-NEW-WIND
Inflow = 16.85 cfs @ 12.18 hrs, Volume= 1.493 af
Outflow = 9.83 cfs @ 12.05 hrs, Volume= 1.493 af, Atten= 42%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.09 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.87 fps, Avg. Travel Time= 0.2 min

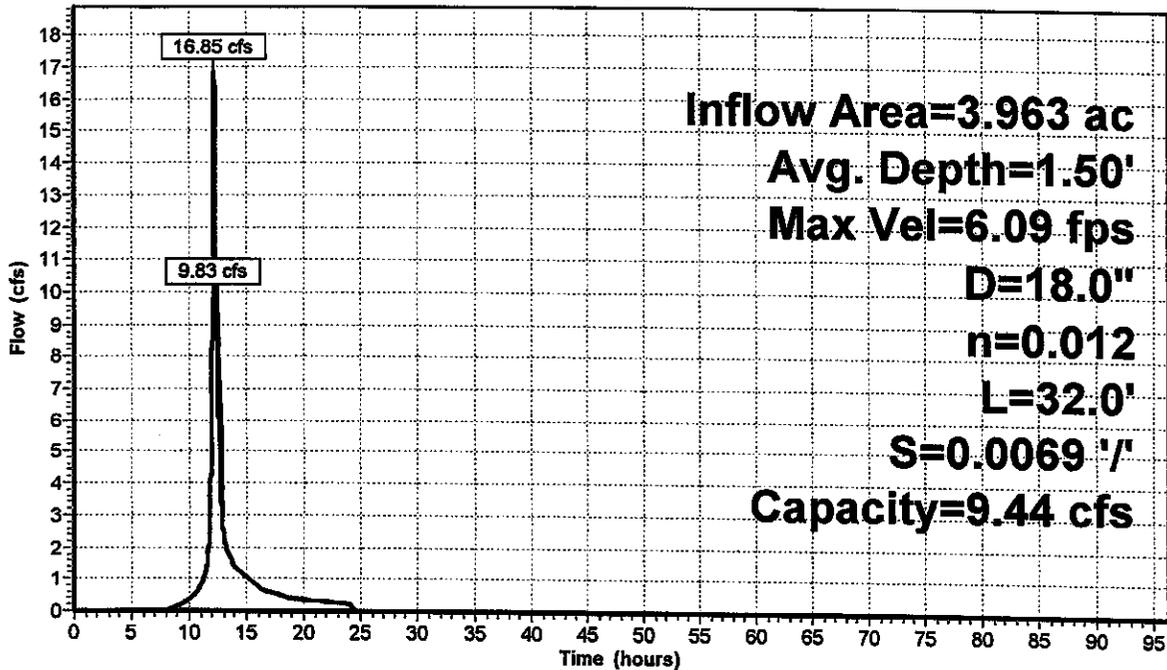
Peak Storage= 57 cf @ 12.06 hrs, Average Depth at Peak Storage= 1.50'
Defined Flood Depth= 350.10', Capacity at Flood Depth= -9,191.99 cfs
Bank-Full Depth= 1.50', Capacity at Bank-Full= 9.44 cfs

18.0" Diameter Pipe, n= 0.012
Length= 32.0' Slope= 0.0069 '/'
Inlet Invert= 346.39', Outlet Invert= 346.17'



Reach 4R: 18" Pipe - Pre

Hydrograph

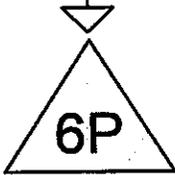


- Inflow
- Outflow

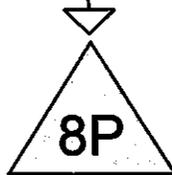
# APPENDIX N



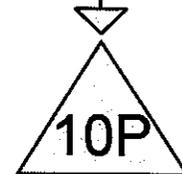
Lot 8



Lot 7



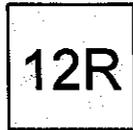
Lot 6



Lot 8 Dry Swale



Lot 7 Dry Swale



Roadside Ditch (Lot8)

Roadside Ditch (Lot7)

Lot 6 Dry Swale



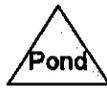
Remaining



18" Pipe - Post



Roadside Ditch (Lot6)



**3104 - Nowicki**

Prepared by Mercurio-Norton-Tarolli  
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Page 1

**Area Listing (selected nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
0.217	73	Woods, Fair, HSG C (9S,14S)
3.128	74	Prop. Lawn, >75% Grass cover, Good, HSG C (5S,7S,9S,14S)
0.174	98	Prop. Driveway (7S,9S)
0.158	98	Prop. Driveways (5S,14S)
0.132	98	Prop. House (7S,9S)
0.053	98	Prop. Houses (5S)
0.170	98	Station Road (14S)
<b>4.032</b>		<b>TOTAL AREA</b>

**Summary for Subcatchment 9S: Lot 6**

Runoff = 1.04 cfs @ 12.20 hrs, Volume= 0.098 af, Depth= 1.13"

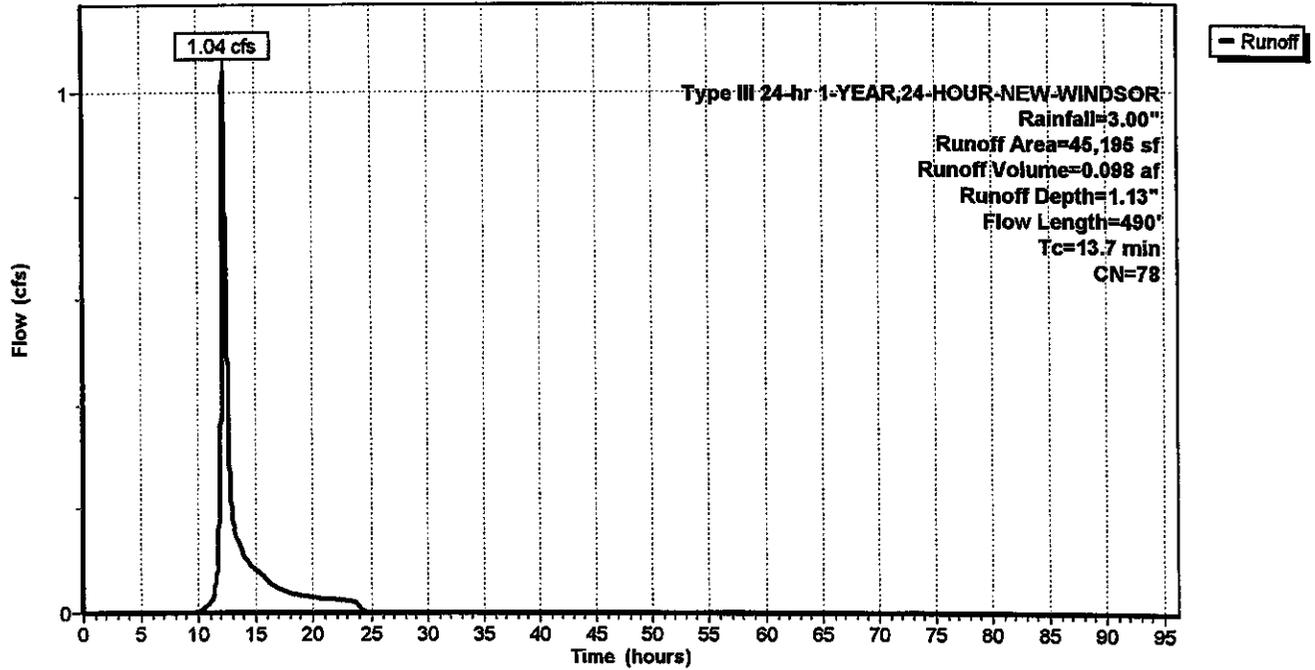
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-YEAR,24-HOUR-NEW-WINDSOR Rainfall=3.00"

Area (sf)	CN	Description
* 4,109	98	Prop. Driveway
* 3,450	98	Prop. House
* 35,991	74	Prop. Lawn, >75% Grass cover, Good, HSG C
1,645	73	Woods, Fair, HSG C
45,195	78	Weighted Average
37,636		Pervious Area
7,559		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0280	0.14		<b>Sheet Flow, Sheet1</b> Grass: Dense n= 0.240 P2= 3.75"
1.8	192	0.0635	1.76		<b>Shallow Concentrated Flow, Shallow1</b> Short Grass Pasture Kv= 7.0 fps
0.2	135	0.1128	9.69	19.38	<b>Channel Flow, Driveway Ditch</b> Area= 2.0 sf Perim= 4.5' r= 0.44' n= 0.030 Earth, clean & winding
0.1	18	0.0100	4.91	3.86	<b>Circular Channel (pipe), 12" Pipe</b> Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.1	45	0.1200	9.99	19.99	<b>Channel Flow, Driveway Ditch</b> Area= 2.0 sf Perim= 4.5' r= 0.44' n= 0.030 Earth, clean & winding
13.7	490	Total			

### Subcatchment 9S: Lot 6

#### Hydrograph



**Summary for Pond 10P: Lot 6 Dry Swale**

Inflow Area = 1.038 ac, 16.73% Impervious, Inflow Depth = 1.13" for 1-YEAR,24-HOUR-NEW-WINDSOR  
 Inflow = 1.04 cfs @ 12.20 hrs, Volume= 0.098 af  
 Outflow = 0.14 cfs @ 13.22 hrs, Volume= 0.098 af, Atten= 86%, Lag= 61.6 min  
 Primary = 0.14 cfs @ 13.22 hrs, Volume= 0.098 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 369.09' @ 13.22 hrs Surf.Area= 1,499 sf Storage= 1,649 cf

Plug-Flow detention time= 127.4 min calculated for 0.098 af (100% of inflow)  
 Center-of-Mass det. time= 127.4 min ( 987.3 - 859.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	367.50'	3,283 cf	8.00'W x 76.00'L x 2.50'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	364.00'	4.0" x 105.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 350.00' S= 0.1333 ' Cc= 0.900 n= 0.012
#2	Device 1	367.50'	4.000 in/hr Exfiltration over Wetted area
#3	Secondary	369.10'	2.5' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.14 cfs @ 13.22 hrs HW=369.09' (Free Discharge)

↑1=Culvert (Passes 0.14 cfs of 0.82 cfs potential flow)

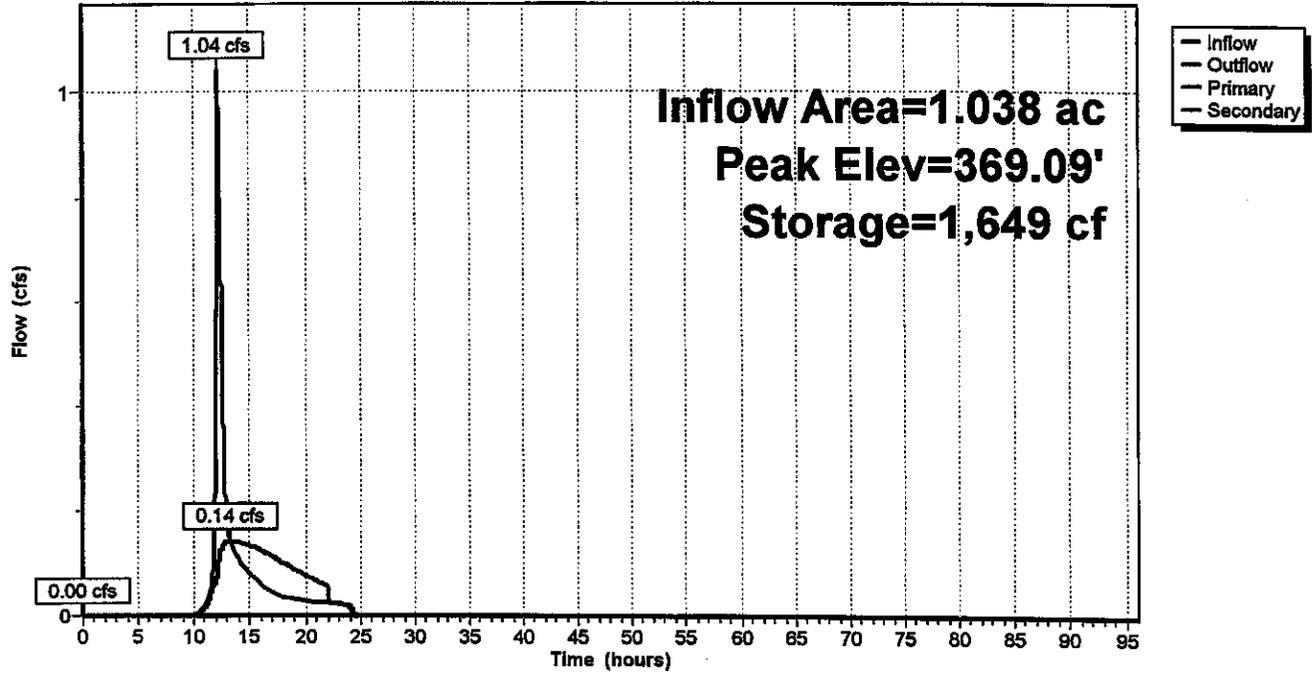
↑2=Exfiltration (Exfiltration Controls 0.14 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=367.50' (Free Discharge)

↑3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

### Pond 10P: Lot 6 Dry Swale

Hydrograph



### Summary for Reach 15R: Roadside Ditch (Lot6)

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af  
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min  
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

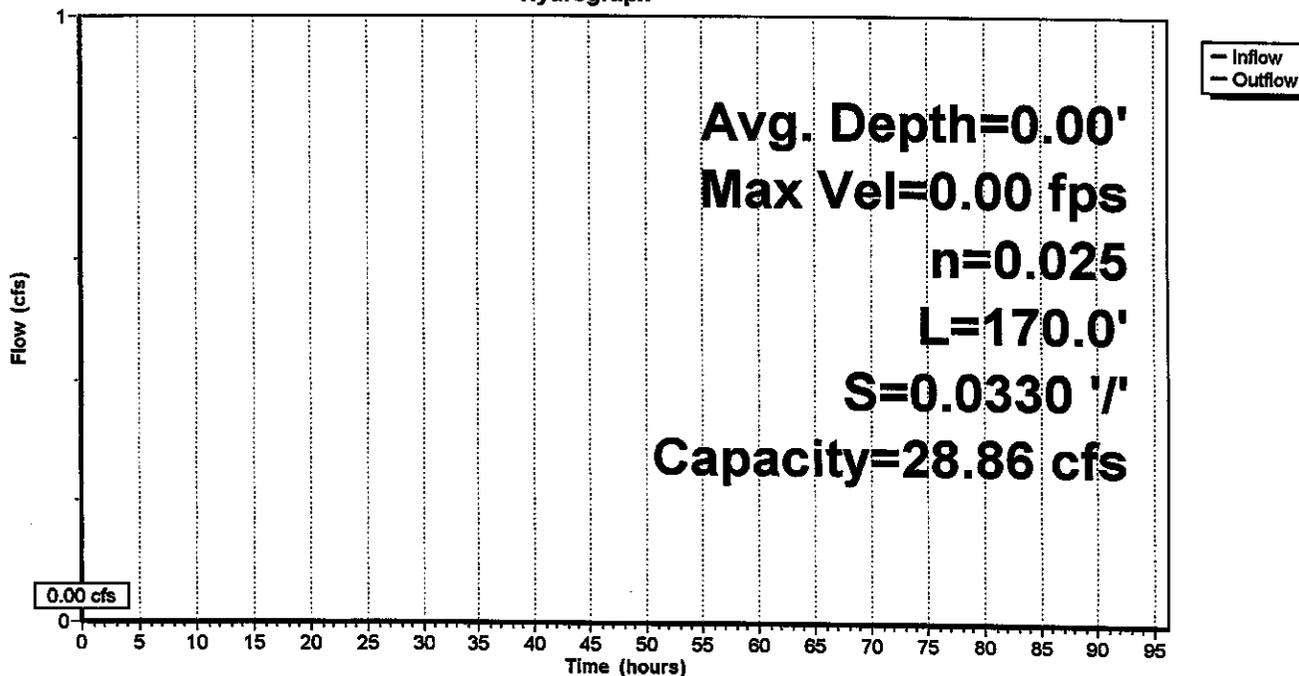
Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'  
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 28.86 cfs

1.00' x 1.00' deep channel, n= 0.025  
 Side Slope Z-value= 3.0 '/ Top Width= 7.00'  
 Length= 170.0' Slope= 0.0330 '/  
 Inlet Invert= 352.00', Outlet Invert= 346.39'



### Reach 15R: Roadside Ditch (Lot6)

Hydrograph



**Summary for Subcatchment 7S: Lot 7**

Runoff = 0.78 cfs @ 12.11 hrs, Volume= 0.059 af, Depth= 1.25"

