



DRAINAGE SUMMARY
May 20, 2022

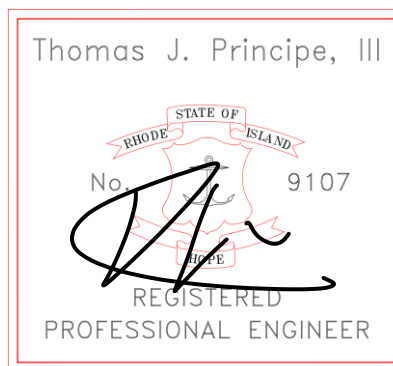
AP 24-4, LOT 18
1747 Mooresfield Road
South Kingstown, RI 02879

Prepared For:

Fox Real Estate Holding LP
1747 Mooresfield Road
Wakefield, RI 028

Prepared By:

Principe Engineering, Inc.
27 Sakonnet Ridge Drive
Tiverton, Rhode Island



This stormwater management analysis and accompanying HydroCAD design calculations were prepared in support of the redevelopment of AP 24-4 Lot 18 at 1747 Mooresfield Road in South Kingstown, RI.

The existing site contains an existing large residential structure that previously was used as a Bed & Breakfast. A paved driveway, parking, terrace areas and a tennis court constitute the existing impervious surfaces in the landscape. The mapped soil beneath the site is ScA (Scio silt loam, 0-3% slopes) and RaA (Rainbow silt loam, 0 to 3% slopes. Both soils are hydrologic group “C” with a seasonal high-water table of 3.5 feet based on on-site investigations. Currently, stormwater flows from west-to-east, parallel to Mooresfield Road, without any stormwater treatment.

The proposed development will treat 100% of the new pavement surfaces by directing surface flows to the proposed stormwater best management practices (BMPs). The proposed site will contain two infiltration areas, each with a sediment forebay.

The stormwater design calculations focus on demonstrating the proposed site adequately handles the intensity from the 1, 10 and 100-year storm events while providing water quality treatment and recharge for the impervious runoff within the sub-areas and at the overall design point. As a result, the post-development flow rates to the design point referenced above have been reduced below the pre-development flows.

Below is a summary of the HydroCAD analysis comparing pre-development and post-development flow rates for the project at the project design point:

	<u>DESIGN POINT</u>		
	Pre (cfs)	Post (cfs)	Difference (cfs)
1-Year Storm	1.81	1.18	-0.63
10-Year Storm	4.87	4.27	-0.60
100-Year Storm	10.58	9.29	-1.29

The project also provides for the required water quality and recharge volumes for all new pavement areas. The existing impervious surfaces equals 18,107 sf (roofs, parking/access and tennis court). The proposed impervious surfaces equals 21,024 sf, which is an increase of only 2,917 sf (the required treatment area).

PAVEMENT AREAS:

RECHARGE= (1’)(0.067)(0.25)/12=0.001 acft

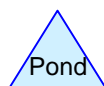
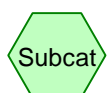
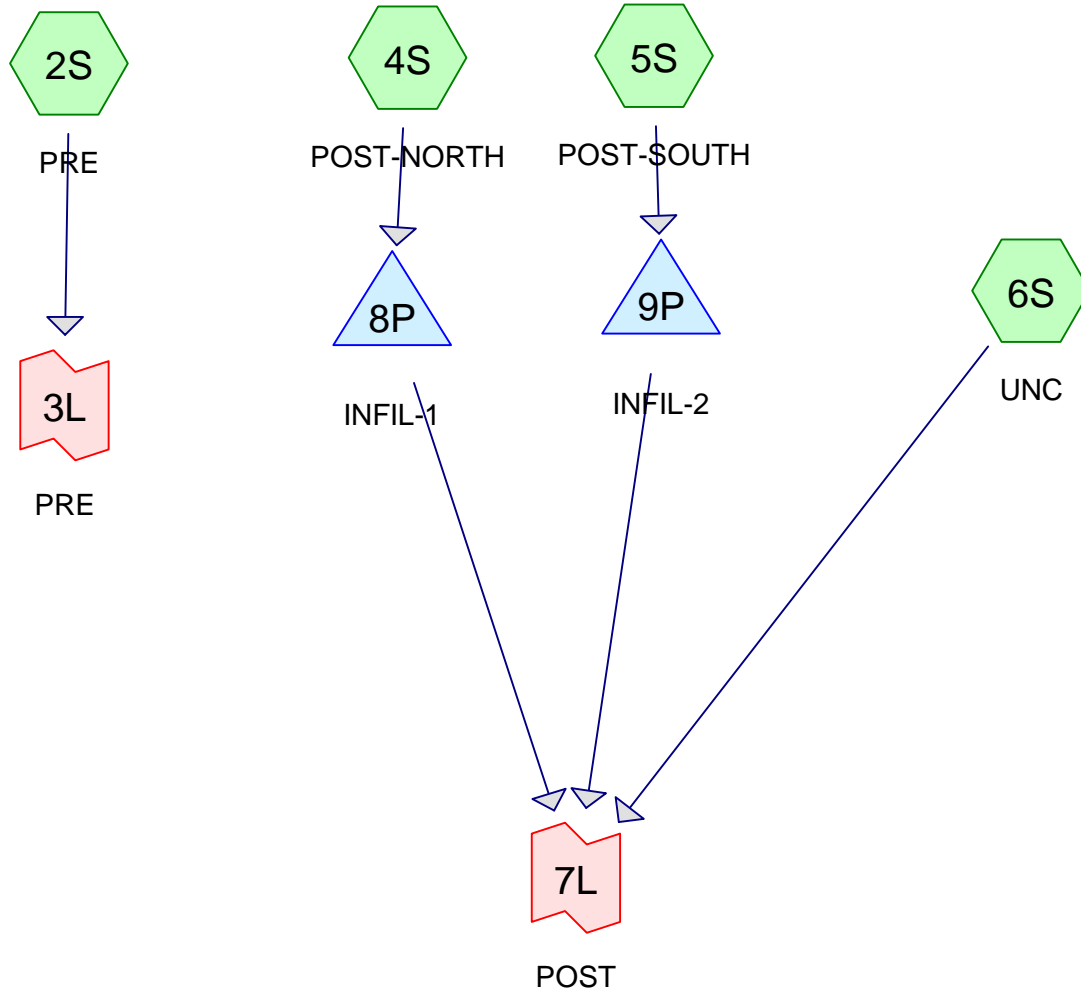
$$WQV = (1'')(0.067)/12 = 0.006 \text{ acft}$$

$$\text{PROVIDED} = 0.004 \text{ (N)} + 0.008 \text{ (S)} = 0.012 \text{ acft } \mathbf{OK}$$

While incorporating the innovative measures described above and taking advantage of the natural slopes and contours of the site, the project is able to achieve a decrease in stormwater runoff rate and volume toward the analyzed design points as well as provide adequate water quality treatment and recharge. Thus, typical post-development impacts to downstream properties and water resource areas have been effectively mitigated.

APPENDICES

- A. Water Quality and Recharge Calculations
- B. HydroCAD 1.2" Water Quality Volume Calculations
- C. HydroCAD 1, 10, 100-year Storm Calculations



Routing Diagram for 1747 MOORESFIELD - KAB
 Prepared by {enter your company name here}, Printed 5/20/2022
 HydroCAD® 10.00-26 s/n 08247 © 2020 HydroCAD Software Solutions LLC

1747 MOORESFIELD - KAB

Prepared by {enter your company name here}
HydroCAD® 10.00-26 s/n 08247 © 2020 HydroCAD Software Solutions LLC

Printed 5/20/2022

Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.414	74	>75% Grass cover, Good, HSG C (2S, 4S, 5S, 6S)
0.059	98	Existing Building, HSG C (4S, 5S)
0.052	98	Existing Impervious, HSG C (6S)
0.135	98	Paved parking, HSG C (2S)
0.110	98	Roofs, HSG C (2S)
0.342	98	Tennis Court, HSG C (2S, 6S)
0.201	98	Unconnected pavement, HSG C (4S, 5S)
4.312	79	TOTAL AREA

1747 MOORESFIELD - KAB

Prepared by {enter your company name here}

Printed 5/20/2022

HydroCAD® 10.00-26 s/n 08247 © 2020 HydroCAD Software Solutions LLC

Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
4.312	HSG C	2S, 4S, 5S, 6S
0.000	HSG D	
0.000	Other	
4.312		TOTAL AREA

1747 MOORESFIELD - KAB

Prepared by {enter your company name here}

Printed 5/20/2022

HydroCAD® 10.00-26 s/n 08247 © 2020 HydroCAD Software Solutions LLC

Page 4

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	3.414	0.000	0.000	3.414	>75% Grass cover, Good	2S, 4S, 5S, 6S
0.000	0.000	0.059	0.000	0.000	0.059	Existing Building	4S, 5S
0.000	0.000	0.052	0.000	0.000	0.052	Existing Impervious	6S
0.000	0.000	0.135	0.000	0.000	0.135	Paved parking	2S
0.000	0.000	0.110	0.000	0.000	0.110	Roofs	2S
0.000	0.000	0.342	0.000	0.000	0.342	Tennis Court	2S, 6S
0.000	0.000	0.201	0.000	0.000	0.201	Unconnected pavement	4S, 5S
0.000	0.000	4.312	0.000	0.000	4.312	TOTAL AREA	

1747 MOORESFIELD - KAB

Type III 24-hr WQV Rainfall=1.20"

Prepared by {enter your company name here}

Printed 5/20/2022

HydroCAD® 10.00-26 s/n 08247 © 2020 HydroCAD Software Solutions LLC

Page 5

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2S: PRE Runoff Area=93,916 sf 19.28% Impervious Runoff Depth=0.24"
Flow Length=307' Tc=17.5 min CN=74/98 Runoff=0.33 cfs 0.043 af

Subcatchment 4S: POST-NORTH Runoff Area=7,709 sf 10.12% Impervious Runoff Depth=0.30"
Flow Length=76' Tc=1.0 min CN=83/98 Runoff=0.06 cfs 0.004 af

Subcatchment 5S: POST-SOUTH Runoff Area=16,666 sf 10.63% Impervious Runoff Depth=0.32"
Flow Length=179' Tc=2.0 min CN=84/98 Runoff=0.14 cfs 0.010 af

Subcatchment 6S: UNC Runoff Area=69,541 sf 13.94% Impervious Runoff Depth=0.19"
Flow Length=307' Tc=17.5 min CN=74/98 Runoff=0.17 cfs 0.025 af

Pond 8P: INFIL-1 Peak Elev=216.55' Storage=58 cf Inflow=0.06 cfs 0.004 af
Discarded=0.01 cfs 0.004 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.004 af

Pond 9P: INFIL-2 Peak Elev=214.36' Storage=252 cf Inflow=0.14 cfs 0.010 af
Discarded=0.01 cfs 0.008 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.008 af

Link 3L: PRE Inflow=0.33 cfs 0.043 af
Primary=0.33 cfs 0.043 af

Link 7L: POST Inflow=0.17 cfs 0.025 af
Primary=0.17 cfs 0.025 af

Total Runoff Area = 4.312 ac Runoff Volume = 0.083 af Average Runoff Depth = 0.23"
83.84% Pervious = 3.615 ac 16.16% Impervious = 0.697 ac

Summary for Subcatchment 2S: PRE

Runoff = 0.33 cfs @ 12.24 hrs, Volume= 0.043 af, Depth= 0.24"