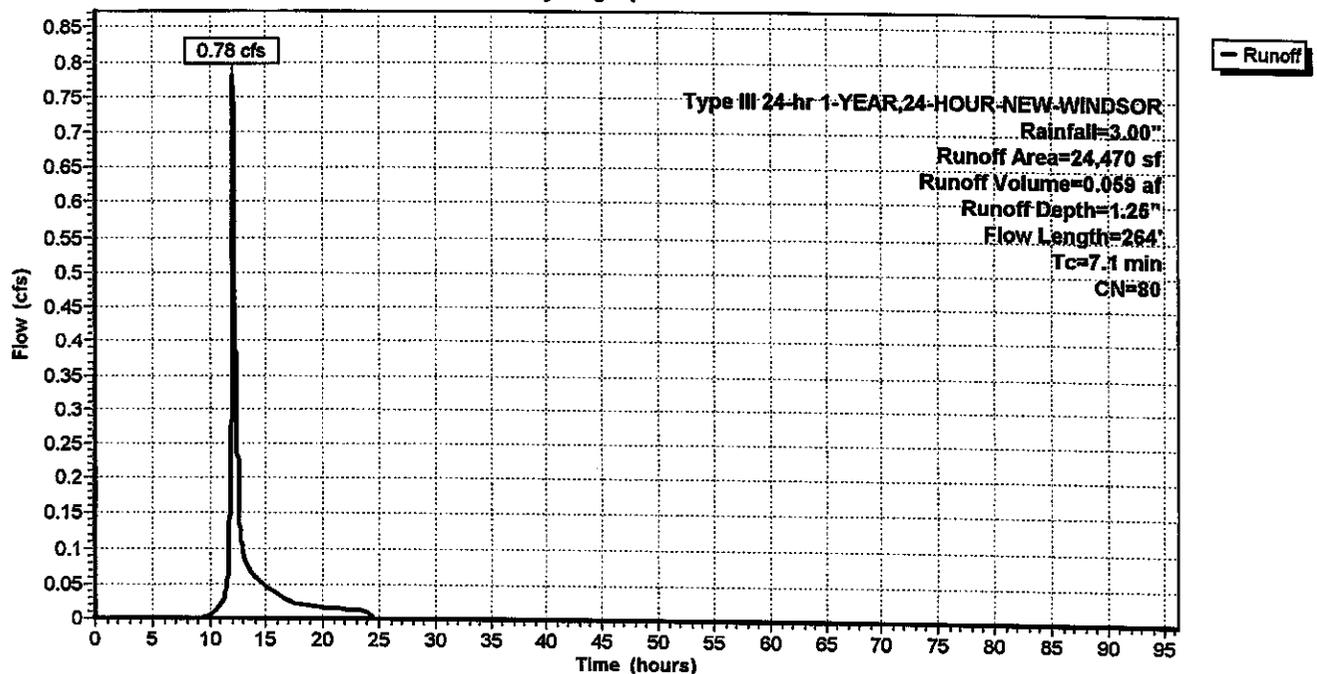
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-YEAR,24-HOUR-NEW-WINDSOR Rainfall=3.00"

Area (sf)	CN	Description
* 3,475	98	Prop. Driveway
* 2,300	98	Prop. House
* 18,695	74	Prop. Lawn, >75% Grass cover, Good, HSG C
24,470	80	Weighted Average
18,695		Pervious Area
5,775		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100	0.0550	0.28		Sheet Flow, Sheet1
1.0	120	0.0792	1.97		Grass: Short n= 0.150 P2= 3.75" Shallow Concentrated Flow, Shallow1
0.1	24	0.5000	4.95		Short Grass Pasture Kv= 7.0 fps Shallow Concentrated Flow, Shallow2
0.0	20	0.0200	6.95	5.46	Short Grass Pasture Kv= 7.0 fps Circular Channel (pipe), 12" Culvert Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
7.1	264	Total			

**Subcatchment 7S: Lot 7**

Hydrograph



**Summary for Pond 8P: Lot 7 Dry Swale**

Inflow Area = 0.562 ac, 23.60% Impervious, Inflow Depth = 1.25" for 1-YEAR,24-HOUR-NEW-WINDSOR  
 Inflow = 0.78 cfs @ 12.11 hrs, Volume= 0.059 af  
 Outflow = 0.10 cfs @ 12.93 hrs, Volume= 0.059 af, Atten= 87%, Lag= 49.1 min  
 Primary = 0.10 cfs @ 12.93 hrs, Volume= 0.059 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 362.71' @ 12.93 hrs Surf.Area= 1,067 sf Storage= 940 cf

Plug-Flow detention time= 96.3 min calculated for 0.059 af (100% of inflow)  
 Center-of-Mass det. time= 96.3 min ( 943.4 - 847.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	361.50'	2,759 cf	8.00'W x 62.50'L x 2.50'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	358.00'	4.0" x 35.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 352.50' S= 0.1571 '/' Cc= 0.900 n= 0.009 PVC, smooth interior
#2	Device 1	361.50'	4.000 in/hr Exfiltration over Horizontal area
#3	Secondary	363.00'	2.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.10 cfs @ 12.93 hrs HW=362.71' (Free Discharge)

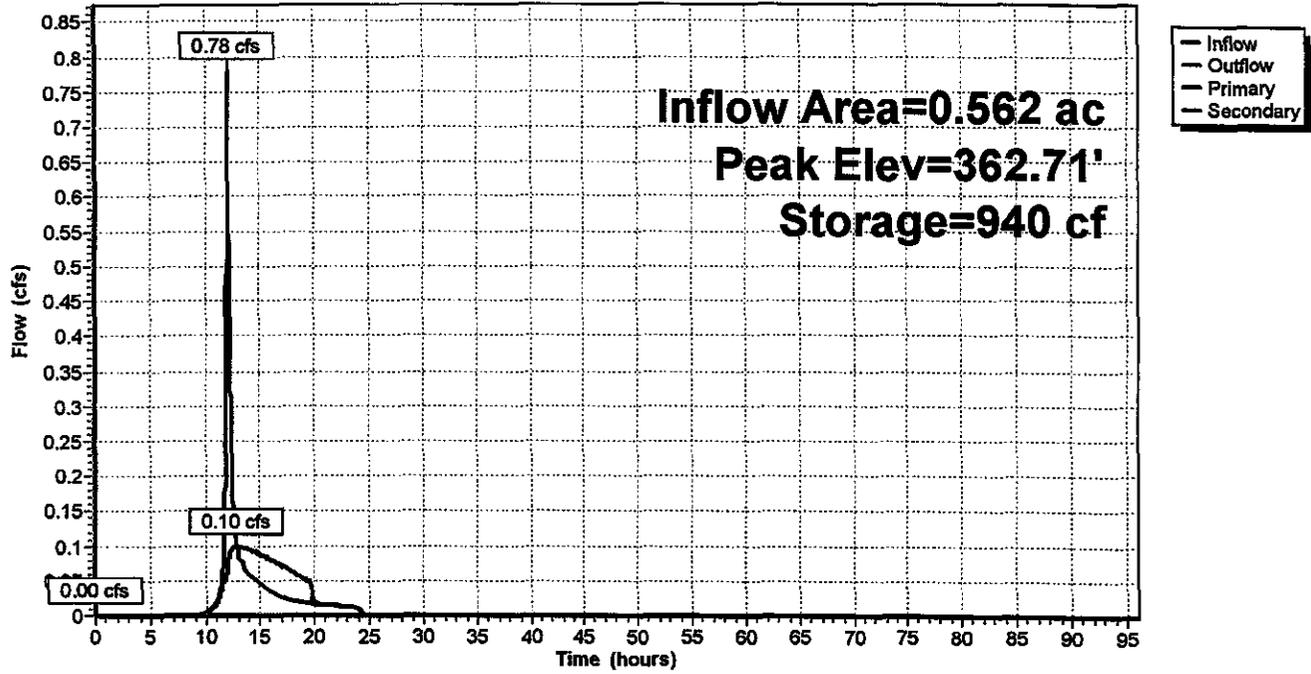
- ↑1=Culvert (Passes 0.10 cfs of 0.90 cfs potential flow)
- ↑2=Exfiltration (Exfiltration Controls 0.10 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=361.50' (Free Discharge)

- ↑3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

### Pond 8P: Lot 7 Dry Swale

#### Hydrograph



Summary for Reach 12R: Roadside Ditch (Lot7)

Inflow Area = 0.562 ac, 23.60% Impervious, Inflow Depth = 1.25" for 1-YEAR,24-HOUR-NEW-WINDSOR
Inflow = 0.10 cfs @ 12.93 hrs, Volume= 0.059 af
Outflow = 0.10 cfs @ 13.03 hrs, Volume= 0.059 af, Atten= 0%, Lag= 6.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.24 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 0.87 fps, Avg. Travel Time= 5.4 min

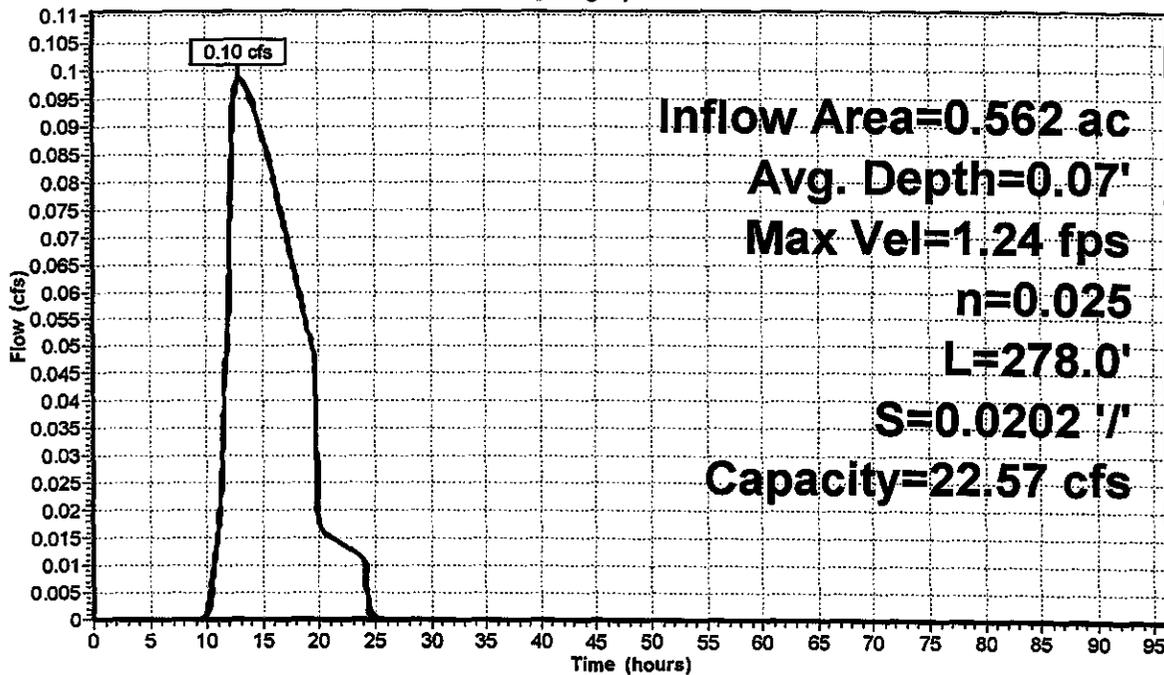
Peak Storage= 22 cf @ 12.97 hrs, Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 22.57 cfs

1.00' x 1.00' deep channel, n= 0.025
Side Slope Z-value= 3.0 ' Top Width= 7.00'
Length= 278.0' Slope= 0.0202 '
Inlet Invert= 352.00', Outlet Invert= 346.39'



Reach 12R: Roadside Ditch (Lot7)

Hydrograph



- Inflow
- Outflow

Inflow Area=0.562 ac
Avg. Depth=0.07'
Max Vel=1.24 fps
n=0.025
L=278.0'
S=0.0202 '
Capacity=22.57 cfs

**Summary for Subcatchment 5S: Lot 8**

Runoff = 0.48 cfs @ 12.17 hrs, Volume= 0.042 af, Depth= 1.19"

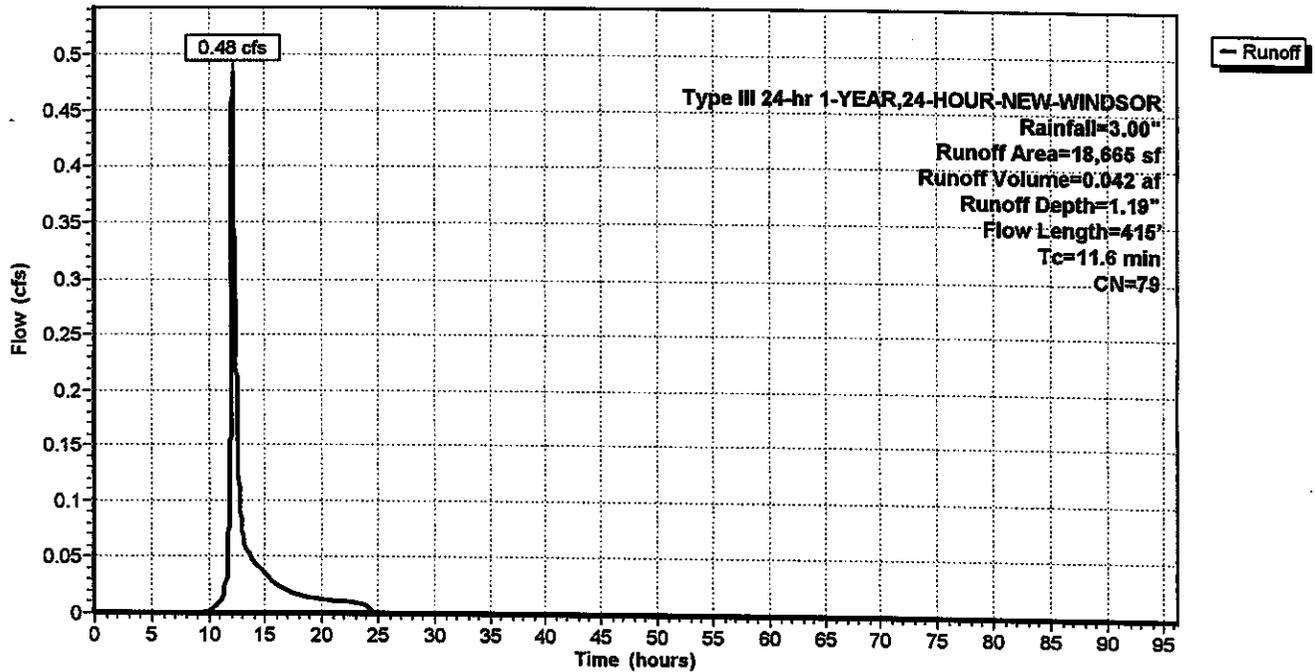
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-YEAR,24-HOUR-NEW-WINDSOR Rainfall=3.00"

Area (sf)	CN	Description
* 14,930	74	Prop. Lawn, >75% Grass cover, Good, HSG C
* 1,435	98	Prop. Driveways
* 2,300	98	Prop. Houses
18,665	79	Weighted Average
14,930		Pervious Area
3,735		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0625	0.20		Sheet Flow, Sheet1
3.1	300	0.0533	1.62		Grass: Dense n= 0.240 P2= 3.75"
0.1	15	0.3000	3.83		Shallow Concentrated Flow, Shallow1
					Short Grass Pasture Kv= 7.0 fps
					Shallow Concentrated Flow, Shallow2
					Short Grass Pasture Kv= 7.0 fps
11.6	415	Total			

**Subcatchment 5S: Lot 8**

Hydrograph



**Summary for Pond 6P: Lot 8 Dry Swale**

Inflow Area = 0.428 ac, 20.01% Impervious, Inflow Depth = 1.19" for 1-YEAR, 24-HOUR-NEW-WINDSOR  
 Inflow = 0.48 cfs @ 12.17 hrs, Volume= 0.042 af  
 Outflow = 0.08 cfs @ 12.86 hrs, Volume= 0.042 af, Atten= 83%, Lag= 41.3 min  
 Primary = 0.08 cfs @ 12.86 hrs, Volume= 0.042 af  
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 364.39' @ 12.86 hrs Surf.Area= 905 sf Storage= 621 cf

Plug-Flow detention time= 68.8 min calculated for 0.042 af (100% of inflow)  
 Center-of-Mass det. time= 68.8 min ( 923.5 - 854.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	363.50'	2,759 cf	8.00'W x 62.50'L x 2.50'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	360.00'	4.0" x 50.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 359.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior
#2	Device 1	363.50'	4.000 in/hr Exfiltration over Horizontal area
#3	Secondary	365.25'	2.5' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.08 cfs @ 12.86 hrs HW=364.39' (Free Discharge)

↑1=Culvert (Passes 0.08 cfs of 0.64 cfs potential flow)

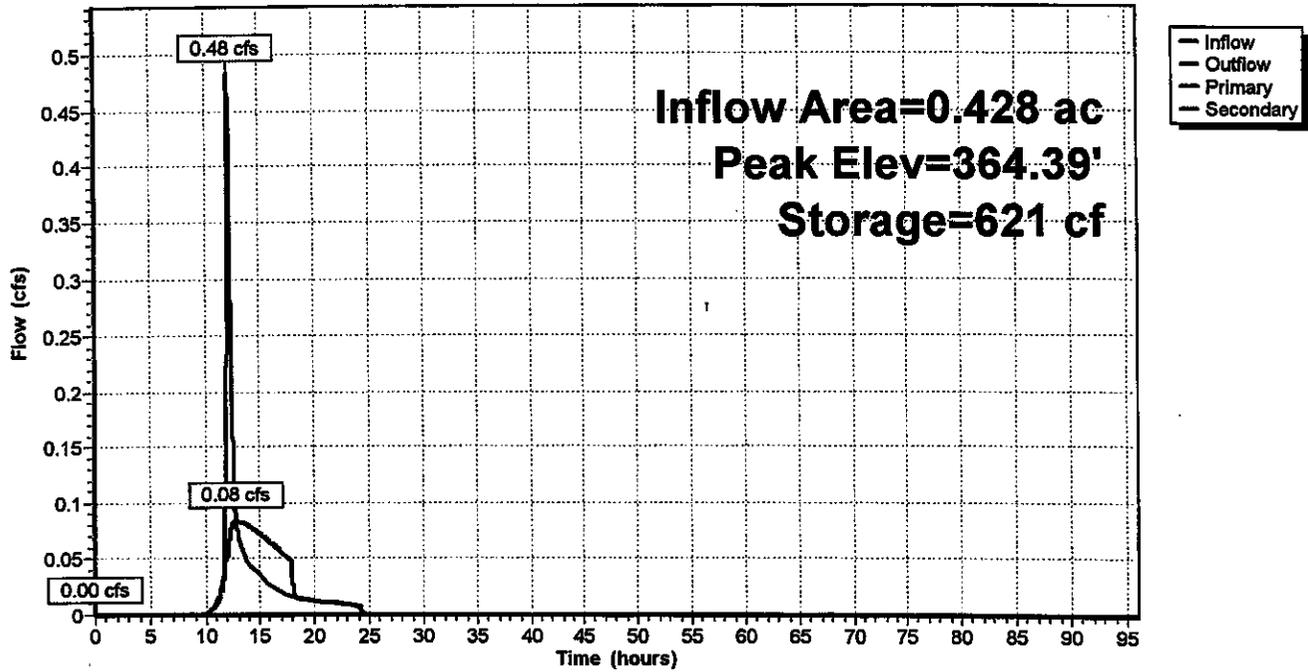
↑2=Exfiltration (Exfiltration Controls 0.08 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=363.50' (Free Discharge)

↑3=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

### Pond 6P: Lot 8 Dry Swale

#### Hydrograph



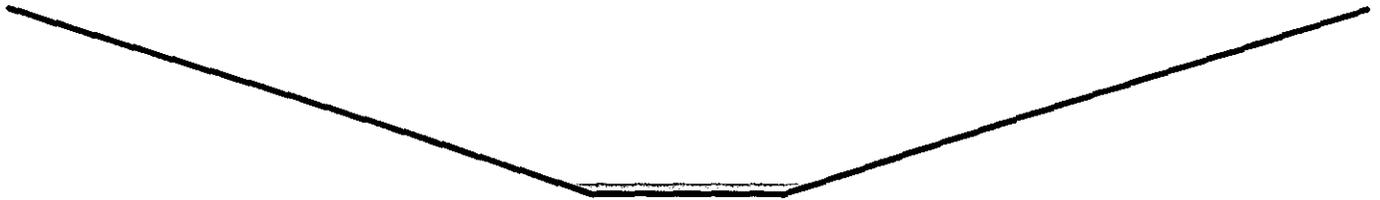
Summary for Reach 16R: Roadside Ditch (Lot8)

Inflow Area = 0.428 ac, 20.01% Impervious, Inflow Depth = 1.19" for 1-YEAR,24-HOUR-NEW-WINDSOR
Inflow = 0.08 cfs @ 12.86 hrs, Volume= 0.042 af
Outflow = 0.08 cfs @ 13.04 hrs, Volume= 0.042 af, Atten= 0%, Lag= 11.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.36 fps, Min. Travel Time= 6.1 min
Avg. Velocity = 0.88 fps, Avg. Travel Time= 9.4 min

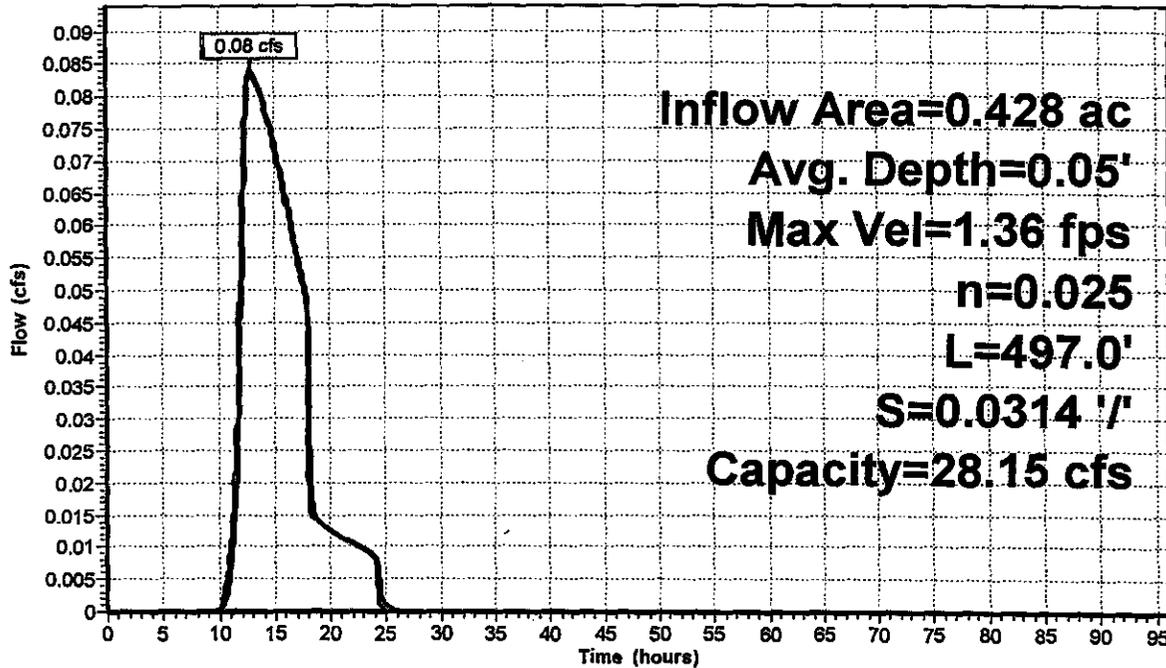
Peak Storage= 31 cf @ 12.94 hrs, Average Depth at Peak Storage= 0.05'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 28.15 cfs

1.00' x 1.00' deep channel, n= 0.025
Side Slope Z-value= 3.0 '/' Top Width= 7.00'
Length= 497.0' Slope= 0.0314 '/'
Inlet Invert= 362.00', Outlet Invert= 346.39'



Reach 16R: Roadside Ditch (Lot8)

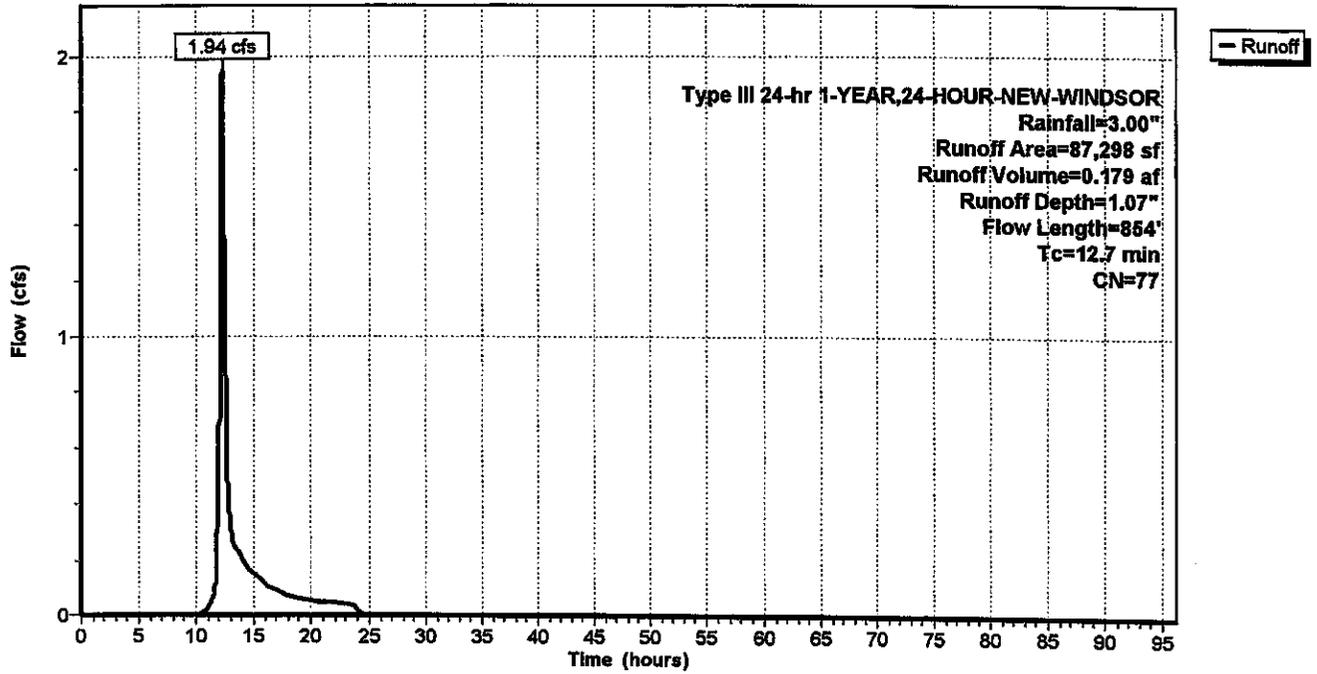
Hydrograph



Inflow Area=0.428 ac
Avg. Depth=0.05'
Max Vel=1.36 fps
n=0.025
L=497.0'
S=0.0314 '/'
Capacity=28.15 cfs

### Subcatchment 14S: Remaining

Hydrograph



**Summary for Subcatchment 14S: Remaining**

Runoff = 1.94 cfs @ 12.18 hrs, Volume= 0.179 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 1-YEAR,24-HOUR-NEW-WINDSOR Rainfall=3.00"

Area (sf)	CN	Description
* 7,402	98	Station Road
* 5,433	98	Prop. Driveways
7,805	73	Woods, Fair, HSG C
* 66,658	74	Prop. Lawn, >75% Grass cover, Good, HSG C
87,298	77	Weighted Average
74,463		Pervious Area
12,835		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0550	0.19		<b>Sheet Flow, Sheet1</b>
					Grass: Dense n= 0.240 P2= 3.75"
2.6	267	0.0581	1.69		<b>Shallow Concentrated Flow, Shallow1</b>
					Short Grass Pasture Kv= 7.0 fps
0.1	12	0.4000	3.16		<b>Shallow Concentrated Flow, Shallow2</b>
					Woodland Kv= 5.0 fps
0.8	352	0.0323	7.15	28.61	<b>Channel Flow, Roadside Ditch</b>
					Area= 4.0 sf Perim= 7.3' r= 0.55' n= 0.025
0.2	46	0.0050	4.40	5.40	<b>Circular Channel (pipe), 15" Pipe</b>
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
0.2	77	0.0323	7.15	28.61	<b>Channel Flow, Roadside Ditch</b>
					Area= 4.0 sf Perim= 7.3' r= 0.55' n= 0.025
12.7	854	Total			

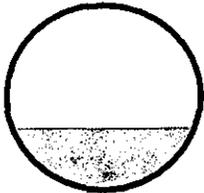
Summary for Reach 11R: 18" Pipe - Post

Inflow Area = 4.032 ac, 17.03% Impervious, Inflow Depth = 1.12" for 1-YEAR,24-HOUR-NEW-WINDSOR  
Inflow = 2.16 cfs @ 12.19 hrs, Volume= 0.377 af  
Outflow = 2.16 cfs @ 12.19 hrs, Volume= 0.377 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
Max. Velocity= 4.33 fps, Min. Travel Time= 0.1 min  
Avg. Velocity = 2.08 fps, Avg. Travel Time= 0.3 min

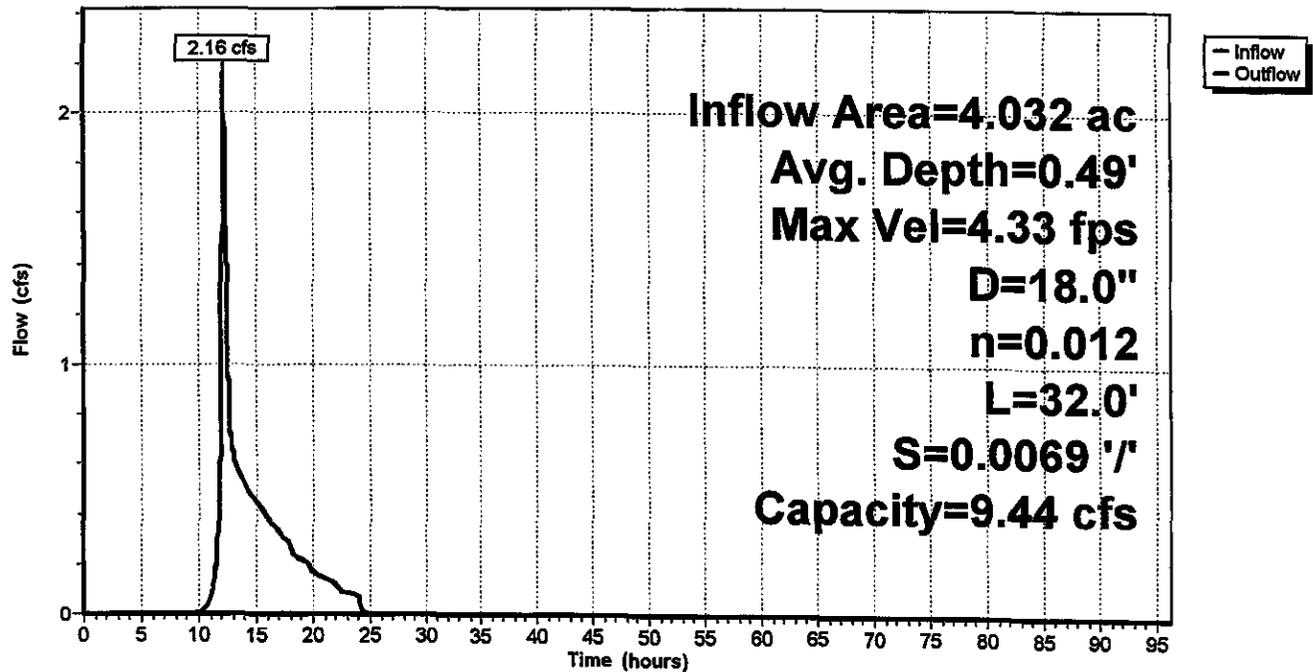
Peak Storage= 16 cf @ 12.19 hrs, Average Depth at Peak Storage= 0.49'  
Defined Flood Depth= 350.10', Capacity at Flood Depth= -9,191.99 cfs  
Bank-Full Depth= 1.50', Capacity at Bank-Full= 9.44 cfs

18.0" Diameter Pipe, n= 0.012  
Length= 32.0' Slope= 0.0069 '/'  
Inlet Invert= 346.39', Outlet Invert= 346.17'



Reach 11R: 18" Pipe - Post

Hydrograph



**Summary for Subcatchment 9S: Lot 6**

Runoff = 2.58 cfs @ 12.19 hrs, Volume= 0.234 af, Depth= 2.71"

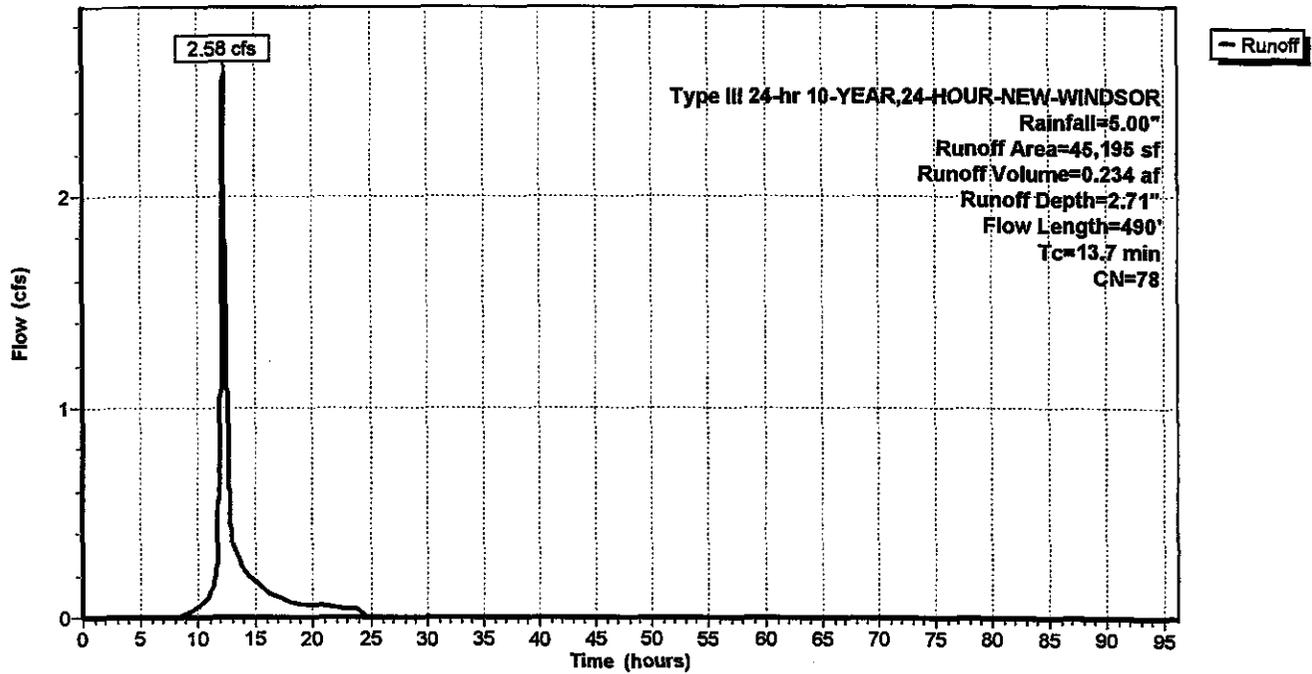
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-YEAR,24-HOUR-NEW-WINDSOR Rainfall=5.00"

Area (sf)	CN	Description
* 4,109	98	Prop. Driveway
* 3,450	98	Prop. House
* 35,991	74	Prop. Lawn, >75% Grass cover, Good, HSG C
1,645	73	Woods, Fair, HSG C
45,195	78	Weighted Average
37,636		Pervious Area
7,559		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0280	0.14		Sheet Flow, Sheet1
1.8	192	0.0635	1.76		Grass: Dense n= 0.240 P2= 3.75" Shallow Concentrated Flow, Shallow1
0.2	135	0.1128	9.69	19.38	Short Grass Pasture Kv= 7.0 fps Channel Flow, Driveway Ditch
0.1	18	0.0100	4.91	3.86	Area= 2.0 sf Perim= 4.5' r= 0.44' n= 0.030 Earth, clean & winding Circular Channel (pipe), 12" Pipe
0.1	45	0.1200	9.99	19.99	Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Channel Flow, Driveway Ditch
					Area= 2.0 sf Perim= 4.5' r= 0.44' n= 0.030 Earth, clean & winding
13.7	490	Total			