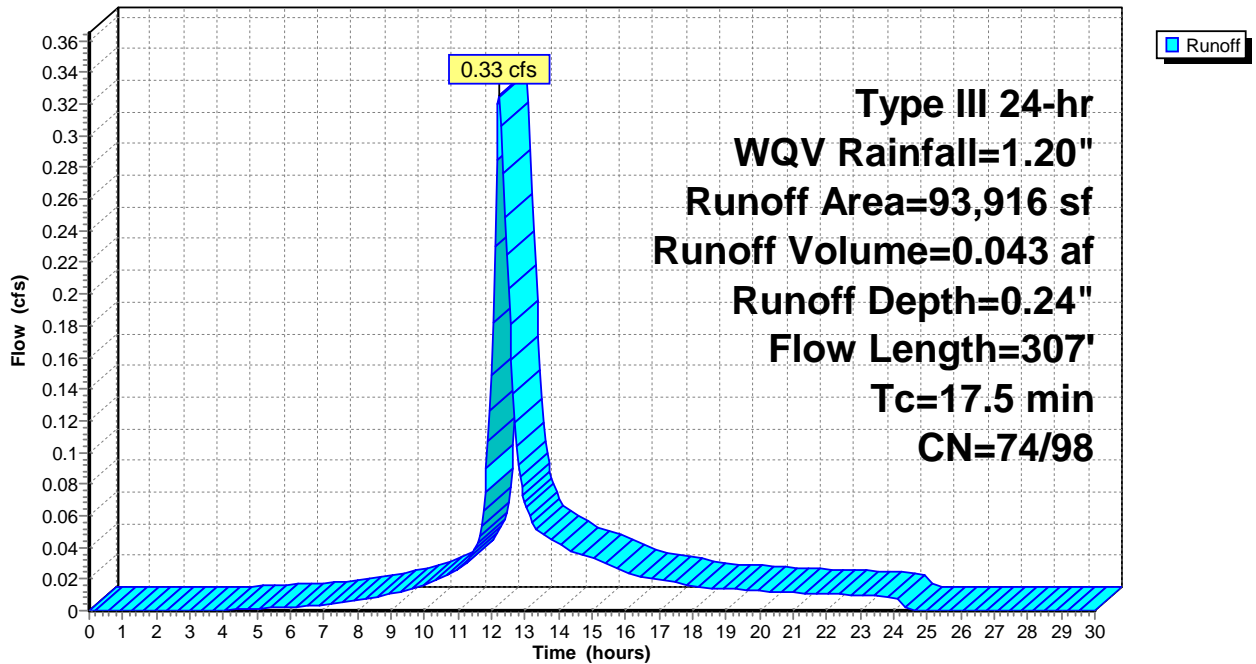
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-30.00 hrs, dt= 0.00
 Type III 24-hr WQV Rainfall=1.20"

Area (sf)	CN	Description
5,864	98	Paved parking, HSG C
* 7,450	98	Tennis Court, HSG C
4,793	98	Roofs, HSG C
75,809	74	>75% Grass cover, Good, HSG C
93,916	79	Weighted Average
75,809	74	80.72% Pervious Area
18,107	98	19.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	210	0.0600	0.21		Sheet Flow, Grass: Dense n= 0.240 P2= 3.33"
0.7	61	0.0050	1.44		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	36	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
17.5	307	Total			

Subcatchment 2S: PRE

Hydrograph



Summary for Subcatchment 4S: POST-NORTH

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.06 cfs @ 12.03 hrs, Volume= 0.004 af, Depth= 0.30"

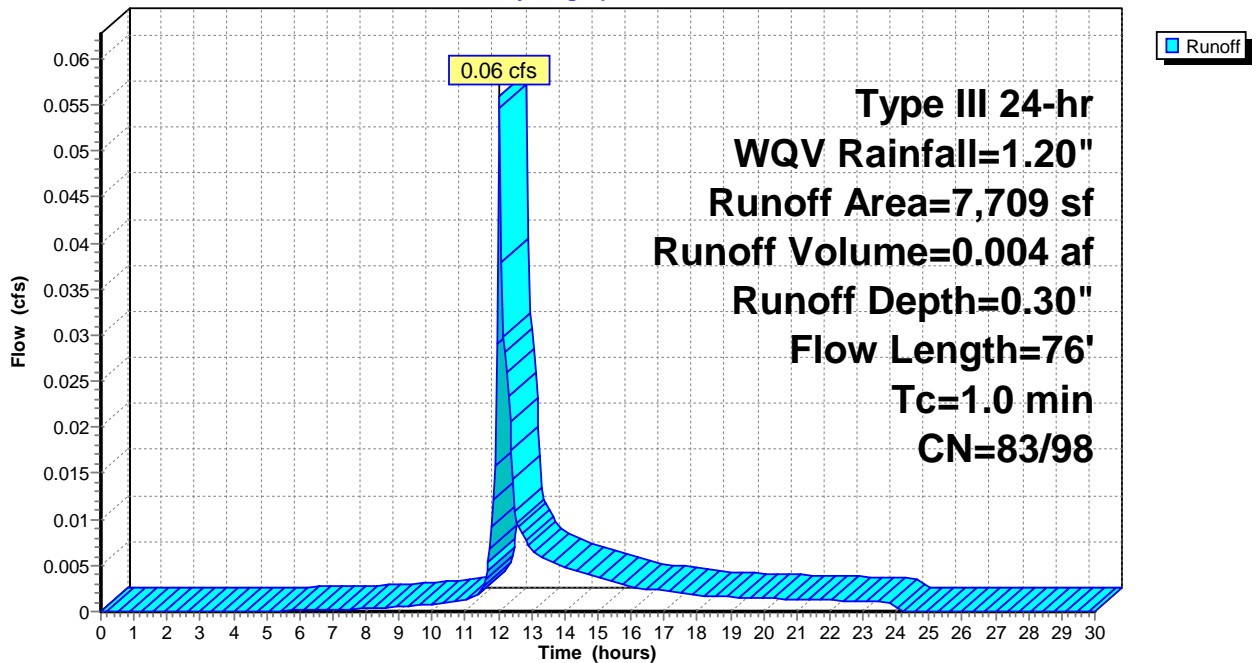
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-30.00 hrs, dt= 0.00
Type III 24-hr WQV Rainfall=1.20"

Area (sf)	CN	Description
* 780	98	Existing Building, HSG C
2,644	98	Unconnected pavement, HSG C
4,285	74	>75% Grass cover, Good, HSG C
7,709	85	Weighted Average
6,929	83	89.88% Pervious Area
780	98	10.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	64	0.0140	1.11		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.33"
0.0	12	0.0800	4.55		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.0	76	Total			

Subcatchment 4S: POST-NORTH

Hydrograph



Summary for Subcatchment 5S: POST-SOUTH

[49] Hint: Tc<2dt may require smaller dt

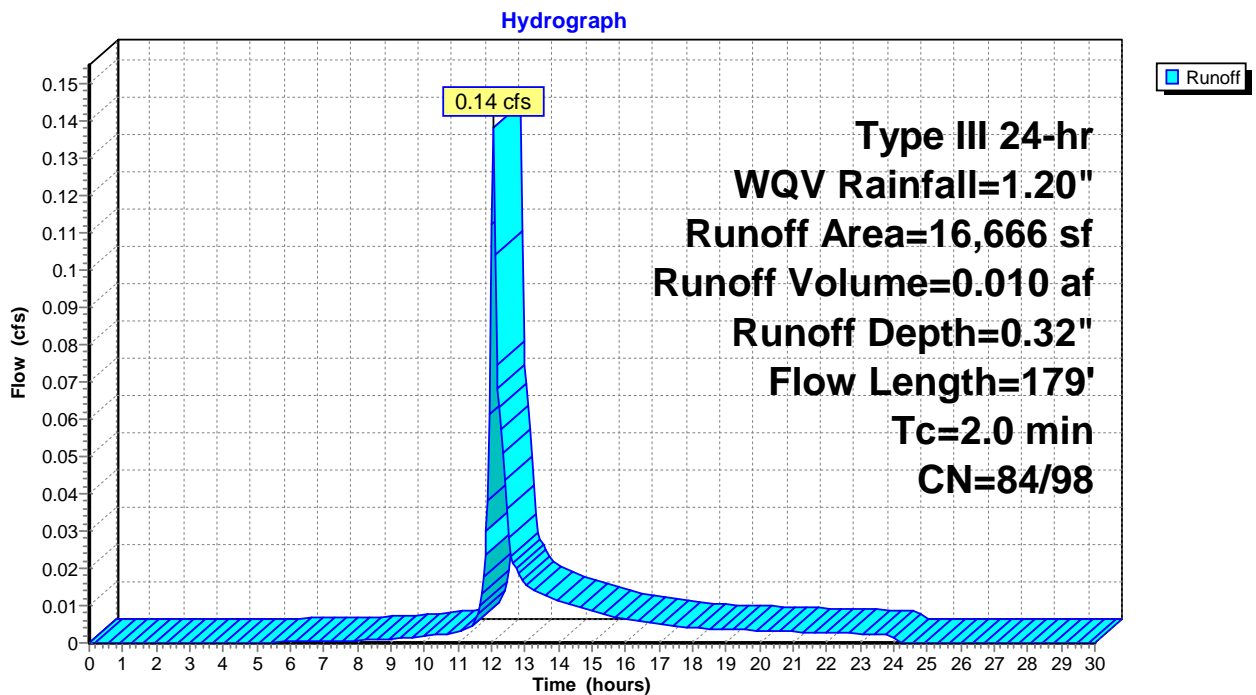
Runoff = 0.14 cfs @ 12.05 hrs, Volume= 0.010 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-30.00 hrs, dt= 0.00
 Type III 24-hr WQV Rainfall=1.20"

	Area (sf)	CN	Description
*	1,771	98	Existing Building, HSG C
	6,132	98	Unconnected pavement, HSG C
	8,763	74	>75% Grass cover, Good, HSG C
	16,666	85	Weighted Average
	14,895	84	89.37% Pervious Area
	1,771	98	10.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	98	0.0090	1.02		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.33"
0.3	54	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	27	0.0700	4.26		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
2.0	179	Total			

Subcatchment 5S: POST-SOUTH



Summary for Subcatchment 6S: UNC

Runoff = 0.17 cfs @ 12.24 hrs, Volume= 0.025 af, Depth= 0.19"