### Subcatchment 9S: Lot 6

Hydrograph



**Summary for Pond 10P: Lot 6 Dry Swale**

Inflow Area = 1.038 ac, 16.73% Impervious, Inflow Depth = 2.71" for 10-YEAR,24-HOUR-NEW-WINDS  
 Inflow = 2.58 cfs @ 12.19 hrs, Volume= 0.234 af  
 Outflow = 2.00 cfs @ 12.31 hrs, Volume= 0.234 af, Atten= 23%, Lag= 7.3 min  
 Primary = 0.17 cfs @ 12.31 hrs, Volume= 0.145 af  
 Secondary = 1.83 cfs @ 12.31 hrs, Volume= 0.090 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 369.53' @ 12.31 hrs Surf.Area= 1,780 sf Storage= 2,375 cf

Plug-Flow detention time= 91.1 min calculated for 0.234 af (100% of inflow)  
 Center-of-Mass det. time= 91.1 min ( 925.3 - 834.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	367.50'	3,283 cf	8.00'W x 76.00'L x 2.50'H Prismatic Z=3.0

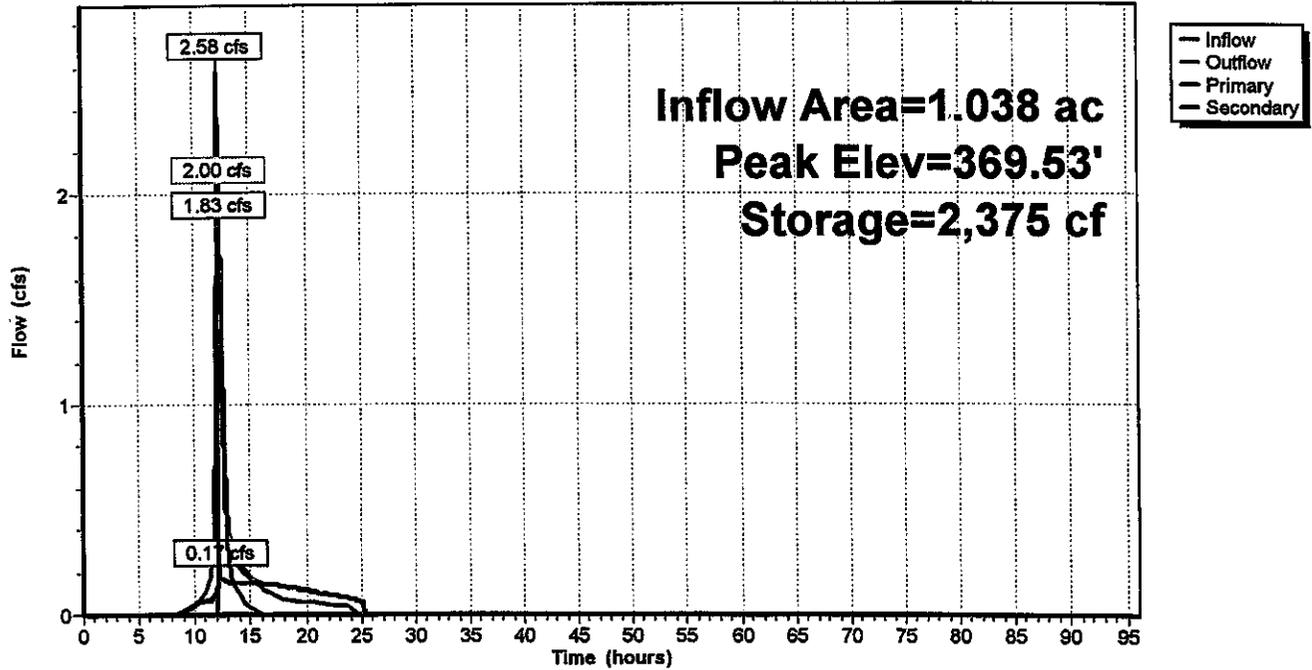
Device	Routing	Invert	Outlet Devices
#1	Primary	364.00'	4.0" x 105.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 350.00' S= 0.1333 ' Cc= 0.900 n= 0.012
#2	Device 1	367.50'	4.000 in/hr Exfiltration over Wetted area
#3	Secondary	369.10'	2.5' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.17 cfs @ 12.31 hrs HW=369.53' (Free Discharge)  
 ↑1=Culvert (Passes 0.17 cfs of 0.83 cfs potential flow)  
 ↑2=Exfiltration (Exfiltration Controls 0.17 cfs)

Secondary OutFlow Max=1.82 cfs @ 12.31 hrs HW=369.53' (Free Discharge)  
 ↑3=Broad-Crested Rectangular Weir (Weir Controls 1.82 cfs @ 1.69 fps)

Pond 10P: Lot 6 Dry Swale

Hydrograph



Summary for Reach 15R: Roadside Ditch (Lot6)

Inflow = 1.83 cfs @ 12.31 hrs, Volume= 0.090 af  
Outflow = 1.82 cfs @ 12.34 hrs, Volume= 0.090 af, Atten= 0%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
Max. Velocity= 3.52 fps, Min. Travel Time= 0.8 min  
Avg. Velocity = 1.51 fps, Avg. Travel Time= 1.9 min

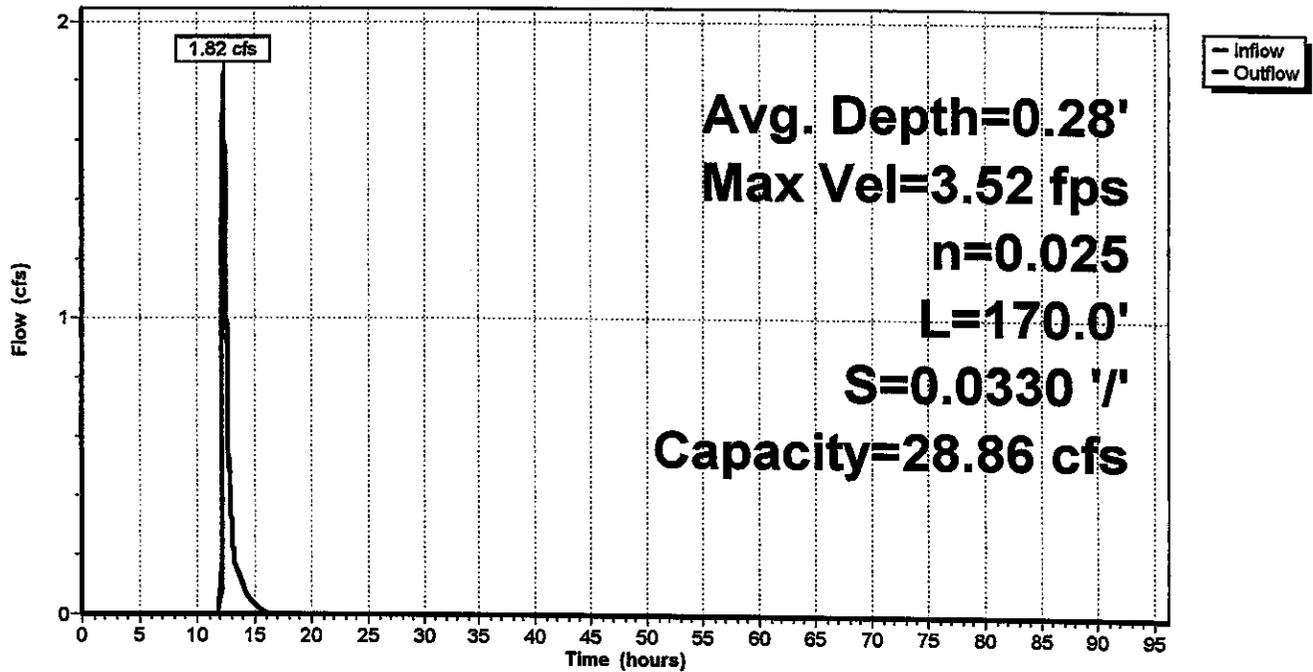
Peak Storage= 88 cf @ 12.32 hrs, Average Depth at Peak Storage= 0.28'  
Bank-Full Depth= 1.00', Capacity at Bank-Full= 28.86 cfs

1.00' x 1.00' deep channel, n= 0.025  
Side Slope Z-value= 3.0 ' Top Width= 7.00'  
Length= 170.0' Slope= 0.0330 ' / '  
Inlet Invert= 352.00', Outlet Invert= 346.39'



Reach 15R: Roadside Ditch (Lot6)

Hydrograph



**Summary for Subcatchment 7S: Lot 7**

Runoff = 1.83 cfs @ 12.10 hrs, Volume= 0.135 af, Depth= 2.89"

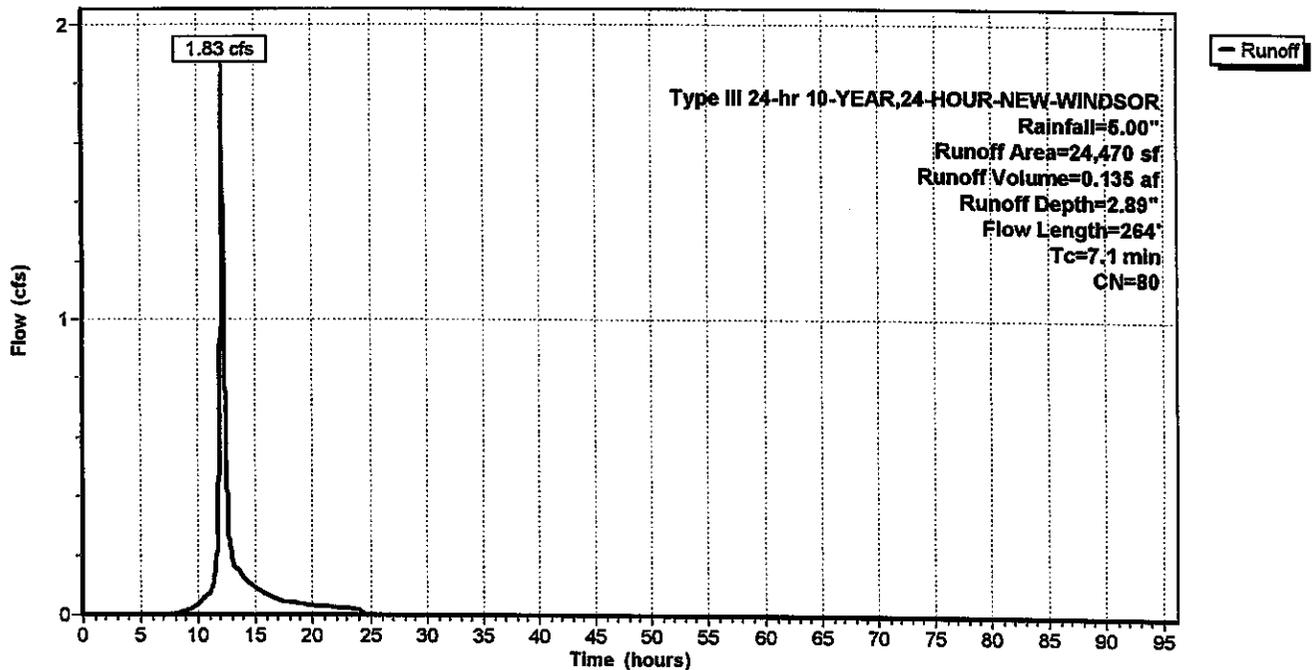
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-YEAR,24-HOUR-NEW-WINDSOR Rainfall=5.00"

Area (sf)	CN	Description
* 3,475	98	Prop. Driveway
* 2,300	98	Prop. House
* 18,695	74	Prop. Lawn, >75% Grass cover, Good, HSG C
24,470	80	Weighted Average
18,695		Pervious Area
5,775		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100	0.0550	0.28		Sheet Flow, Sheet1 Grass: Short n= 0.150 P2= 3.75"
1.0	120	0.0792	1.97		Shallow Concentrated Flow, Shallow1 Short Grass Pasture Kv= 7.0 fps
0.1	24	0.5000	4.95		Shallow Concentrated Flow, Shallow2 Short Grass Pasture Kv= 7.0 fps
0.0	20	0.0200	6.95	5.46	Circular Channel (pipe), 12" Culvert Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
7.1	264	Total			

**Subcatchment 7S: Lot 7**

Hydrograph



**Summary for Pond 8P: Lot 7 Dry Swale**

Inflow Area = 0.562 ac, 23.60% Impervious, Inflow Depth = 2.89" for 10-YEAR,24-HOUR-NEW-WINDS  
 Inflow = 1.83 cfs @ 12.10 hrs, Volume= 0.135 af  
 Outflow = 0.98 cfs @ 12.26 hrs, Volume= 0.135 af, Atten= 47%, Lag= 9.4 min  
 Primary = 0.13 cfs @ 12.26 hrs, Volume= 0.099 af  
 Secondary = 0.85 cfs @ 12.26 hrs, Volume= 0.037 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 363.30' @ 12.26 hrs Surf.Area= 1,380 sf Storage= 1,661 cf

Plug-Flow detention time= 95.9 min calculated for 0.135 af (100% of inflow)  
 Center-of-Mass det. time= 95.9 min ( 918.7 - 822.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	361.50'	2,759 cf	8.00'W x 62.50'L x 2.50'H Prismaoid Z=3.0

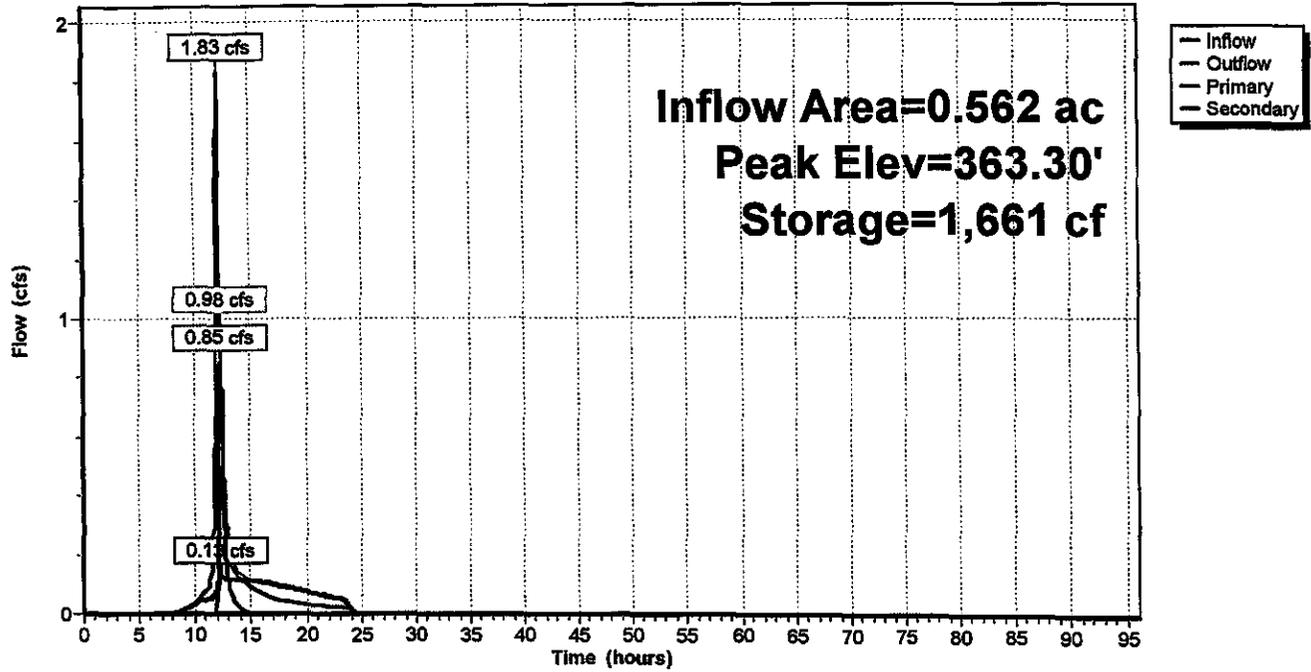
Device	Routing	Invert	Outlet Devices
#1	Primary	358.00'	4.0" x 35.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 352.50' S= 0.1571 ' Cc= 0.900 n= 0.009 PVC, smooth interior
#2	Device 1	361.50'	4.000 in/hr Exfiltration over Horizontal area
#3	Secondary	363.00'	2.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.13 cfs @ 12.26 hrs HW=363.30' (Free Discharge)  
 ↑1=Culvert (Passes 0.13 cfs of 0.95 cfs potential flow)  
 ↑2=Exfiltration (Exfiltration Controls 0.13 cfs)

Secondary OutFlow Max=0.85 cfs @ 12.26 hrs HW=363.30' (Free Discharge)  
 ↑3=Broad-Crested Rectangular Weir (Weir Controls 0.85 cfs @ 1.39 fps)

### Pond 8P: Lot 7 Dry Swale

Hydrograph



Summary for Reach 12R: Roadside Ditch (Lot7)

Inflow Area = 0.562 ac, 23.60% Impervious, Inflow Depth = 2.89" for 10-YEAR,24-HOUR-NEW-WINDS  
 Inflow = 0.98 cfs @ 12.26 hrs, Volume= 0.135 af  
 Outflow = 0.96 cfs @ 12.32 hrs, Volume= 0.135 af, Atten= 1%, Lag= 3.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Max. Velocity= 2.47 fps, Min. Travel Time= 1.9 min  
 Avg. Velocity = 1.07 fps, Avg. Travel Time= 4.3 min

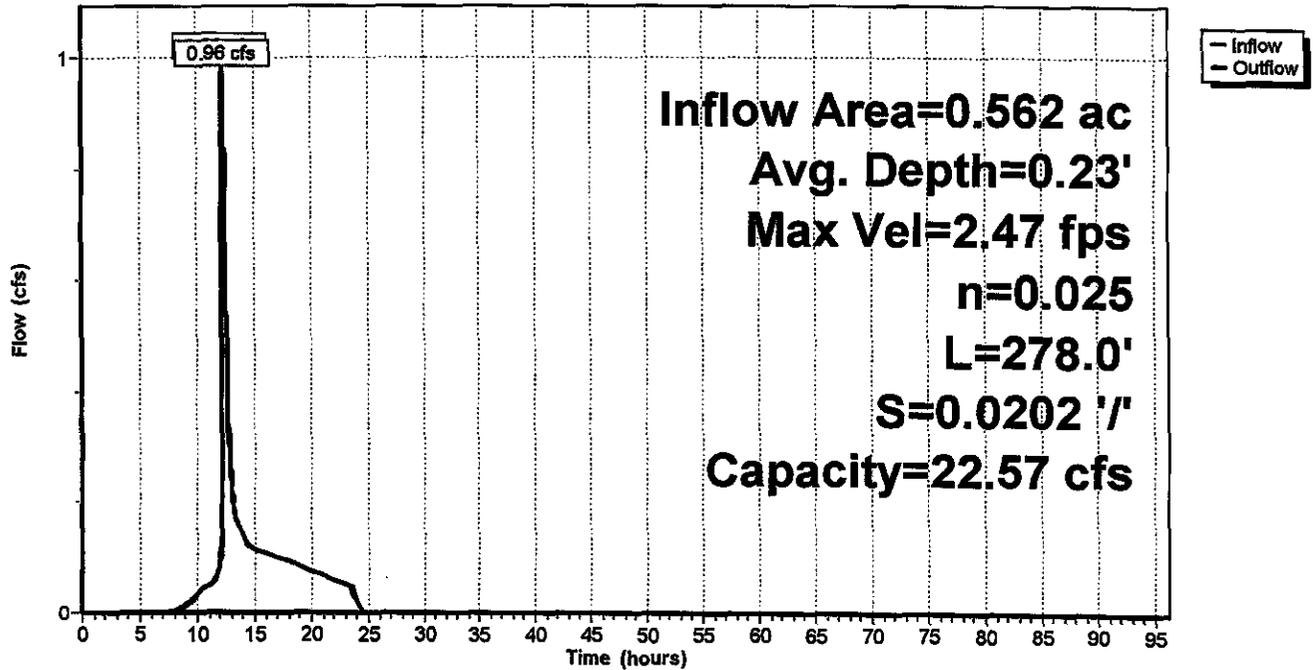
Peak Storage= 108 cf @ 12.29 hrs, Average Depth at Peak Storage= 0.23'  
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 22.57 cfs

1.00' x 1.00' deep channel, n= 0.025  
 Side Slope Z-value= 3.0 ' / ' Top Width= 7.00'  
 Length= 278.0' Slope= 0.0202 ' / '  
 Inlet Invert= 352.00', Outlet Invert= 346.39'



Reach 12R: Roadside Ditch (Lot7)

Hydrograph



**Summary for Subcatchment 5S: Lot 8**

Runoff = 1.17 cfs @ 12.16 hrs, Volume= 0.100 af, Depth= 2.80"

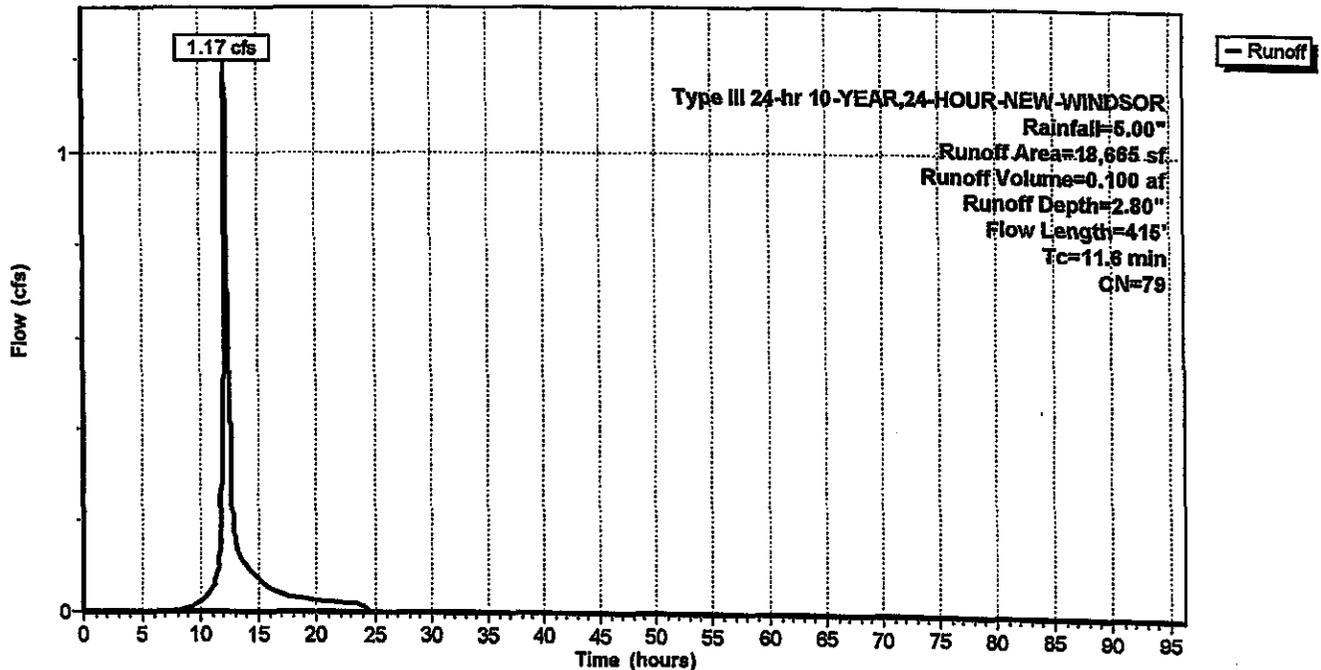
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-YEAR,24-HOUR-NEW-WINDSOR Rainfall=5.00"

Area (sf)	CN	Description
* 14,930	74	Prop. Lawn, >75% Grass cover, Good, HSG C
* 1,435	98	Prop. Driveways
* 2,300	98	Prop. Houses
18,665	79	Weighted Average
14,930		Pervious Area
3,735		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0625	0.20		Sheet Flow, Sheet1
					Grass: Dense n= 0.240 P2= 3.75"
3.1	300	0.0533	1.62		Shallow Concentrated Flow, Shallow1
					Short Grass Pasture Kv= 7.0 fps
0.1	15	0.3000	3.83		Shallow Concentrated Flow, Shallow2
					Short Grass Pasture Kv= 7.0 fps
11.6	415	Total			

**Subcatchment 5S: Lot 8**

Hydrograph



**Summary for Pond 6P: Lot 8 Dry Swale**

Inflow Area = 0.428 ac, 20.01% Impervious, Inflow Depth = 2.80" for 10-YEAR,24-HOUR-NEW-WIND:  
 Inflow = 1.17 cfs @ 12.16 hrs, Volume= 0.100 af  
 Outflow = 0.28 cfs @ 12.63 hrs, Volume= 0.100 af, Atten= 76%, Lag= 28.4 min  
 Primary = 0.13 cfs @ 12.63 hrs, Volume= 0.094 af  
 Secondary = 0.15 cfs @ 12.63 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 365.33' @ 12.63 hrs Surf.Area= 1,397 sf Storage= 1,702 cf

Plug-Flow detention time= 131.5 min calculated for 0.100 af (100% of inflow)  
 Center-of-Mass det. time= 131.5 min ( 961.1 - 829.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	363.50'	2,759 cf	8.00'W x 62.50'L x 2.50'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	360.00'	4.0" x 50.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 359.50' S= 0.0100 '/ Cc= 0.900 n= 0.010 PVC, smooth interior
#2	Device 1	363.50'	4.000 in/hr Exfiltration over Horizontal area
#3	Secondary	365.25'	2.5' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.13 cfs @ 12.63 hrs HW=365.33' (Free Discharge)

↑1=Culvert (Passes 0.13 cfs of 0.70 cfs potential flow)

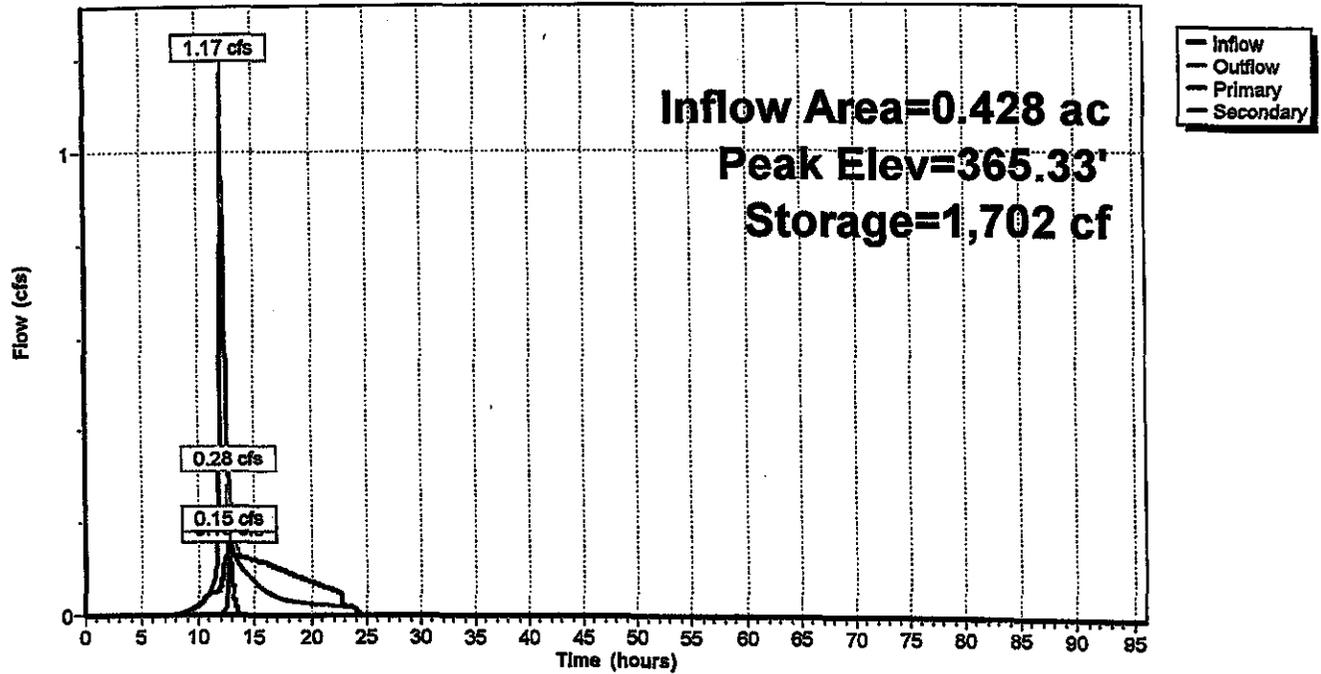
↑2=Exfiltration (Exfiltration Controls 0.13 cfs)

Secondary OutFlow Max=0.15 cfs @ 12.63 hrs HW=365.33' (Free Discharge)

↑3=Broad-Crested Rectangular Weir (Weir Controls 0.15 cfs @ 0.72 fps)

### Pond 6P: Lot 8 Dry Swale

#### Hydrograph



Summary for Reach 16R: Roadside Ditch (Lot8)

Inflow Area = 0.428 ac, 20.01% Impervious, Inflow Depth = 2.80" for 10-YEAR,24-HOUR-NEW-WIND  
 Inflow = 0.28 cfs @ 12.63 hrs, Volume= 0.100 af  
 Outflow = 0.27 cfs @ 12.76 hrs, Volume= 0.100 af, Atten= 3%, Lag= 7.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Max. Velocity= 1.99 fps, Min. Travel Time= 4.2 min  
 Avg. Velocity = 1.15 fps, Avg. Travel Time= 7.2 min

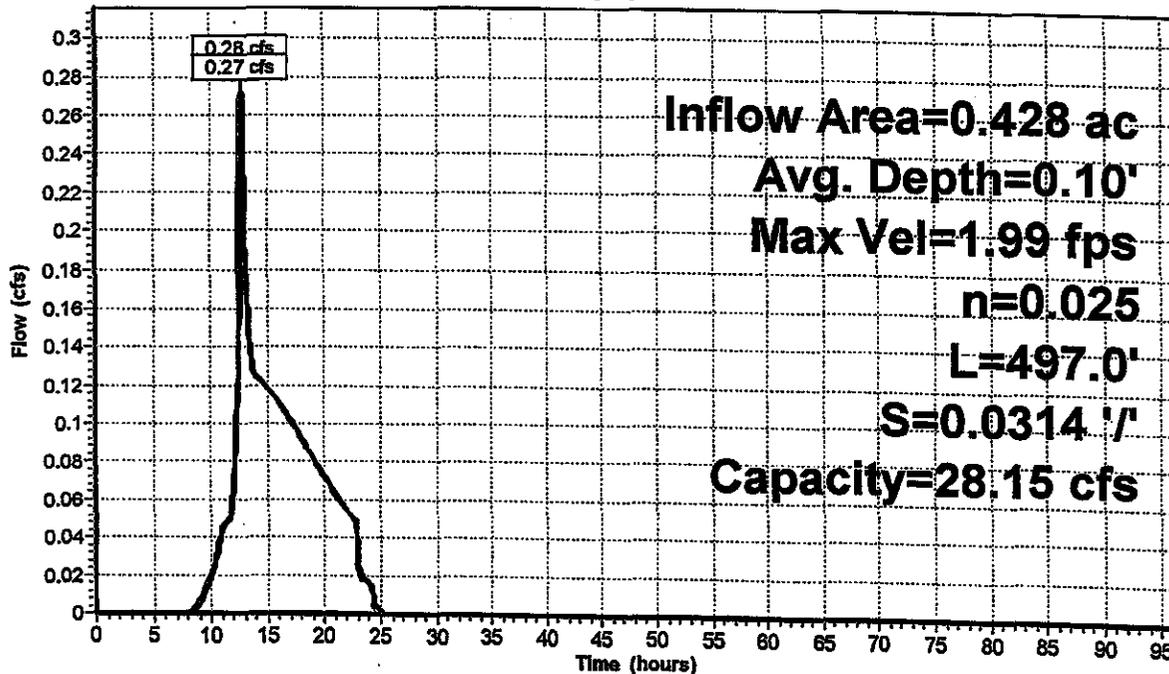
Peak Storage= 68 cf @ 12.69 hrs, Average Depth at Peak Storage= 0.10'  
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 28.15 cfs

1.00' x 1.00' deep channel, n= 0.025  
 Side Slope Z-value= 3.0 ' Top Width= 7.00'  
 Length= 497.0' Slope= 0.0314 '/  
 Inlet Invert= 362.00', Outlet Invert= 346.39'



Reach 16R: Roadside Ditch (Lot8)

Hydrograph



**Summary for Subcatchment 14S: Remaining**

Runoff = 4.96 cfs @ 12.18 hrs, Volume= 0.438 af, Depth= 2.62"

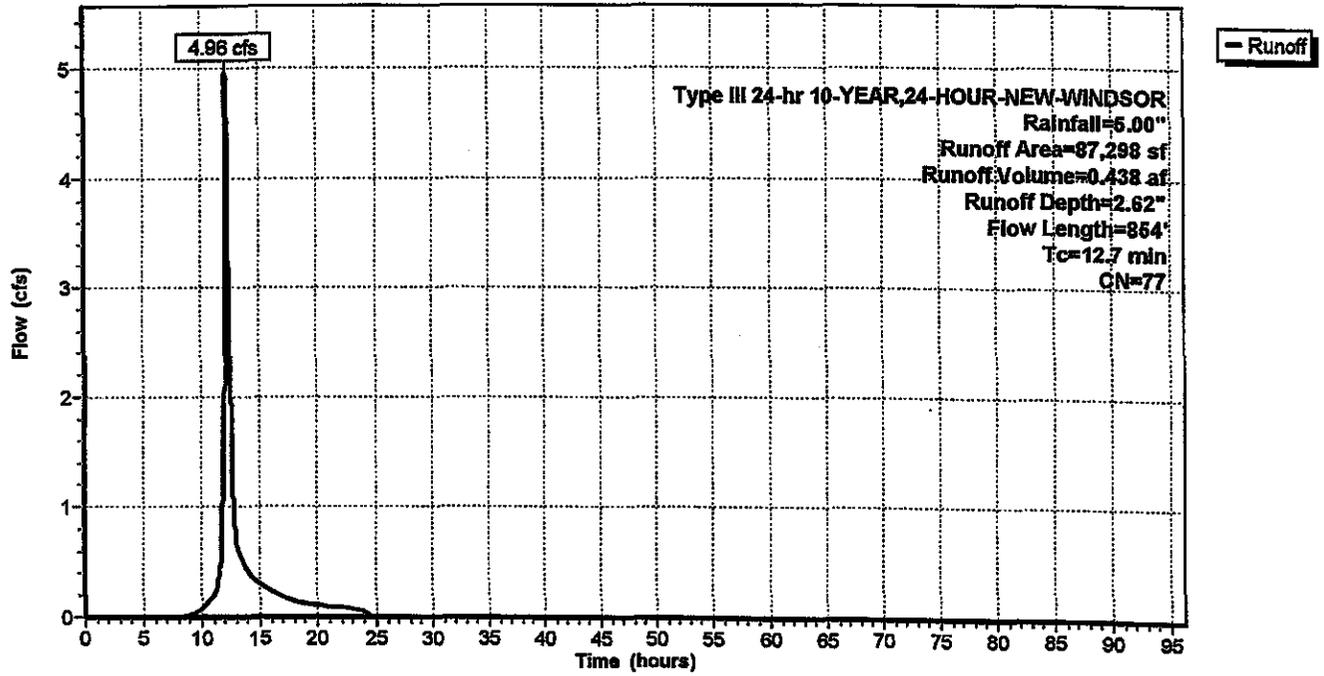
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 10-YEAR,24-HOUR-NEW-WINDSOR Rainfall=5.00"