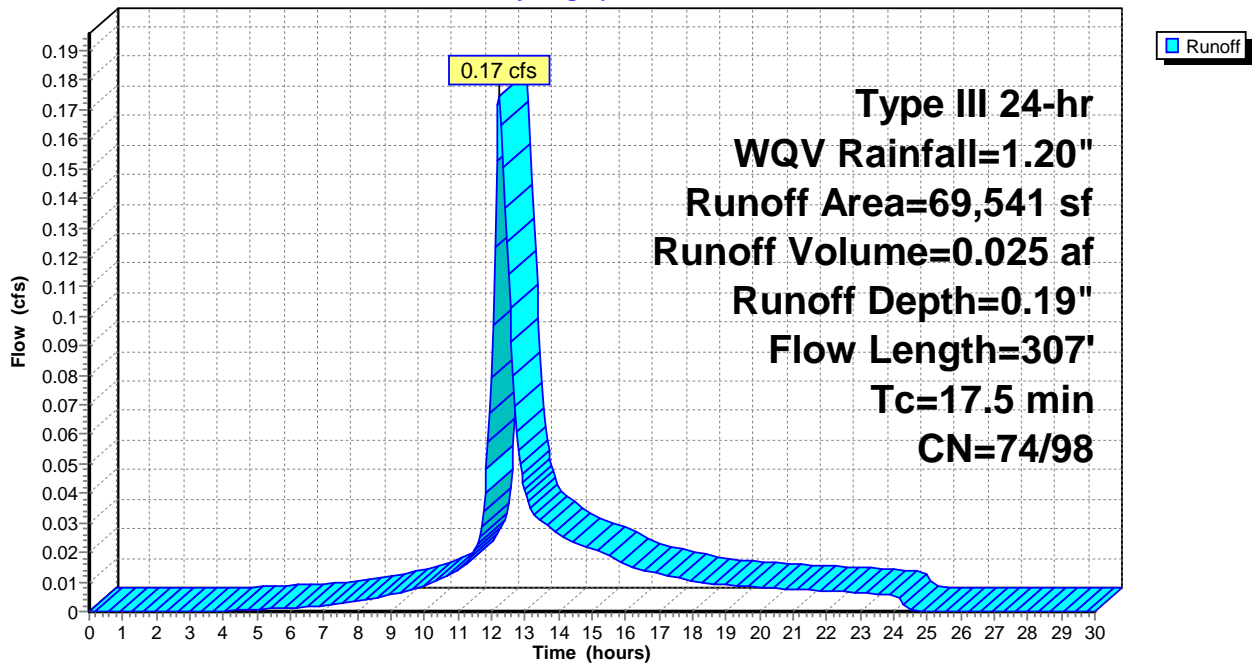
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv. UI as Pervious, Time Span= 0.00-30.00 hrs, dt= 0.05
 Type III 24-hr WQV Rainfall=1.20"

Area (sf)	CN	Description
59,844	74	>75% Grass cover, Good, HSG C
* 2,247	98	Existing Impervious, HSG C
* 7,450	98	Tennis Court, HSG C
69,541	77	Weighted Average
59,844	74	86.06% Pervious Area
9,697	98	13.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	210	0.0600	0.21		Sheet Flow, Grass: Dense n= 0.240 P2= 3.33"
0.7	61	0.0050	1.44		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	36	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
17.5	307	Total			

Subcatchment 6S: UNC

Hydrograph



Summary for Pond 8P: INFIL-1

Inflow Area = 0.177 ac, 10.12% Impervious, Inflow Depth = 0.30" for WQV event
 Inflow = 0.06 cfs @ 12.03 hrs, Volume= 0.004 af
 Outflow = 0.01 cfs @ 12.85 hrs, Volume= 0.004 af, Atten= 86%, Lag= 48.9 min
 Discarded = 0.01 cfs @ 12.85 hrs, Volume= 0.004 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 216.55' @ 12.85 hrs Surf.Area= 1,223 sf Storage= 58 cf

Plug-Flow detention time= 74.0 min calculated for 0.004 af (100% of inflow)
 Center-of-Mass det. time= 73.8 min (927.5 - 853.7)

Volume	Invert	Avail.Storage	Storage Description
#1	216.50'	2,613 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.50	1,203	0	0
217.00	1,416	655	655
218.00	2,500	1,958	2,613

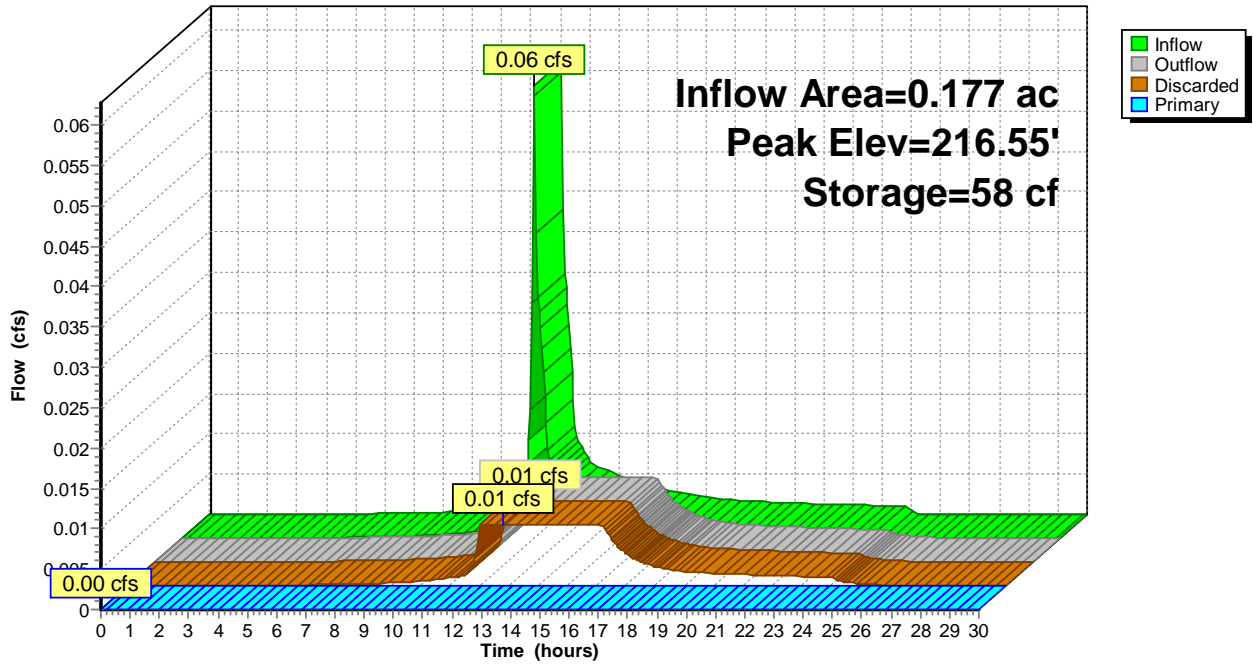
Device	Routing	Invert	Outlet Devices
#1	Discarded	216.50'	0.270 in/hr Exfiltration over Surface area
#2	Primary	217.00'	20.0' long x 6.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Discarded OutFlow Max=0.01 cfs @ 12.85 hrs HW=216.55' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=216.50' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 8P: INFIL-1

Hydrograph



Summary for Pond 9P: INFIL-2

Inflow Area = 0.383 ac, 10.63% Impervious, Inflow Depth = 0.32" for WQV event
 Inflow = 0.14 cfs @ 12.05 hrs, Volume= 0.010 af
 Outflow = 0.01 cfs @ 16.81 hrs, Volume= 0.008 af, Atten= 96%, Lag= 285.6 min
 Discarded = 0.01 cfs @ 16.81 hrs, Volume= 0.008 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 214.36' @ 16.81 hrs Surf.Area= 854 sf Storage= 252 cf

Plug-Flow detention time= 441.8 min calculated for 0.008 af (77% of inflow)
 Center-of-Mass det. time= 350.5 min (1,201.9 - 851.3)

Volume	Invert	Avail.Storage	Storage Description
#1	214.00'	3,224 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
214.00	537	0	0
215.00	1,412	975	975
216.00	3,087	2,250	3,224

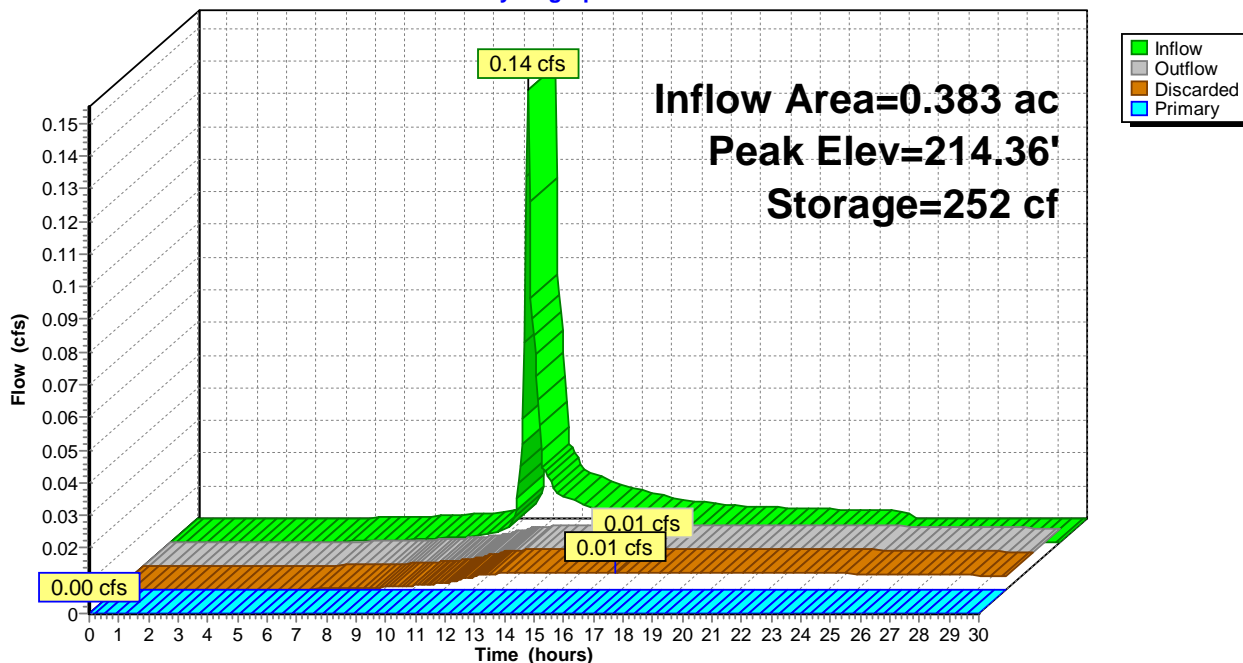
Device	Routing	Invert	Outlet Devices
#1	Discarded	214.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	215.00'	20.0' long x 6.0' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00			
2.50 3.00 3.50 4.00 4.50 5.00 5.50			
Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65			
2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83			

Discarded OutFlow Max=0.01 cfs @ 16.81 hrs HW=214.36' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=214.00' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 9P: INFIL-2