Area (sf)	CN	Description
* 7,402	98	Station Road
* 5,433	98	Prop. Driveways
7,805	73	Woods, Fair, HSG C
* 66,658	74	Prop. Lawn, >75% Grass cover, Good, HSG C
87,298	77	Weighted Average
74,463		Pervious Area
12,835		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0550	0.19		Sheet Flow, Sheet1 Grass: Dense n= 0.240 P2= 3.75"
2.6	267	0.0581	1.69		Shallow Concentrated Flow, Shallow1 Short Grass Pasture Kv= 7.0 fps
0.1	12	0.4000	3.16		Shallow Concentrated Flow, Shallow2 Woodland Kv= 5.0 fps
0.8	352	0.0323	7.15	28.61	Channel Flow, Roadside Ditch Area= 4.0 sf Perim= 7.3' r= 0.55' n= 0.025
0.2	46	0.0050	4.40	5.40	Circular Channel (pipe), 15" Pipe Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
0.2	77	0.0323	7.15	28.61	Channel Flow, Roadside Ditch Area= 4.0 sf Perim= 7.3' r= 0.55' n= 0.025
12.7	854	Total			

### Subcatchment 14S: Remaining

Hydrograph



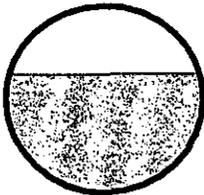
Summary for Reach 11R: 18" Pipe - Post

Inflow Area = 4.032 ac, 17.03% Impervious, Inflow Depth = 2.70" for 10-YEAR, 24-HOUR-NEW-WIND  
 Inflow = 6.83 cfs @ 12.27 hrs, Volume= 0.908 af  
 Outflow = 6.83 cfs @ 12.27 hrs, Volume= 0.908 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Max. Velocity= 5.82 fps, Min. Travel Time= 0.1 min  
 Avg. Velocity = 2.55 fps, Avg. Travel Time= 0.2 min

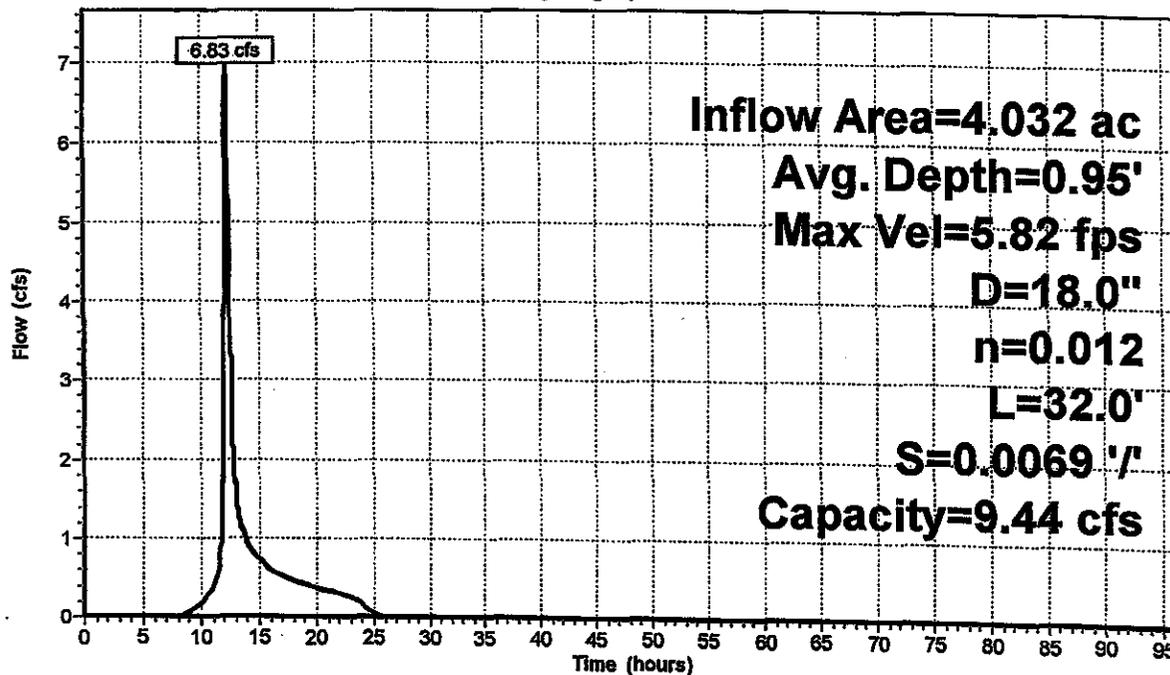
Peak Storage= 38 cf @ 12.27 hrs, Average Depth at Peak Storage= 0.95'  
 Defined Flood Depth= 350.10', Capacity at Flood Depth= -9,191.99 cfs  
 Bank-Full Depth= 1.50', Capacity at Bank-Full= 9.44 cfs

18.0" Diameter Pipe, n= 0.012  
 Length= 32.0' Slope= 0.0069 '/'  
 Inlet Invert= 346.39', Outlet Invert= 346.17'



Reach 11R: 18" Pipe - Post

Hydrograph



**Summary for Subcatchment 9S: Lot 6**

Runoff = 4.93 cfs @ 12.19 hrs, Volume= 0.450 af, Depth= 5.21"

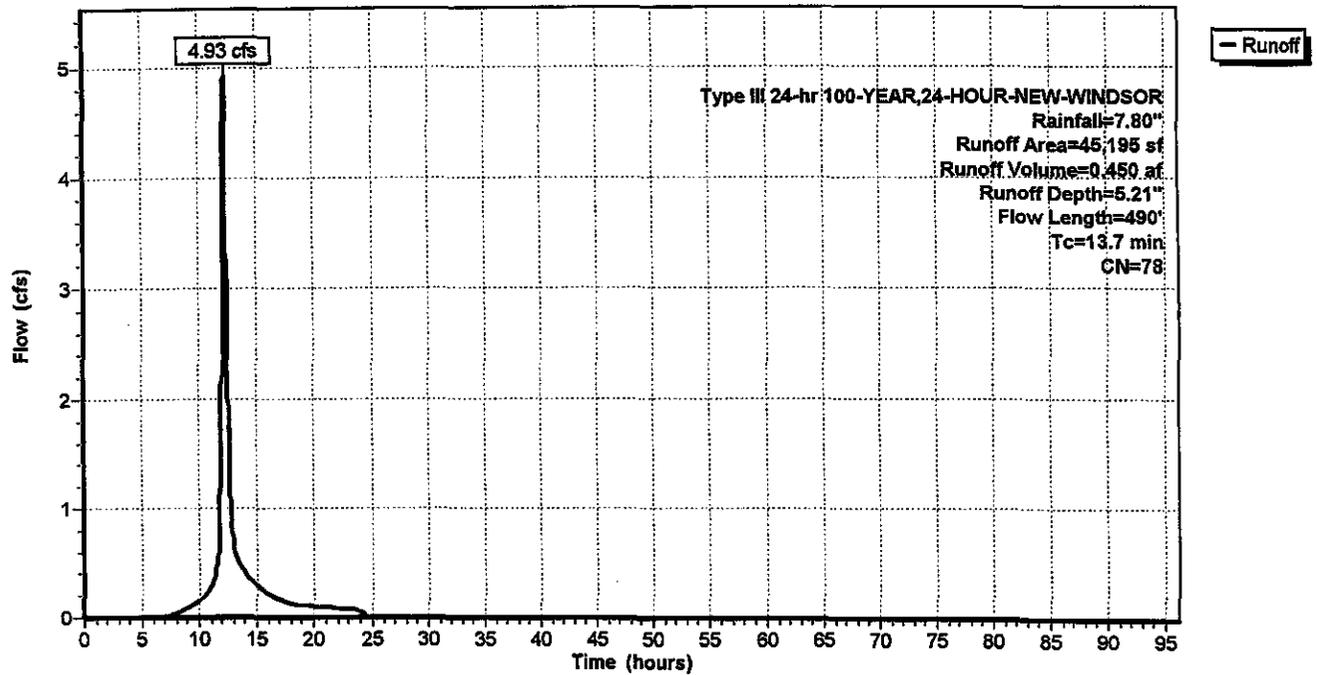
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-YEAR,24-HOUR-NEW-WINDSOR Rainfall=7.80"

Area (sf)	CN	Description
* 4,109	98	Prop. Driveway
* 3,450	98	Prop. House
* 35,991	74	Prop. Lawn, >75% Grass cover, Good, HSG C
1,645	73	Woods, Fair, HSG C
45,195	78	Weighted Average
37,636		Pervious Area
7,559		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0280	0.14		<b>Sheet Flow, Sheet1</b> Grass: Dense n= 0.240 P2= 3.75"
1.8	192	0.0635	1.76		<b>Shallow Concentrated Flow, Shallow1</b> Short Grass Pasture Kv= 7.0 fps
0.2	135	0.1128	9.69	19.38	<b>Channel Flow, Driveway Ditch</b> Area= 2.0 sf Perim= 4.5' r= 0.44' n= 0.030 Earth, clean & winding
0.1	18	0.0100	4.91	3.86	<b>Circular Channel (pipe), 12" Pipe</b> Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
0.1	45	0.1200	9.99	19.99	<b>Channel Flow, Driveway Ditch</b> Area= 2.0 sf Perim= 4.5' r= 0.44' n= 0.030 Earth, clean & winding
13.7	490	Total			

### Subcatchment 9S: Lot 6

#### Hydrograph



**Summary for Pond 10P: Lot 6 Dry Swale**

Inflow Area = 1.038 ac, 16.73% Impervious, Inflow Depth = 5.21" for 100-YEAR, 24-HOUR-NEW-WIND  
 Inflow = 4.93 cfs @ 12.19 hrs, Volume= 0.450 af  
 Outflow = 4.53 cfs @ 12.24 hrs, Volume= 0.450 af, Atten= 8%, Lag= 3.5 min  
 Primary = 0.19 cfs @ 12.24 hrs, Volume= 0.189 af  
 Secondary = 4.33 cfs @ 12.24 hrs, Volume= 0.261 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 369.85' @ 12.24 hrs Surf.Area= 1,988 sf Storage= 2,968 cf

Plug-Flow detention time= 68.1 min calculated for 0.450 af (100% of inflow)  
 Center-of-Mass det. time= 68.1 min ( 883.7 - 815.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	367.50'	3,283 cf	8.00'W x 76.00'L x 2.50'H Prismatic Z=3.0

Device	Routing	Invert	Outlet Devices
#1	Primary	364.00'	4.0" x 105.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 350.00' S= 0.1333 ' Cc= 0.900 n= 0.012
#2	Device 1	367.50'	4.000 in/hr Exfiltration over Wetted area
#3	Secondary	369.10'	2.5' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.19 cfs @ 12.24 hrs HW=369.85' (Free Discharge)

↑1=Culvert (Passes 0.19 cfs of 0.84 cfs potential flow)

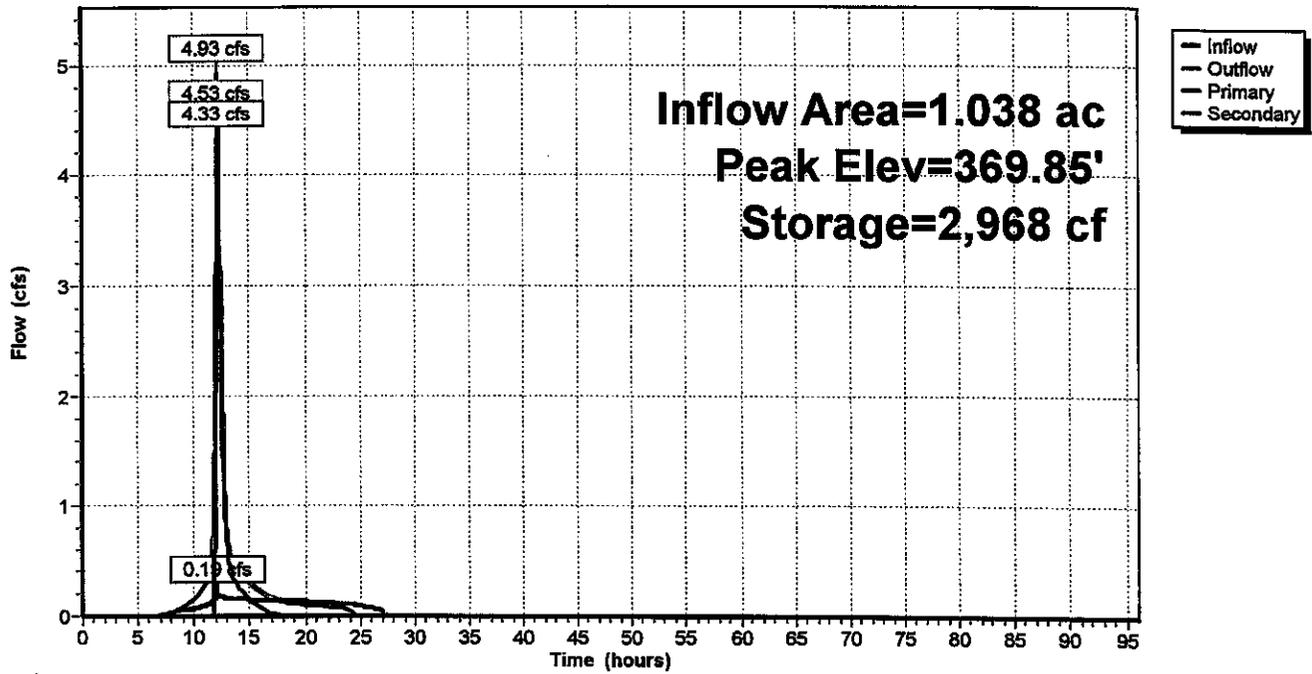
↑2=Exfiltration (Exfiltration Controls 0.19 cfs)

Secondary OutFlow Max=4.33 cfs @ 12.24 hrs HW=369.85' (Free Discharge)

↑3=Broad-Crested Rectangular Weir (Weir Controls 4.33 cfs @ 2.32 fps)

### Pond 10P: Lot 6 Dry Swale

Hydrograph



Summary for Reach 15R: Roadside Ditch (Lot6)

Inflow = 4.33 cfs @ 12.24 hrs, Volume= 0.261 af  
Outflow = 4.33 cfs @ 12.26 hrs, Volume= 0.261 af, Atten= 0%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
Max. Velocity= 4.44 fps, Min. Travel Time= 0.6 min  
Avg. Velocity = 1.80 fps, Avg. Travel Time= 1.6 min

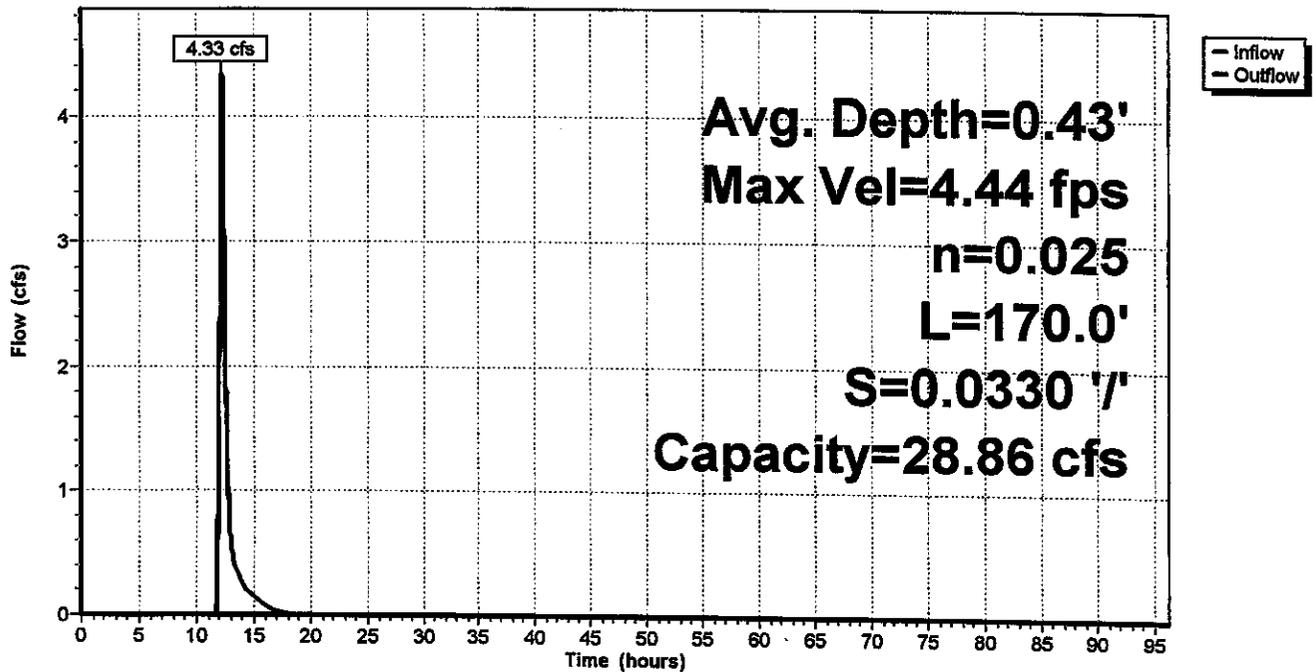
Peak Storage= 166 cf @ 12.25 hrs, Average Depth at Peak Storage= 0.43'  
Bank-Full Depth= 1.00', Capacity at Bank-Full= 28.86 cfs

1.00' x 1.00' deep channel, n= 0.025  
Side Slope Z-value= 3.0 ' / ' Top Width= 7.00'  
Length= 170.0' Slope= 0.0330 ' / '  
Inlet Invert= 352.00', Outlet Invert= 346.39'



Reach 15R: Roadside Ditch (Lot6)

Hydrograph



**Summary for Subcatchment 7S: Lot 7**

Runoff = 3.40 cfs @ 12.10 hrs, Volume= 0.255 af, Depth= 5.44"