Hydrograph



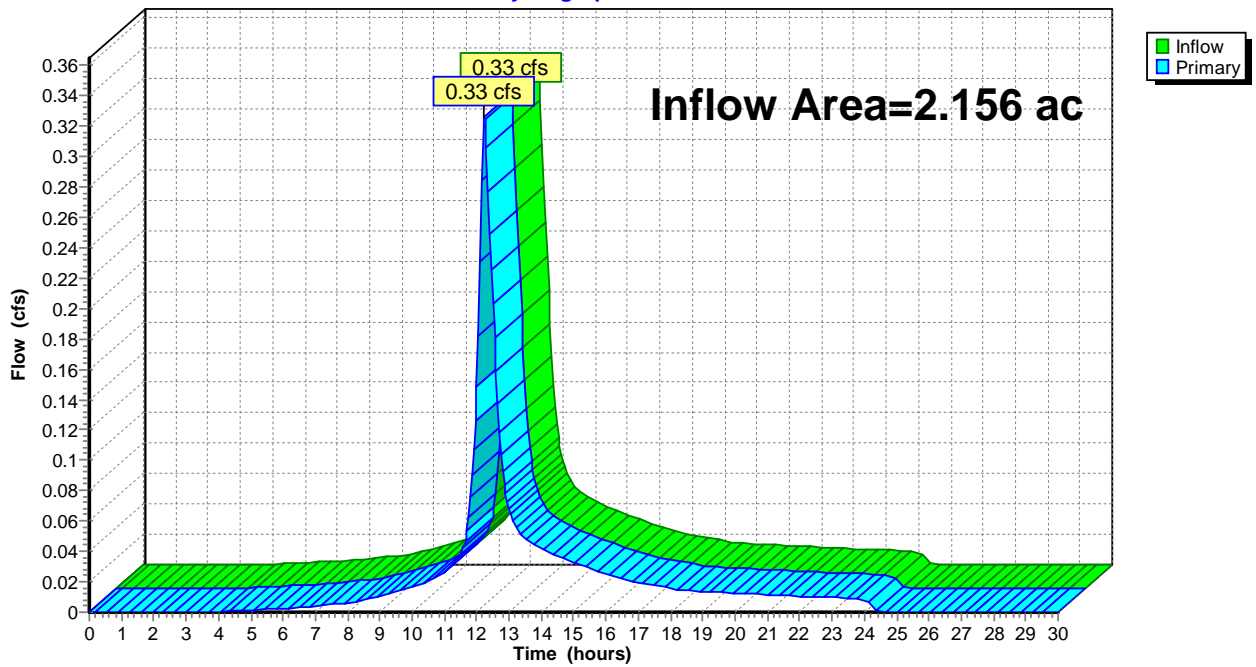
Summary for Link 3L: PRE

Inflow Area = 2.156 ac, 19.28% Impervious, Inflow Depth = 0.24" for WQV event
Inflow = 0.33 cfs @ 12.24 hrs, Volume= 0.043 af
Primary = 0.33 cfs @ 12.24 hrs, Volume= 0.043 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 3L: PRE

Hydrograph



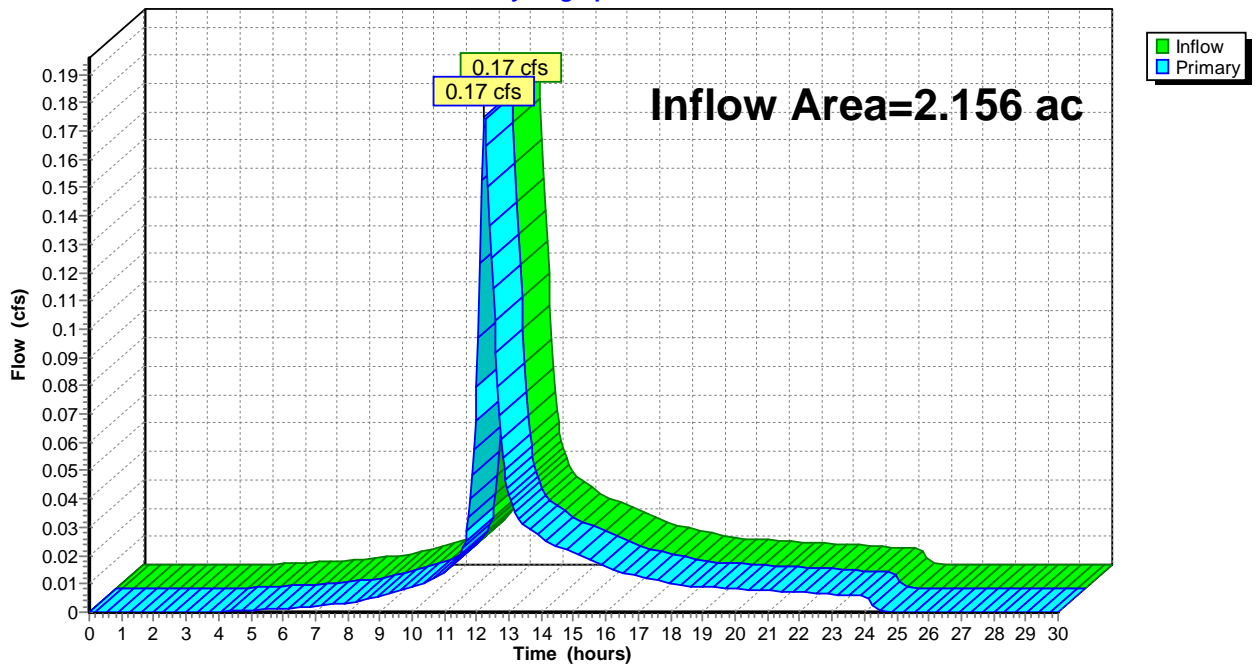
Summary for Link 7L: POST

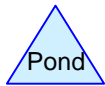
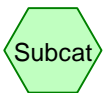
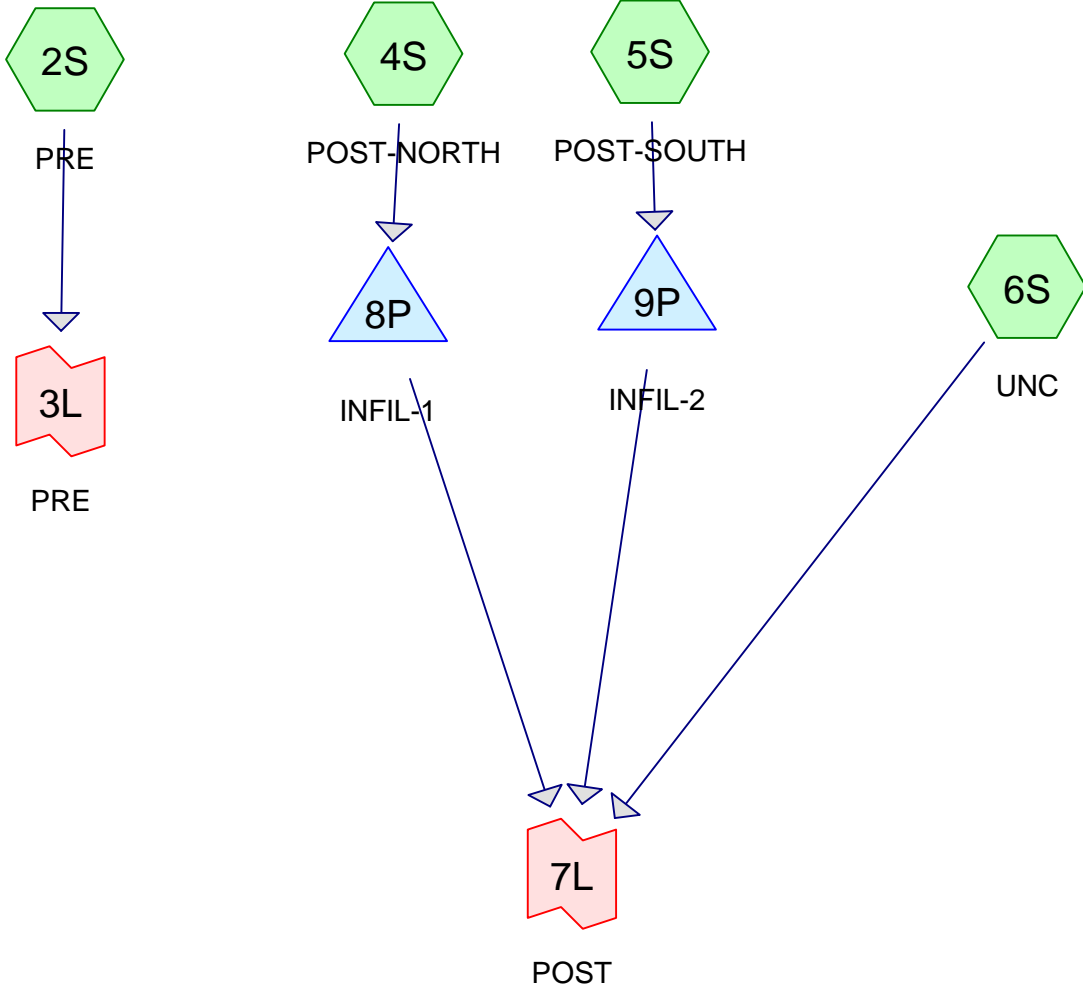
Inflow Area = 2.156 ac, 13.04% Impervious, Inflow Depth = 0.14" for WQV event
Inflow = 0.17 cfs @ 12.24 hrs, Volume= 0.025 af
Primary = 0.17 cfs @ 12.24 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 7L: POST

Hydrograph





Routing Diagram for 1747 MOORESFIELD - KAB
 Prepared by {enter your company name here}, Printed 5/20/2022
 HydroCAD® 10.00-26 s/n 08247 © 2020 HydroCAD Software Solutions LLC

1747 MOORESFIELD - KAB

Prepared by {enter your company name here}
HydroCAD® 10.00-26 s/n 08247 © 2020 HydroCAD Software Solutions LLC

Printed 5/20/2022

Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.414	74	>75% Grass cover, Good, HSG C (2S, 4S, 5S, 6S)
0.059	98	Existing Building, HSG C (4S, 5S)
0.052	98	Existing Impervious, HSG C (6S)
0.135	98	Paved parking, HSG C (2S)
0.110	98	Roofs, HSG C (2S)
0.342	98	Tennis Court, HSG C (2S, 6S)
0.201	98	Unconnected pavement, HSG C (4S, 5S)
4.312	79	TOTAL AREA

1747 MOORESFIELD - KAB

Prepared by {enter your company name here}

Printed 5/20/2022

HydroCAD® 10.00-26 s/n 08247 © 2020 HydroCAD Software Solutions LLC

Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
4.312	HSG C	2S, 4S, 5S, 6S
0.000	HSG D	
0.000	Other	
4.312		TOTAL AREA

1747 MOORESFIELD - KAB

Prepared by {enter your company name here}

Printed 5/20/2022

HydroCAD® 10.00-26 s/n 08247 © 2020 HydroCAD Software Solutions LLC

Page 4

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	3.414	0.000	0.000	3.414	>75% Grass cover, Good	2S, 4S, 5S, 6S
0.000	0.000	0.059	0.000	0.000	0.059	Existing Building	4S, 5S
0.000	0.000	0.052	0.000	0.000	0.052	Existing Impervious	6S
0.000	0.000	0.135	0.000	0.000	0.135	Paved parking	2S
0.000	0.000	0.110	0.000	0.000	0.110	Roofs	2S
0.000	0.000	0.342	0.000	0.000	0.342	Tennis Court	2S, 6S
0.000	0.000	0.201	0.000	0.000	0.201	Unconnected pavement	4S, 5S
0.000	0.000	4.312	0.000	0.000	4.312	TOTAL AREA	

1747 MOORESFIELD - KAB

Type III 24-hr 1-yr Rainfall=2.80"