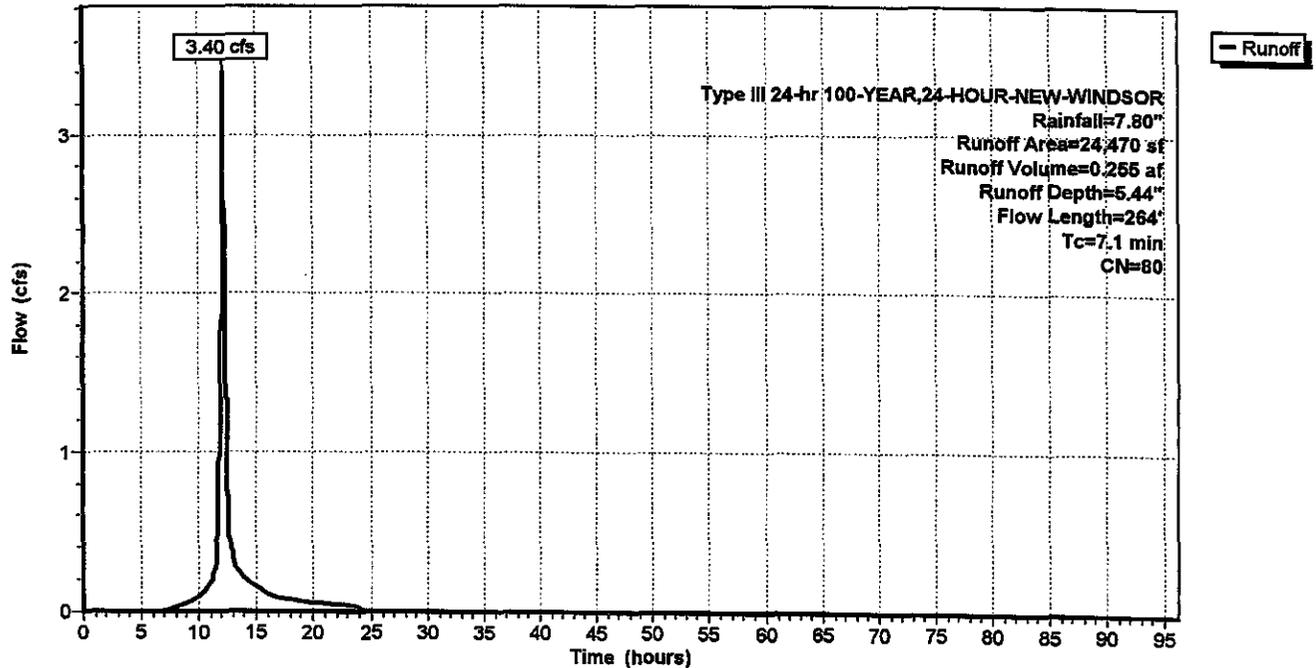
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-YEAR,24-HOUR-NEW-WINDSOR Rainfall=7.80"

Area (sf)	CN	Description
* 3,475	98	Prop. Driveway
* 2,300	98	Prop. House
* 18,695	74	Prop. Lawn, >75% Grass cover, Good, HSG C
24,470	80	Weighted Average
18,695		Pervious Area
5,775		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	100	0.0550	0.28		Sheet Flow, Sheet1 Grass: Short n= 0.150 P2= 3.75"
1.0	120	0.0792	1.97		Shallow Concentrated Flow, Shallow1 Short Grass Pasture Kv= 7.0 fps
0.1	24	0.5000	4.95		Shallow Concentrated Flow, Shallow2 Short Grass Pasture Kv= 7.0 fps
0.0	20	0.0200	6.95	5.46	Circular Channel (pipe), 12" Culvert Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
7.1	264	Total			

**Subcatchment 7S: Lot 7**

Hydrograph



**Summary for Pond 8P: Lot 7 Dry Swale**

Inflow Area = 0.562 ac, 23.60% Impervious, Inflow Depth = 5.44" for 100-YEAR,24-HOUR-NEW-WIND  
 Inflow = 3.40 cfs @ 12.10 hrs, Volume= 0.255 af  
 Outflow = 2.89 cfs @ 12.15 hrs, Volume= 0.255 af, Atten= 15%, Lag= 3.2 min  
 Primary = 0.15 cfs @ 12.15 hrs, Volume= 0.130 af  
 Secondary = 2.75 cfs @ 12.15 hrs, Volume= 0.124 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 363.64' @ 12.15 hrs Surf.Area= 1,569 sf Storage= 2,153 cf

Plug-Flow detention time= 74.3 min calculated for 0.255 af (100% of inflow)  
 Center-of-Mass det. time= 74.3 min ( 879.2 - 804.9 )

Volume	Invert	Avail.Storage	Storage Description
#1	361.50'	2,759 cf	8.00'W x 62.50'L x 2.50'H Prismatic Z=3.0

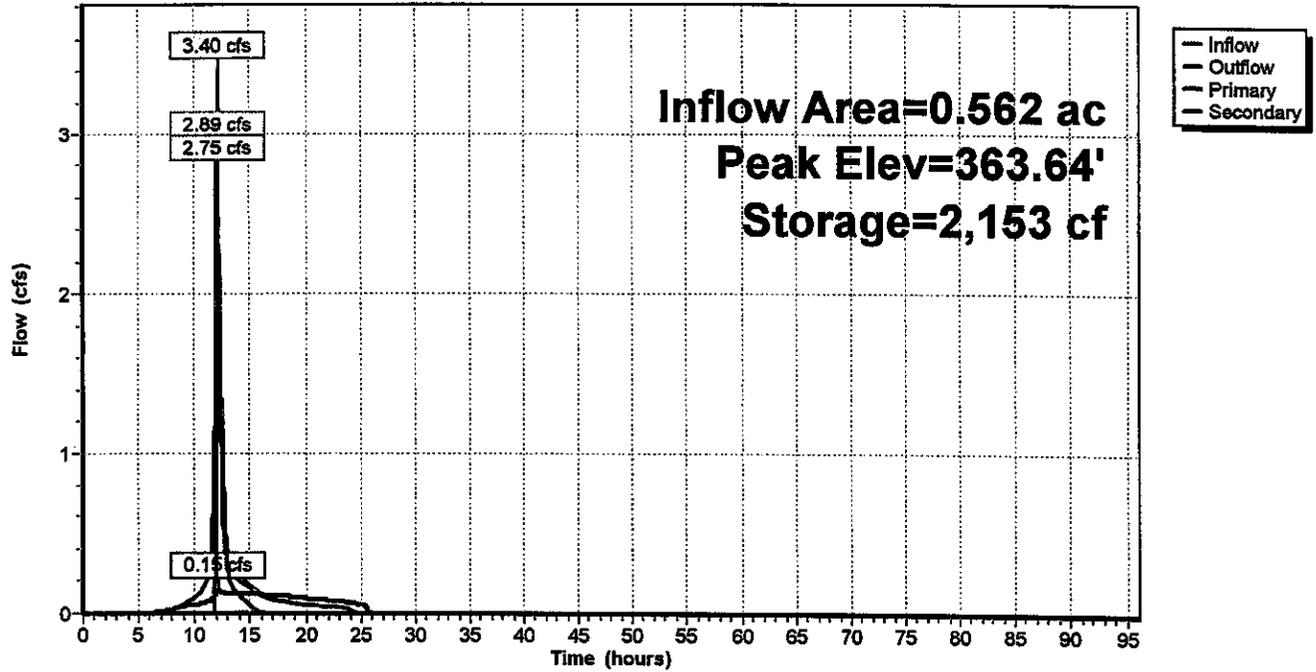
Device	Routing	Invert	Outlet Devices
#1	Primary	358.00'	4.0" x 35.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 352.50' S= 0.1571 '/' Cc= 0.900 n= 0.009 PVC, smooth interior
#2	Device 1	361.50'	4.000 in/hr Exfiltration over Horizontal area
#3	Secondary	363.00'	2.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.15 cfs @ 12.15 hrs HW=363.64' (Free Discharge)  
 ↳1=Culvert (Passes 0.15 cfs of 0.98 cfs potential flow)  
 ↳2=Exfiltration (Exfiltration Controls 0.15 cfs)

Secondary OutFlow Max=2.75 cfs @ 12.15 hrs HW=363.64' (Free Discharge)  
 ↳3=Broad-Crested Rectangular Weir (Weir Controls 2.75 cfs @ 2.15 fps)

### Pond 8P: Lot 7 Dry Swale

#### Hydrograph



### Summary for Reach 12R: Roadside Ditch (Lot7)

Inflow Area = 0.562 ac, 23.60% Impervious, Inflow Depth = 5.44" for 100-YEAR, 24-HOUR-NEW-WIND  
 Inflow = 2.89 cfs @ 12.15 hrs, Volume= 0.255 af  
 Outflow = 2.86 cfs @ 12.20 hrs, Volume= 0.255 af, Atten= 1%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Max. Velocity= 3.32 fps, Min. Travel Time= 1.4 min  
 Avg. Velocity = 1.16 fps, Avg. Travel Time= 4.0 min

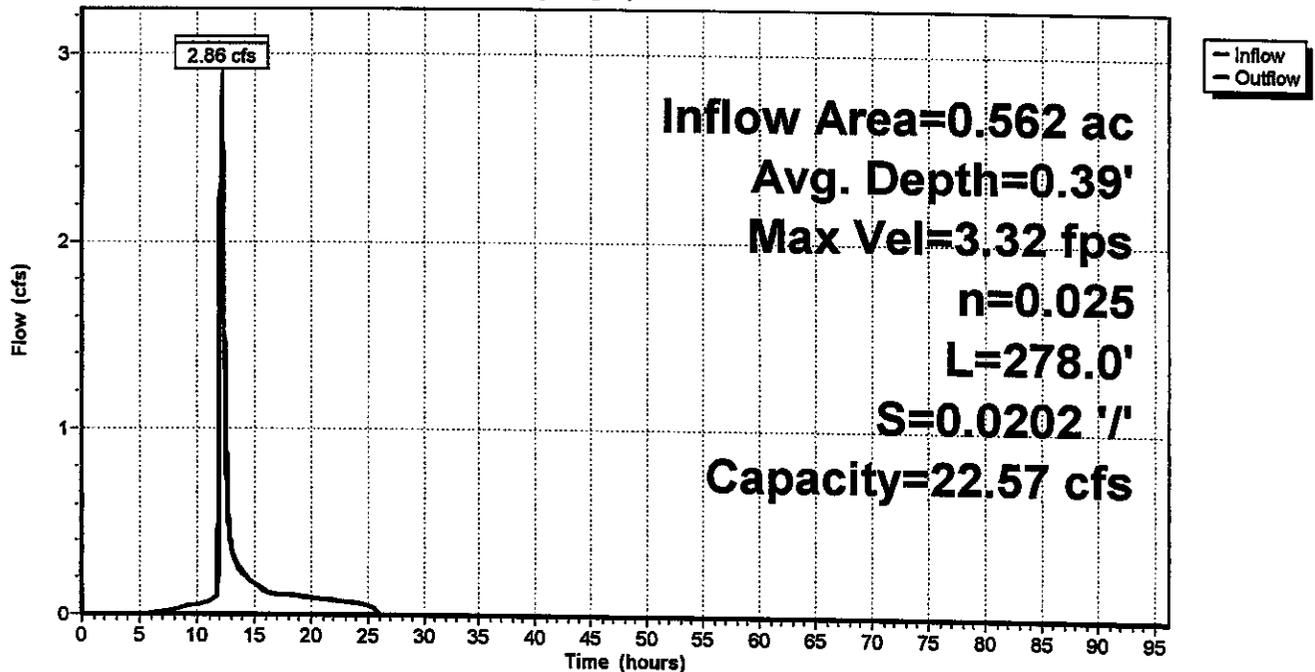
Peak Storage= 240 cf @ 12.17 hrs, Average Depth at Peak Storage= 0.39'  
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 22.57 cfs

1.00' x 1.00' deep channel, n= 0.025  
 Side Slope Z-value= 3.0 ' Top Width= 7.00'  
 Length= 278.0' Slope= 0.0202 ' / '  
 Inlet Invert= 352.00', Outlet Invert= 346.39'



### Reach 12R: Roadside Ditch (Lot7)

Hydrograph



**Summary for Subcatchment 5S: Lot 8**

Runoff = 2.20 cfs @ 12.16 hrs, Volume= 0.190 af, Depth= 5.32"

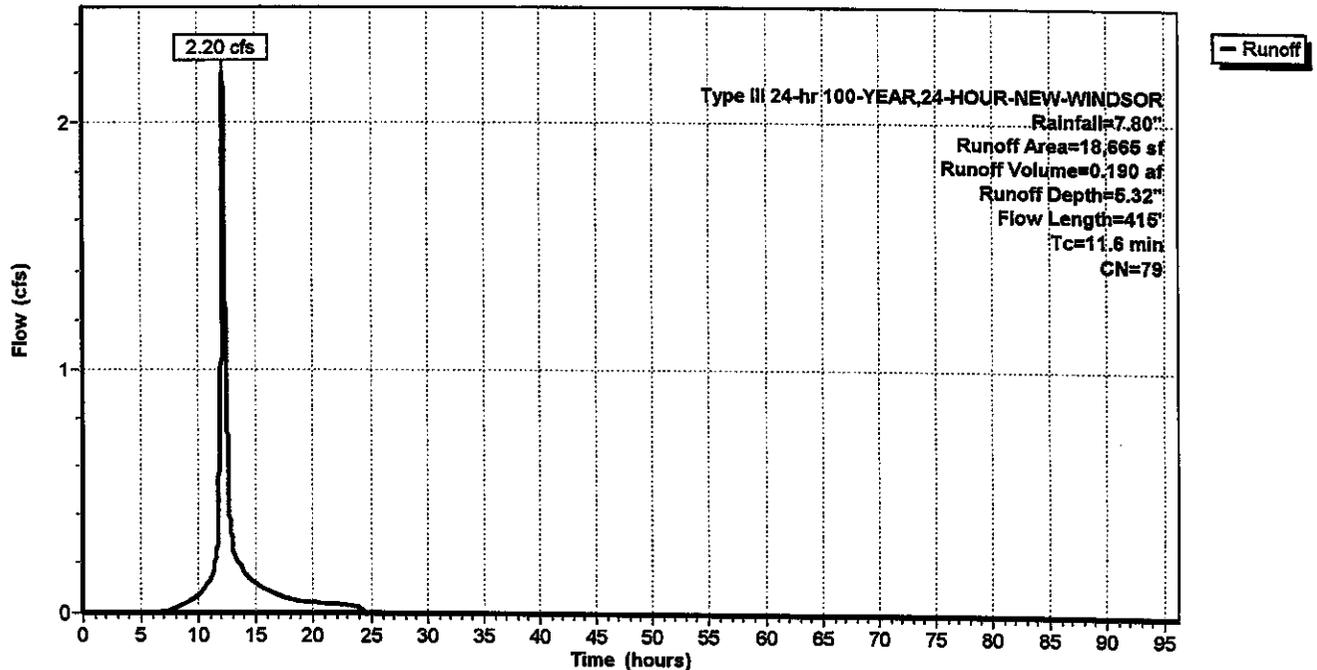
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-YEAR, 24-HOUR-NEW-WINDSOR Rainfall=7.80"

Area (sf)	CN	Description
* 14,930	74	Prop. Lawn, >75% Grass cover, Good, HSG C
* 1,435	98	Prop. Driveways
* 2,300	98	Prop. Houses
18,665	79	Weighted Average
14,930		Pervious Area
3,735		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	100	0.0625	0.20		Sheet Flow, Sheet1 Grass: Dense n= 0.240 P2= 3.75"
3.1	300	0.0533	1.62		Shallow Concentrated Flow, Shallow1 Short Grass Pasture Kv= 7.0 fps
0.1	15	0.3000	3.83		Shallow Concentrated Flow, Shallow2 Short Grass Pasture Kv= 7.0 fps
11.6	415	Total			

**Subcatchment 5S: Lot 8**

Hydrograph



**Summary for Pond 6P: Lot 8 Dry Swale**

Inflow Area = 0.428 ac, 20.01% Impervious, Inflow Depth = 5.32" for 100-YEAR,24-HOUR-NEW-WIND  
 Inflow = 2.20 cfs @ 12.16 hrs, Volume= 0.190 af  
 Outflow = 1.66 cfs @ 12.27 hrs, Volume= 0.190 af, Atten= 25%, Lag= 6.5 min  
 Primary = 0.15 cfs @ 12.27 hrs, Volume= 0.125 af  
 Secondary = 1.52 cfs @ 12.27 hrs, Volume= 0.065 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Peak Elev= 365.63' @ 12.27 hrs Surf.Area= 1,566 sf Storage= 2,146 cf

Plug-Flow detention time= 100.7 min calculated for 0.190 af (100% of inflow)  
 Center-of-Mass det. time= 100.7 min ( 912.1 - 811.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	363.50'	2,759 cf	8.00'W x 62.50'L x 2.50'H Prismatic Z=3.0

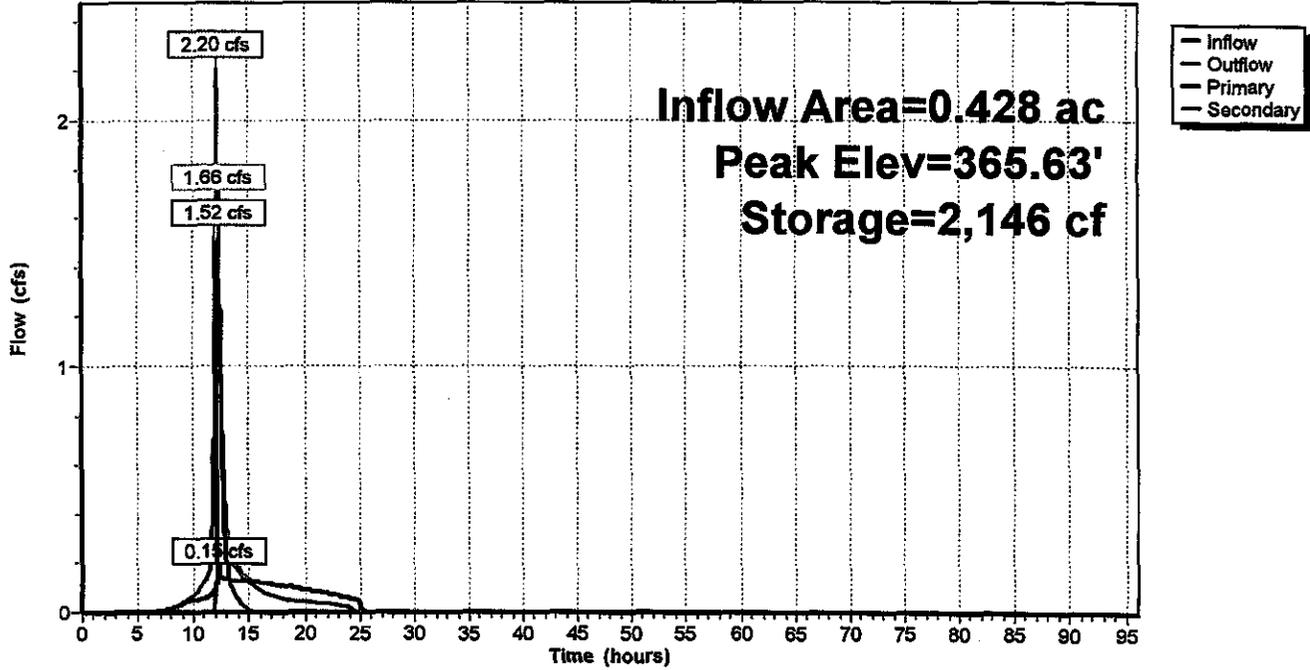
Device	Routing	Invert	Outlet Devices
#1	Primary	360.00'	4.0" x 50.0' long Culvert CPP, square edge headwall, Ke= 0.500 Outlet Invert= 359.50' S= 0.0100 '/' Cc= 0.900 n= 0.010 PVC, smooth interior
#2	Device 1	363.50'	4.000 in/hr Exfiltration over Horizontal area
#3	Secondary	365.25'	2.5' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.15 cfs @ 12.27 hrs HW=365.63' (Free Discharge)  
 ↑1=Culvert (Passes 0.15 cfs of 0.72 cfs potential flow)  
 ↑2=Exfiltration (Exfiltration Controls 0.15 cfs)

Secondary OutFlow Max=1.51 cfs @ 12.27 hrs HW=365.63' (Free Discharge)  
 ↑3=Broad-Crested Rectangular Weir (Weir Controls 1.51 cfs @ 1.58 fps)

Pond 6P: Lot 8 Dry Swale

Hydrograph



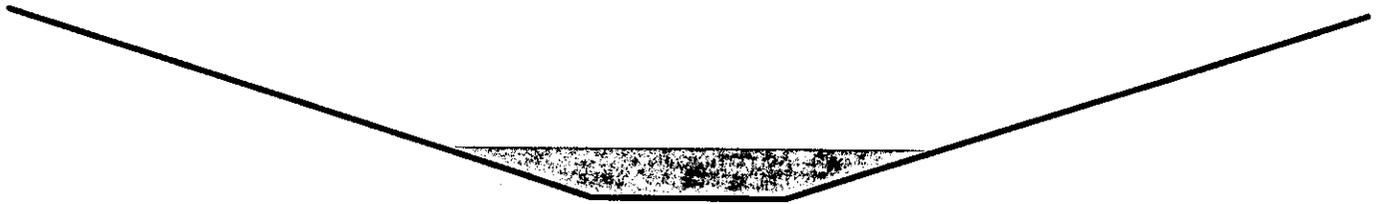
### Summary for Reach 16R: Roadside Ditch (Lot8)

Inflow Area = 0.428 ac, 20.01% Impervious, Inflow Depth = 5.32" for 100-YEAR, 24-HOUR-NEW-WINDSOR  
 Inflow = 1.66 cfs @ 12.27 hrs, Volume= 0.190 af  
 Outflow = 1.61 cfs @ 12.35 hrs, Volume= 0.190 af, Atten= 3%, Lag= 4.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Max. Velocity= 3.35 fps, Min. Travel Time= 2.5 min  
 Avg. Velocity = 1.28 fps, Avg. Travel Time= 6.5 min

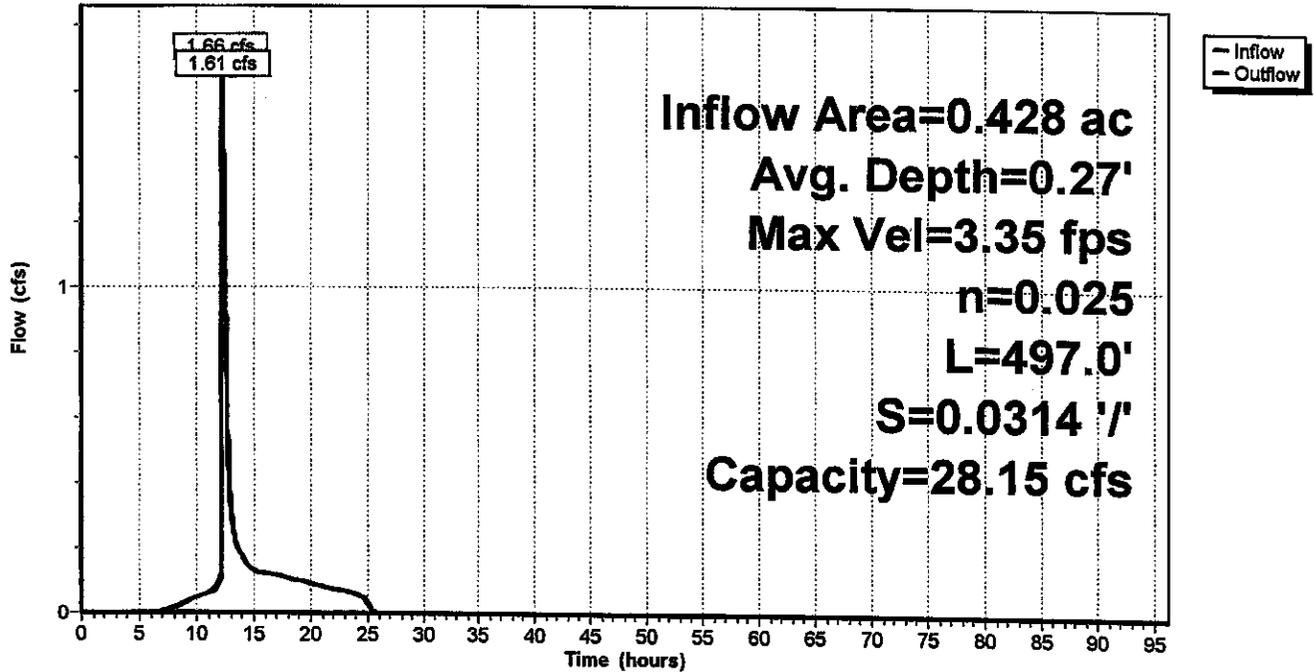
Peak Storage= 239 cf @ 12.31 hrs, Average Depth at Peak Storage= 0.27'  
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 28.15 cfs

1.00' x 1.00' deep channel, n= 0.025  
 Side Slope Z-value= 3.0 ' Top Width= 7.00'  
 Length= 497.0' Slope= 0.0314 '/  
 Inlet Invert= 362.00', Outlet Invert= 346.39'



### Reach 16R: Roadside Ditch (Lot8)

Hydrograph



**Summary for Subcatchment 14S: Remaining**

Runoff = 9.59 cfs @ 12.17 hrs, Volume= 0.850 af, Depth= 5.09"

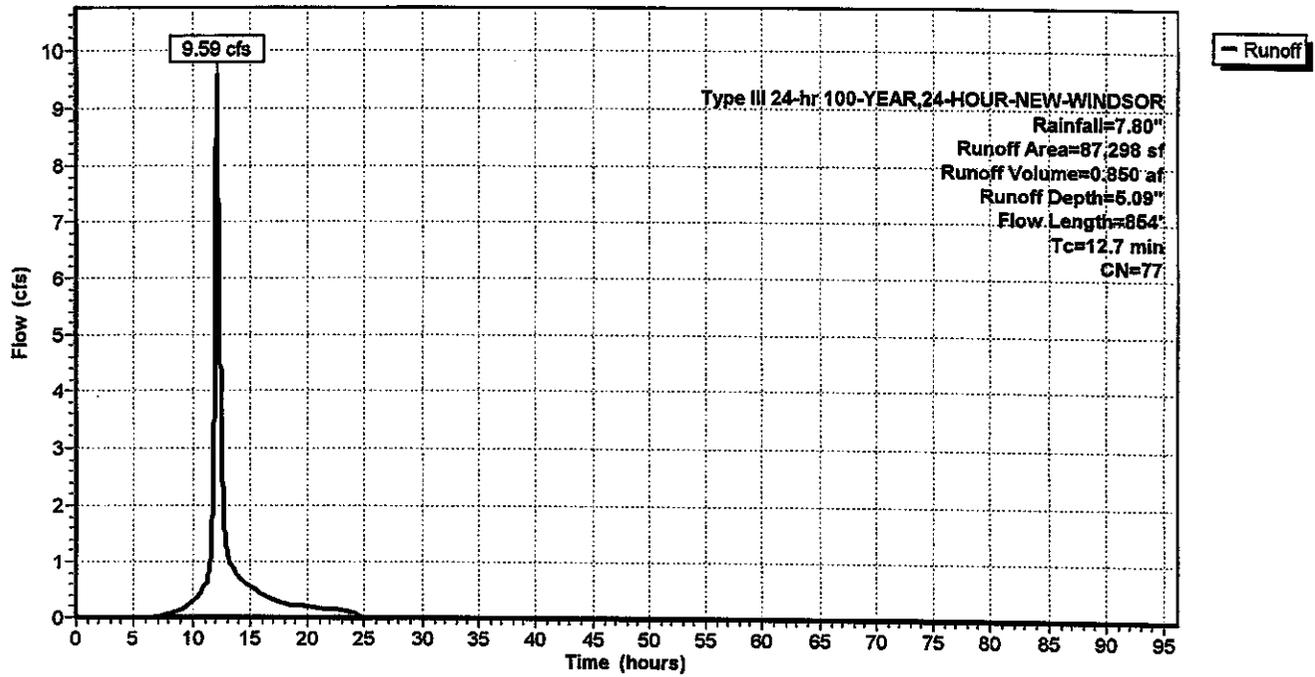
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 100-YEAR,24-HOUR-NEW-WINDSOR Rainfall=7.80"

Area (sf)	CN	Description
* 7,402	98	Station Road
* 5,433	98	Prop. Driveways
7,805	73	Woods, Fair, HSG C
* 66,658	74	Prop. Lawn, >75% Grass cover, Good, HSG C
87,298	77	Weighted Average
74,463		Pervious Area
12,835		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0550	0.19		Sheet Flow, Sheet1
					Grass: Dense n= 0.240 P2= 3.75"
2.6	267	0.0581	1.69		Shallow Concentrated Flow, Shallow1
					Short Grass Pasture Kv= 7.0 fps
0.1	12	0.4000	3.16		Shallow Concentrated Flow, Shallow2
					Woodland Kv= 5.0 fps
0.8	352	0.0323	7.15	28.61	Channel Flow, Roadside Ditch
					Area= 4.0 sf Perim= 7.3' r= 0.55' n= 0.025
0.2	46	0.0050	4.40	5.40	Circular Channel (pipe), 15" Pipe
					Diam= 15.0" Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011
0.2	77	0.0323	7.15	28.61	Channel Flow, Roadside Ditch
					Area= 4.0 sf Perim= 7.3' r= 0.55' n= 0.025
12.7	854	Total			

### Subcatchment 14S: Remaining

Hydrograph



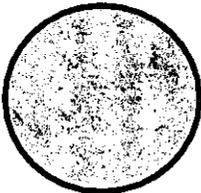
Summary for Reach 11R: 18" Pipe - Post

Inflow Area = 4.032 ac, 17.03% Impervious, Inflow Depth = 5.19" for 100-YEAR,24-HOUR-NEW-WINDSOR
Inflow = 16.80 cfs @ 12.21 hrs, Volume= 1.745 af
Outflow = 10.05 cfs @ 12.07 hrs, Volume= 1.745 af, Atten= 40%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.08 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.76 fps, Avg. Travel Time= 0.2 min

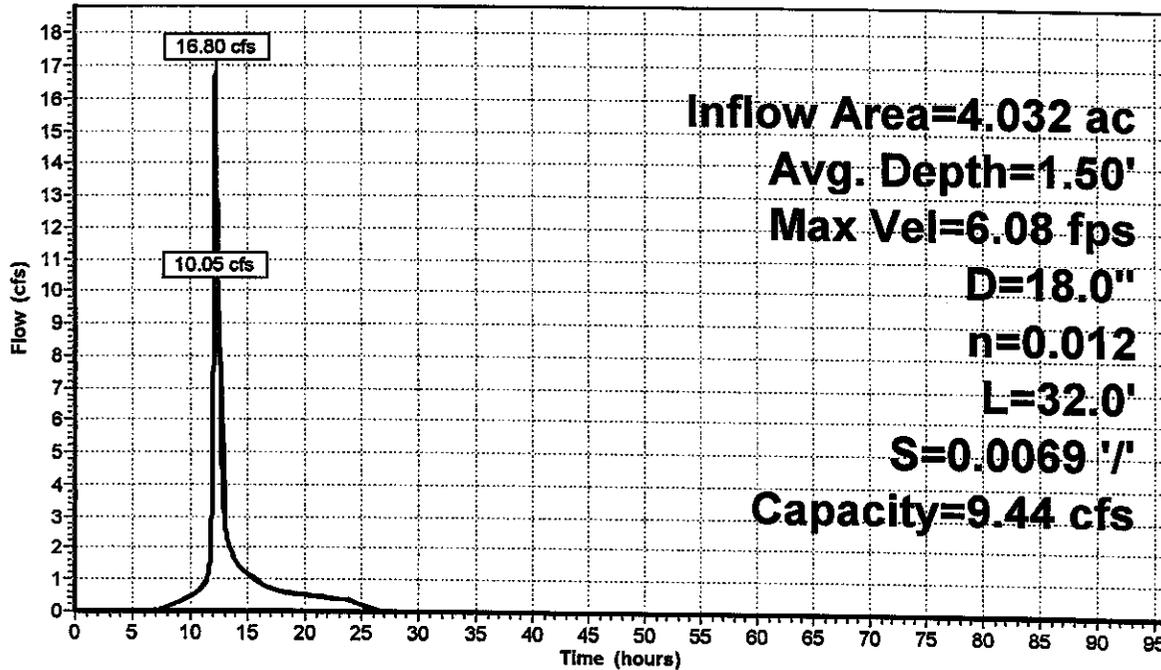
Peak Storage= 57 cf @ 12.08 hrs, Average Depth at Peak Storage= 1.50'
Defined Flood Depth= 350.10', Capacity at Flood Depth= -9,191.99 cfs
Bank-Full Depth= 1.50', Capacity at Bank-Full= 9.44 cfs

18.0" Diameter Pipe, n= 0.012
Length= 32.0' Slope= 0.0069 '/'
Inlet Invert= 346.39', Outlet Invert= 346.17'



Reach 11R: 18" Pipe - Post

Hydrograph



- Inflow
- Outflow

**APPENDIX O**

culvert calculator

Entered Data:

Shape .....	Circular
Number of Barrels .....	1
Solving for .....	Headwater
Chart Number .....	2
Scale Number .....	3
Chart Description .....	CORRUGATED METAL PIPE CULVERT
Scale Description .....	PIPE PROJECTING FROM FILL
Overtopping .....	off
Flowrate .....	51.7600 cfs
Manning's n .....	0.0240
Roadway Elevation .....	355.9000 ft
Inlet Elevation .....	352.1200 ft
Outlet Elevation .....	351.2600 ft
Diameter .....	3.5000 ft
Length .....	60.0000 ft
Entrance Loss .....	0.0000
Tailwater .....	3.5000 ft

Computed Results:

Headwater .....	355.8997 ft Inlet Control
Slope .....	0.0143 ft/ft
Velocity .....	7.5196 fps

EXISTING 42" CMP CULVERT

tmp#22.txt  
culvert calculator

Entered Data:

Shape .....	Circular
Number of Barrels .....	2
Solving for .....	Headwater
Chart Number .....	2
Scale Number .....	3
Chart Description .....	CORRUGATED METAL PIPE CULVERT
Scale Description .....	PIPE PROJECTING FROM FILL
Overtopping .....	off
Flowrate .....	68.9700 cfs
Manning's n .....	0.0120
Roadway Elevation .....	370.0000 ft
Inlet Elevation .....	365.9300 ft
Outlet Elevation .....	365.4600 ft
Diameter .....	2.5000 ft
Length .....	60.0000 ft
Entrance Loss .....	0.0000
Tailwater .....	2.5000 ft

Computed Results:

Headwater .....	369.9995 ft Inlet Control
Slope .....	0.0078 ft/ft
velocity .....	9.0240 fps

PROP. 30" CULVERTS UNDER DRENWAYS FOR  
LOTS 1 & 2

Culvert Calculator

Entered Data:

Shape .....	Circular
Number of Barrels .....	2
Solving for .....	Headwater
Chart Number .....	2
Scale Number .....	3
Chart Description .....	CORRUGATED METAL PIPE CULVERT
Scale Description .....	PIPE PROJECTING FROM FILL
Overtopping .....	off
Flowrate .....	54.0100 cfs
Manning's n .....	0.0120
Roadway Elevation .....	362.0600 ft
Inlet Elevation .....	358.9300 ft
Outlet Elevation .....	358.4300 ft
Diameter .....	2.5000 ft
Length .....	50.0000 ft
Entrance Loss .....	0.0000
Tailwater .....	2.5000 ft

Computed Results:

Headwater .....	362.0600 ft Inlet Control
slope .....	0.0100 ft/ft
velocity .....	9.4949 fps

PROP. 30" CULVERTS UNDER DRAINWAYS  
FOR LOTS 3 & 4