Prepared by {enter your company name here}

Printed 5/20/2022

HydroCAD® 10.00-26 s/n 08247 © 2020 HydroCAD Software Solutions LLC

Page 5

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2S: PRE	Runoff Area=93,916 sf 19.28% Impervious Runoff Depth=1.04" Flow Length=307' Tc=17.5 min CN=79 Runoff=1.81 cfs 0.188 af
Subcatchment 4S: POST-NORTH	Runoff Area=7,709 sf 44.42% Impervious Runoff Depth=1.42" Flow Length=76' Tc=1.0 min CN=85 Runoff=0.33 cfs 0.021 af
Subcatchment 5S: POST-SOUTH	Runoff Area=16,666 sf 47.42% Impervious Runoff Depth=1.42" Flow Length=179' Tc=2.0 min CN=85 Runoff=0.70 cfs 0.045 af
Subcatchment 6S: UNC	Runoff Area=69,541 sf 13.94% Impervious Runoff Depth=0.93" Flow Length=307' Tc=17.5 min CN=77 Runoff=1.18 cfs 0.124 af
Pond 8P: INFIL-1	Peak Elev=216.95' Storage=579 cf Inflow=0.33 cfs 0.021 af Discarded=0.01 cfs 0.014 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.014 af
Pond 9P: INFIL-2	Peak Elev=215.01' Storage=994 cf Inflow=0.70 cfs 0.045 af Discarded=0.01 cfs 0.014 af Primary=0.09 cfs 0.013 af Outflow=0.10 cfs 0.027 af
Link 3L: PRE	Inflow=1.81 cfs 0.188 af Primary=1.81 cfs 0.188 af
Link 7L: POST	Inflow=1.18 cfs 0.138 af Primary=1.18 cfs 0.138 af

Total Runoff Area = 4.312 ac Runoff Volume = 0.378 af Average Runoff Depth = 1.05"
79.17% Pervious = 3.414 ac 20.83% Impervious = 0.898 ac

Summary for Subcatchment 2S: PRE

Runoff = 1.81 cfs @ 12.26 hrs, Volume= 0.188 af, Depth= 1.04"

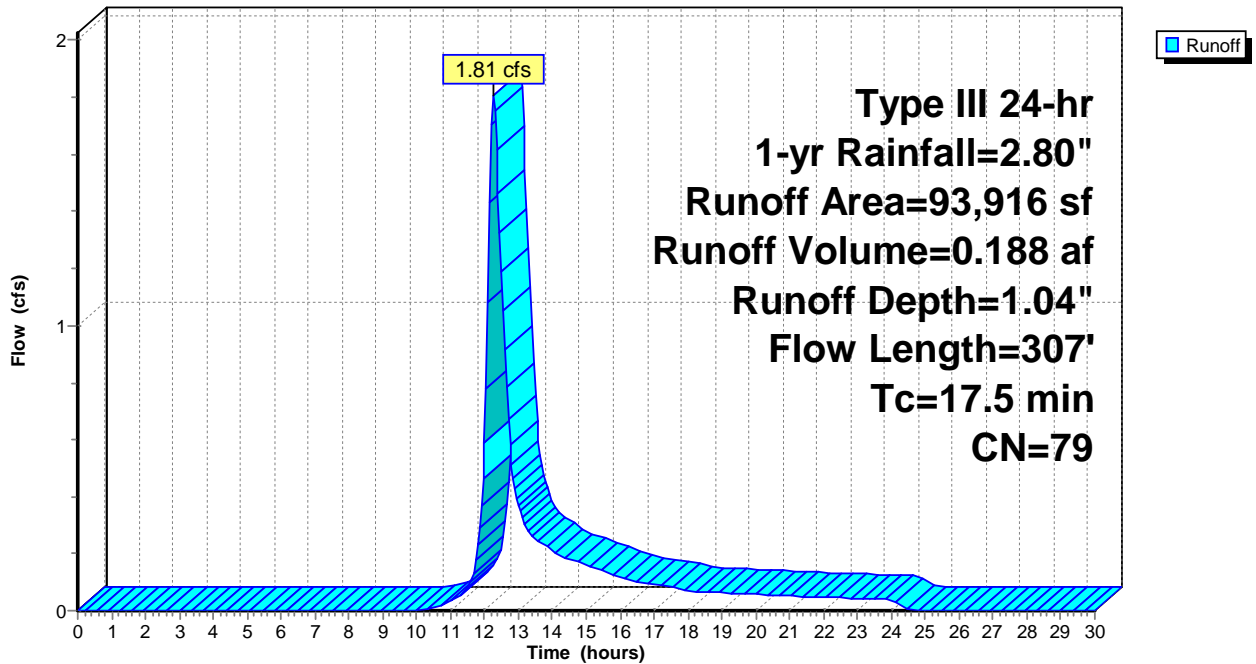
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-yr Rainfall=2.80"

Area (sf)	CN	Description
5,864	98	Paved parking, HSG C
* 7,450	98	Tennis Court, HSG C
4,793	98	Roofs, HSG C
75,809	74	>75% Grass cover, Good, HSG C
93,916	79	Weighted Average
75,809	74	80.72% Pervious Area
18,107	98	19.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	210	0.0600	0.21		Sheet Flow, Grass: Dense n= 0.240 P2= 3.33"
0.7	61	0.0050	1.44		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	36	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
17.5	307	Total			

Subcatchment 2S: PRE

Hydrograph



Summary for Subcatchment 4S: POST-NORTH

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.33 cfs @ 12.02 hrs, Volume= 0.021 af, Depth= 1.42"

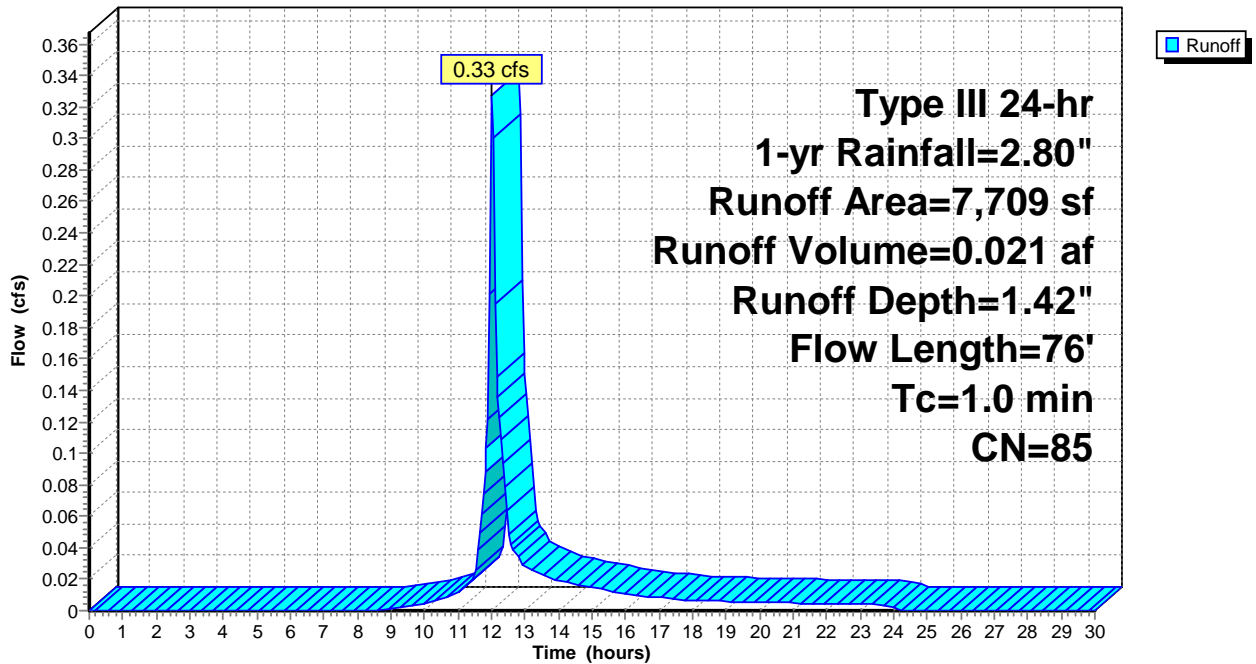
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-yr Rainfall=2.80"

	Area (sf)	CN	Description
*	780	98	Existing Building, HSG C
	2,644	98	Unconnected pavement, HSG C
	4,285	74	>75% Grass cover, Good, HSG C
	7,709	85	Weighted Average
	4,285	74	55.58% Pervious Area
	3,424	98	44.42% Impervious Area
	2,644		77.22% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	64	0.0140	1.11		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.33"
0.0	12	0.0800	4.55		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.0	76	Total			

Subcatchment 4S: POST-NORTH

Hydrograph



Summary for Subcatchment 5S: POST-SOUTH

[49] Hint: Tc<2dt may require smaller dt

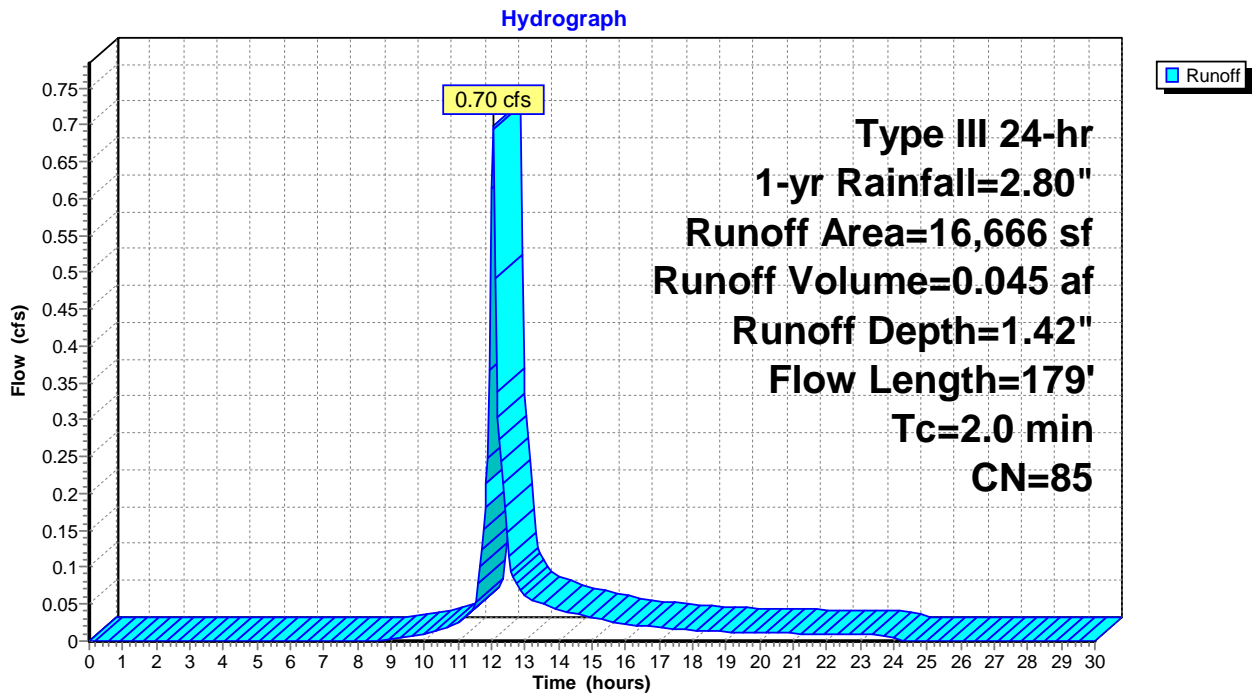
Runoff = 0.70 cfs @ 12.04 hrs, Volume= 0.045 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-yr Rainfall=2.80"

Area (sf)	CN	Description
* 1,771	98	Existing Building, HSG C
6,132	98	Unconnected pavement, HSG C
8,763	74	>75% Grass cover, Good, HSG C
16,666	85	Weighted Average
8,763	74	52.58% Pervious Area
7,903	98	47.42% Impervious Area
6,132		77.59% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	98	0.0090	1.02		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.33"
0.3	54	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	27	0.0700	4.26		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
2.0	179	Total			

Subcatchment 5S: POST-SOUTH



Summary for Subcatchment 6S: UNC

Runoff = 1.18 cfs @ 12.26 hrs, Volume= 0.124 af, Depth= 0.93"

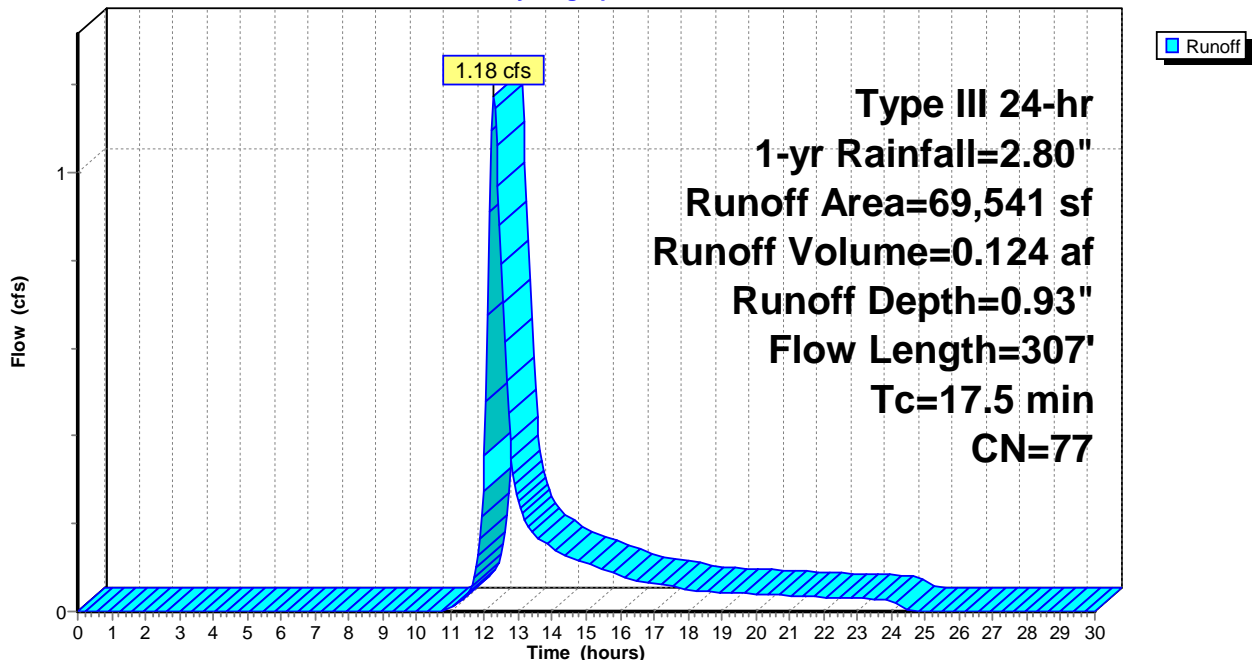
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-yr Rainfall=2.80"

Area (sf)	CN	Description
59,844	74	>75% Grass cover, Good, HSG C
* 2,247	98	Existing Impervious, HSG C
* 7,450	98	Tennis Court, HSG C
69,541	77	Weighted Average
59,844	74	86.06% Pervious Area
9,697	98	13.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	210	0.0600	0.21		Sheet Flow, Grass: Dense n= 0.240 P2= 3.33"
0.7	61	0.0050	1.44		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	36	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
17.5	307	Total			

Subcatchment 6S: UNC

Hydrograph



Summary for Pond 8P: INFIL-1

Inflow Area = 0.177 ac, 44.42% Impervious, Inflow Depth = 1.42" for 1-yr event
 Inflow = 0.33 cfs @ 12.02 hrs, Volume= 0.021 af
 Outflow = 0.01 cfs @ 16.86 hrs, Volume= 0.014 af, Atten= 97%, Lag= 290.6 min
 Discarded = 0.01 cfs @ 16.86 hrs, Volume= 0.014 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 216.95' @ 16.86 hrs Surf.Area= 1,393 sf Storage= 579 cf

Plug-Flow detention time= 485.6 min calculated for 0.014 af (66% of inflow)
 Center-of-Mass det. time= 382.8 min (1,210.3 - 827.6)

Volume	Invert	Avail.Storage	Storage Description
#1	216.50'	2,613 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.50	1,203	0	0
217.00	1,416	655	655
218.00	2,500	1,958	2,613

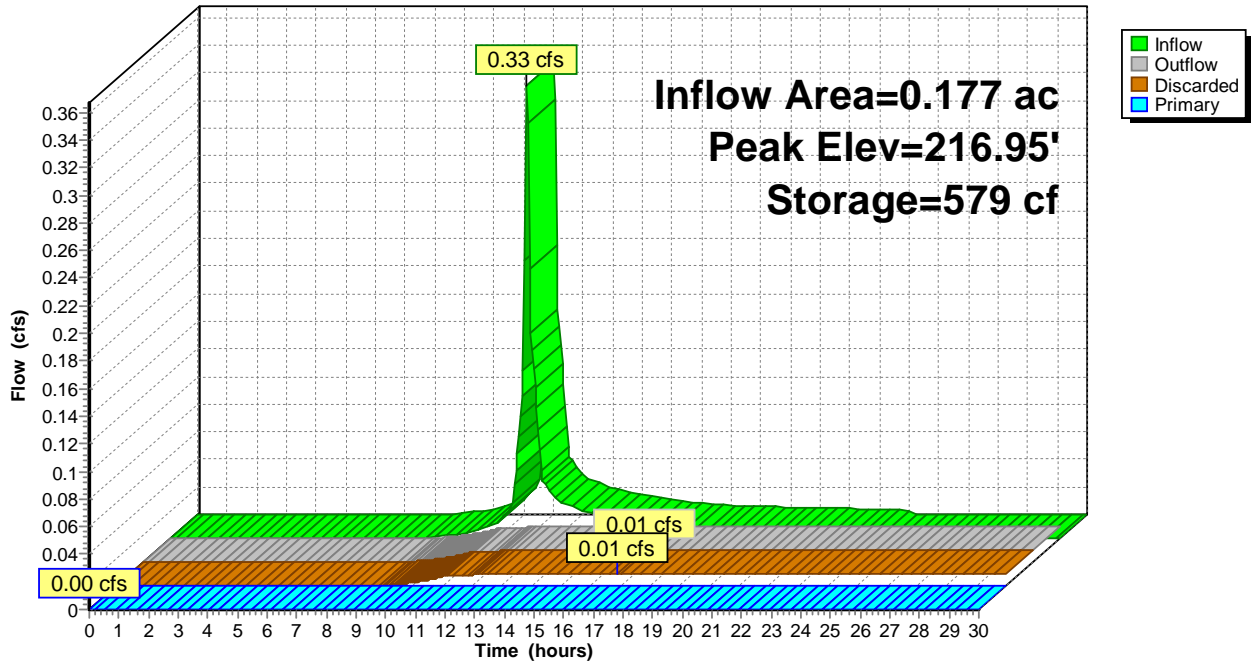
Device	Routing	Invert	Outlet Devices
#1	Discarded	216.50'	0.270 in/hr Exfiltration over Surface area
#2	Primary	217.00'	20.0' long x 6.0' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00			
2.50 3.00 3.50 4.00 4.50 5.00 5.50			
Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65			
2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83			

Discarded OutFlow Max=0.01 cfs @ 16.86 hrs HW=216.95' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=216.50' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 8P: INFIL-1

Hydrograph



Summary for Pond 9P: INFIL-2

Inflow Area = 0.383 ac, 47.42% Impervious, Inflow Depth = 1.42" for 1-yr event
 Inflow = 0.70 cfs @ 12.04 hrs, Volume= 0.045 af
 Outflow = 0.10 cfs @ 12.55 hrs, Volume= 0.027 af, Atten= 86%, Lag= 30.9 min
 Discarded = 0.01 cfs @ 12.55 hrs, Volume= 0.014 af
 Primary = 0.09 cfs @ 12.55 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 215.01' @ 12.55 hrs Surf.Area= 1,435 sf Storage= 994 cf

Plug-Flow detention time= 329.0 min calculated for 0.027 af (60% of inflow)
 Center-of-Mass det. time= 218.8 min (1,047.3 - 828.5)

Volume	Invert	Avail.Storage	Storage Description
#1	214.00'	3,224 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
214.00	537	0	0
215.00	1,412	975	975
216.00	3,087	2,250	3,224

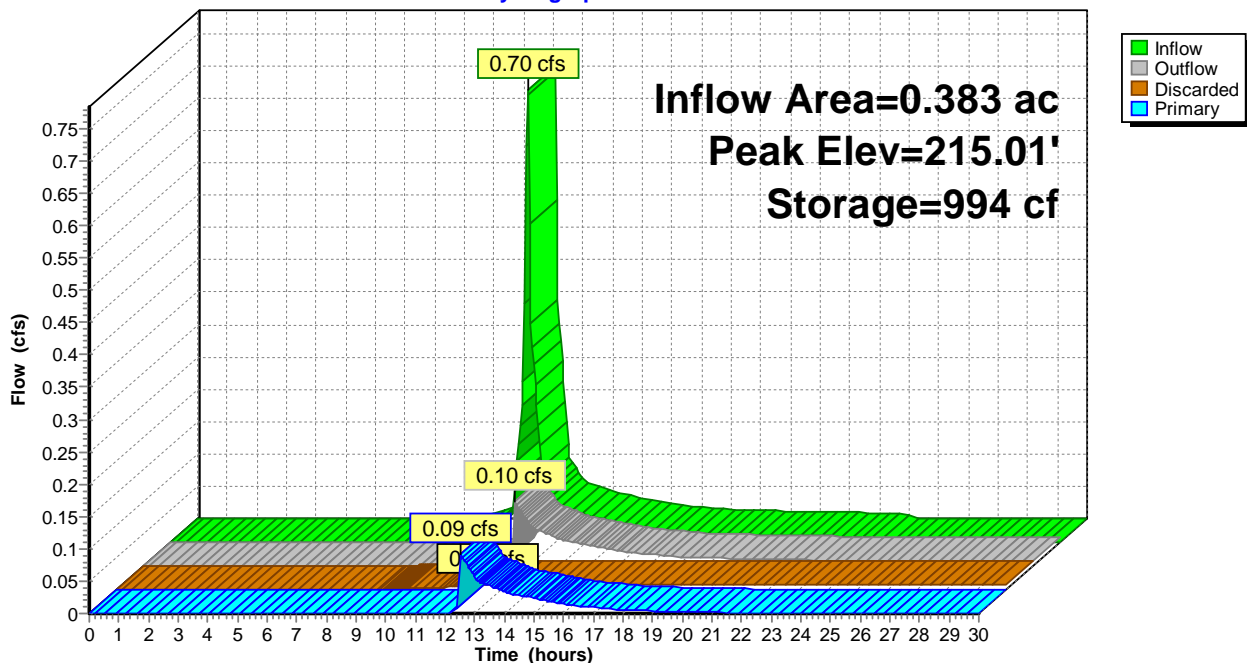
Device	Routing	Invert	Outlet Devices
#1	Discarded	214.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	215.00'	20.0' long x 6.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Discarded OutFlow Max=0.01 cfs @ 12.55 hrs HW=215.01' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.07 cfs @ 12.55 hrs HW=215.01' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 0.07 cfs @ 0.28 fps)

Pond 9P: INFIL-2

Hydrograph



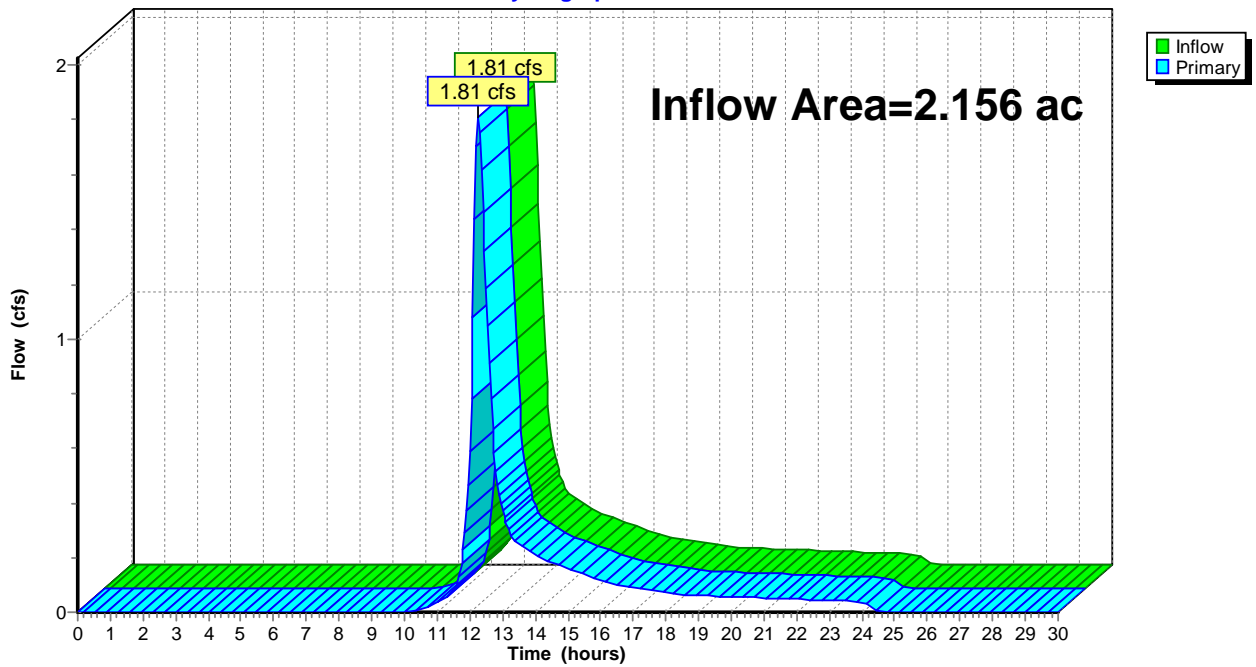
Summary for Link 3L: PRE

Inflow Area = 2.156 ac, 19.28% Impervious, Inflow Depth = 1.04" for 1-yr event
Inflow = 1.81 cfs @ 12.26 hrs, Volume= 0.188 af
Primary = 1.81 cfs @ 12.26 hrs, Volume= 0.188 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 3L: PRE

Hydrograph



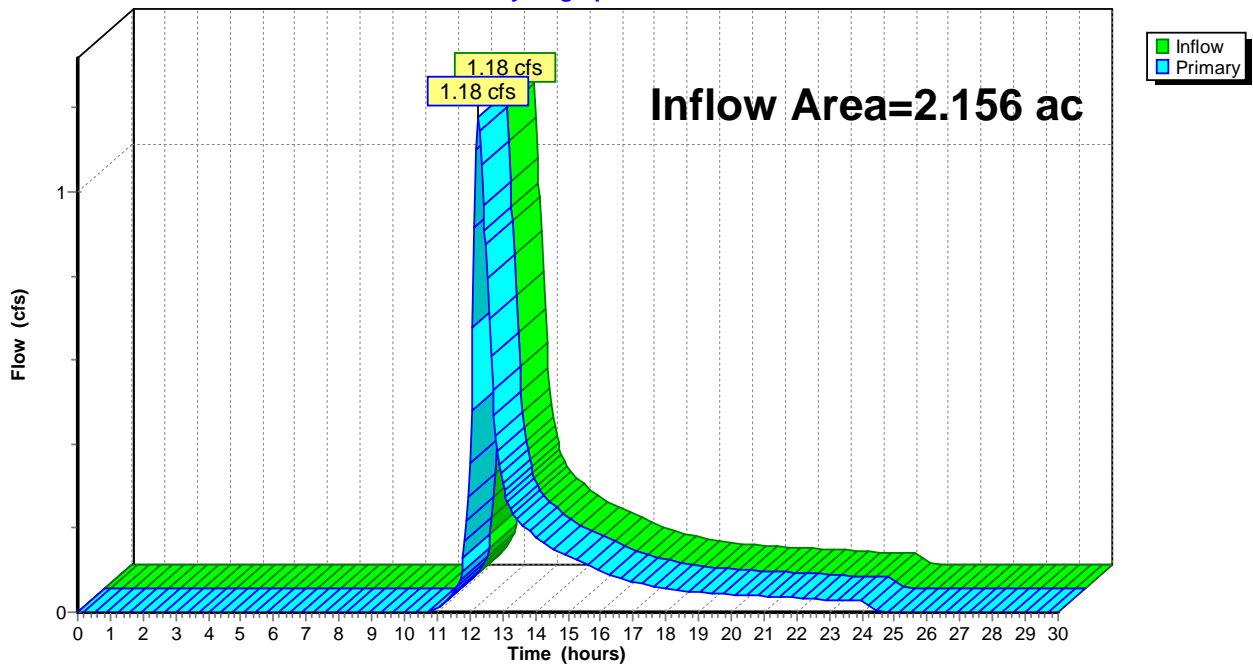
Summary for Link 7L: POST

Inflow Area = 2.156 ac, 22.39% Impervious, Inflow Depth = 0.77" for 1-yr event
Inflow = 1.18 cfs @ 12.26 hrs, Volume= 0.138 af
Primary = 1.18 cfs @ 12.26 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 7L: POST

Hydrograph



1747 MOORESFIELD - KAB

Type III 24-hr 10-yr Rainfall=4.90"

Prepared by {enter your company name here}

Printed 5/20/2022

HydroCAD® 10.00-26 s/n 08247 © 2020 HydroCAD Software Solutions LLC

Page 16

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2S: PRE

Runoff Area=93,916 sf 19.28% Impervious Runoff Depth=2.72"
Flow Length=307' Tc=17.5 min CN=79 Runoff=4.87 cfs 0.488 af

Subcatchment 4S: POST-NORTH

Runoff Area=7,709 sf 44.42% Impervious Runoff Depth=3.28"
Flow Length=76' Tc=1.0 min CN=85 Runoff=0.75 cfs 0.048 af

Subcatchment 5S: POST-SOUTH

Runoff Area=16,666 sf 47.42% Impervious Runoff Depth=3.28"
Flow Length=179' Tc=2.0 min CN=85 Runoff=1.59 cfs 0.104 af

Subcatchment 6S: UNC

Runoff Area=69,541 sf 13.94% Impervious Runoff Depth=2.54"
Flow Length=307' Tc=17.5 min CN=77 Runoff=3.36 cfs 0.338 af

Pond 8P: INFIL-1

Peak Elev=217.05' Storage=726 cf Inflow=0.75 cfs 0.048 af
Discarded=0.01 cfs 0.016 af Primary=0.52 cfs 0.022 af Outflow=0.53 cfs 0.038 af

Pond 9P: INFIL-2

Peak Elev=215.10' Storage=1,126 cf Inflow=1.59 cfs 0.104 af
Discarded=0.01 cfs 0.015 af Primary=1.52 cfs 0.071 af Outflow=1.53 cfs 0.086 af

Link 3L: PRE

Inflow=4.87 cfs 0.488 af
Primary=4.87 cfs 0.488 af

Link 7L: POST

Inflow=4.27 cfs 0.431 af
Primary=4.27 cfs 0.431 af

Total Runoff Area = 4.312 ac Runoff Volume = 0.979 af Average Runoff Depth = 2.72"
79.17% Pervious = 3.414 ac 20.83% Impervious = 0.898 ac

Summary for Subcatchment 2S: PRE

Runoff = 4.87 cfs @ 12.24 hrs, Volume= 0.488 af, Depth= 2.72"

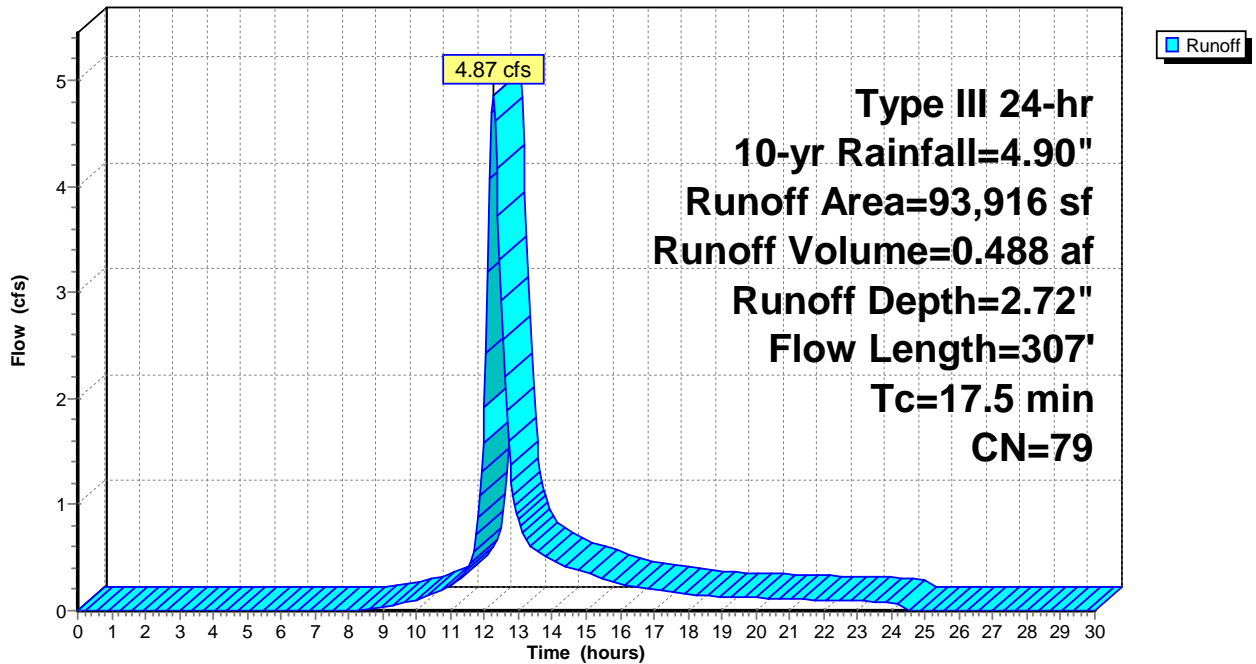
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.90"

Area (sf)	CN	Description
5,864	98	Paved parking, HSG C
* 7,450	98	Tennis Court, HSG C
4,793	98	Roofs, HSG C
75,809	74	>75% Grass cover, Good, HSG C
93,916	79	Weighted Average
75,809	74	80.72% Pervious Area
18,107	98	19.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	210	0.0600	0.21		Sheet Flow, Grass: Dense n= 0.240 P2= 3.33"
0.7	61	0.0050	1.44		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	36	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
17.5	307	Total			

Subcatchment 2S: PRE

Hydrograph



Summary for Subcatchment 4S: POST-NORTH

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.75 cfs @ 12.02 hrs, Volume= 0.048 af, Depth= 3.28"

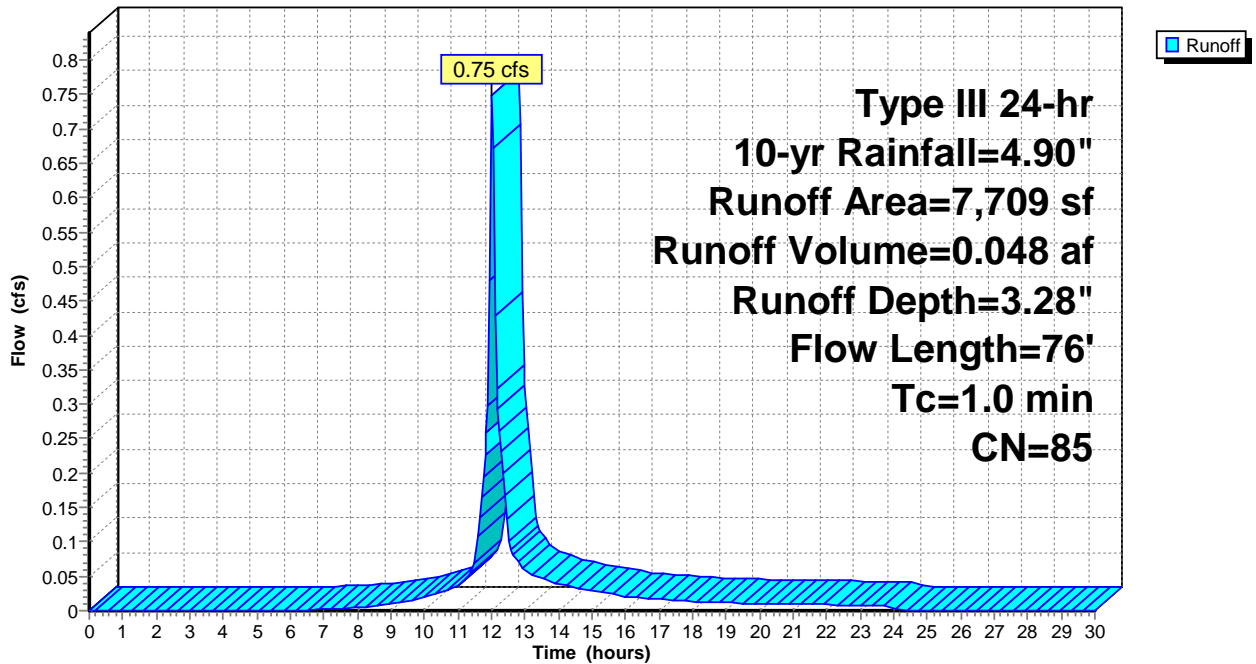
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.90"

	Area (sf)	CN	Description
*	780	98	Existing Building, HSG C
	2,644	98	Unconnected pavement, HSG C
	4,285	74	>75% Grass cover, Good, HSG C
	7,709	85	Weighted Average
	4,285	74	55.58% Pervious Area
	3,424	98	44.42% Impervious Area
	2,644		77.22% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	64	0.0140	1.11		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.33"
0.0	12	0.0800	4.55		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.0	76	Total			

Subcatchment 4S: POST-NORTH

Hydrograph



Summary for Subcatchment 5S: POST-SOUTH

[49] Hint: Tc<2dt may require smaller dt

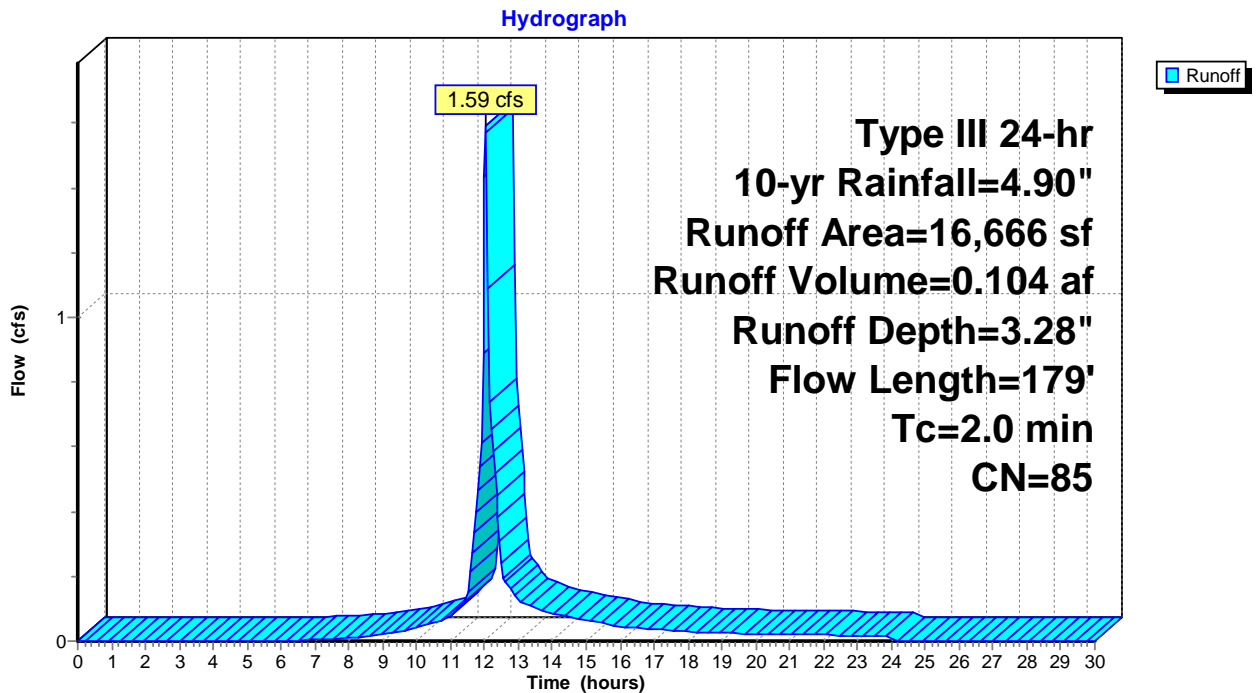
Runoff = 1.59 cfs @ 12.04 hrs, Volume= 0.104 af, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.90"

Area (sf)	CN	Description
* 1,771	98	Existing Building, HSG C
6,132	98	Unconnected pavement, HSG C
8,763	74	>75% Grass cover, Good, HSG C
16,666	85	Weighted Average
8,763	74	52.58% Pervious Area
7,903	98	47.42% Impervious Area
6,132		77.59% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	98	0.0090	1.02		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.33"
0.3	54	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	27	0.0700	4.26		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
2.0	179	Total			

Subcatchment 5S: POST-SOUTH



Summary for Subcatchment 6S: UNC

Runoff = 3.36 cfs @ 12.25 hrs, Volume= 0.338 af, Depth= 2.54"

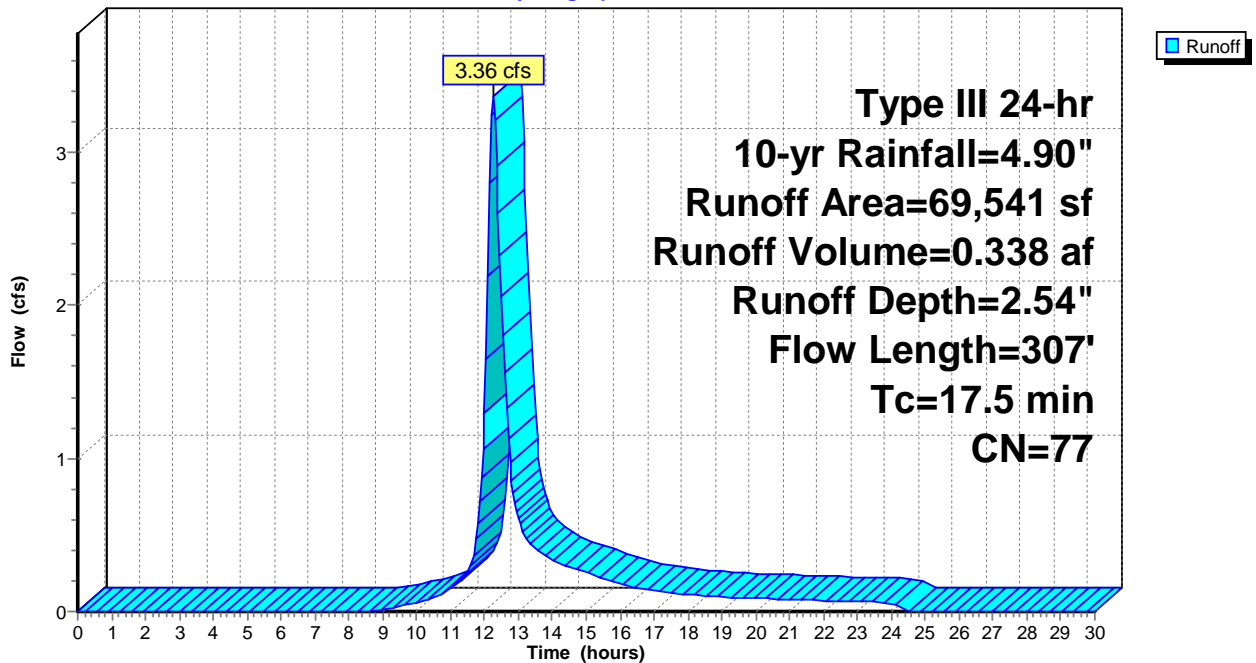
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.90"

Area (sf)	CN	Description
59,844	74	>75% Grass cover, Good, HSG C
* 2,247	98	Existing Impervious, HSG C
* 7,450	98	Tennis Court, HSG C
69,541	77	Weighted Average
59,844	74	86.06% Pervious Area
9,697	98	13.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	210	0.0600	0.21		Sheet Flow, Grass: Dense n= 0.240 P2= 3.33"
0.7	61	0.0050	1.44		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	36	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
17.5	307	Total			

Subcatchment 6S: UNC

Hydrograph



Summary for Pond 8P: INFIL-1

Inflow Area = 0.177 ac, 44.42% Impervious, Inflow Depth = 3.28" for 10-yr event
 Inflow = 0.75 cfs @ 12.02 hrs, Volume= 0.048 af
 Outflow = 0.53 cfs @ 12.11 hrs, Volume= 0.038 af, Atten= 29%, Lag= 5.6 min
 Discarded = 0.01 cfs @ 12.11 hrs, Volume= 0.016 af
 Primary = 0.52 cfs @ 12.11 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 217.05' @ 12.11 hrs Surf.Area= 1,470 sf Storage= 726 cf

Plug-Flow detention time= 222.3 min calculated for 0.038 af (78% of inflow)
 Center-of-Mass det. time= 143.4 min (947.1 - 803.7)

Volume	Invert	Avail.Storage	Storage Description
#1	216.50'	2,613 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.50	1,203	0	0
217.00	1,416	655	655
218.00	2,500	1,958	2,613

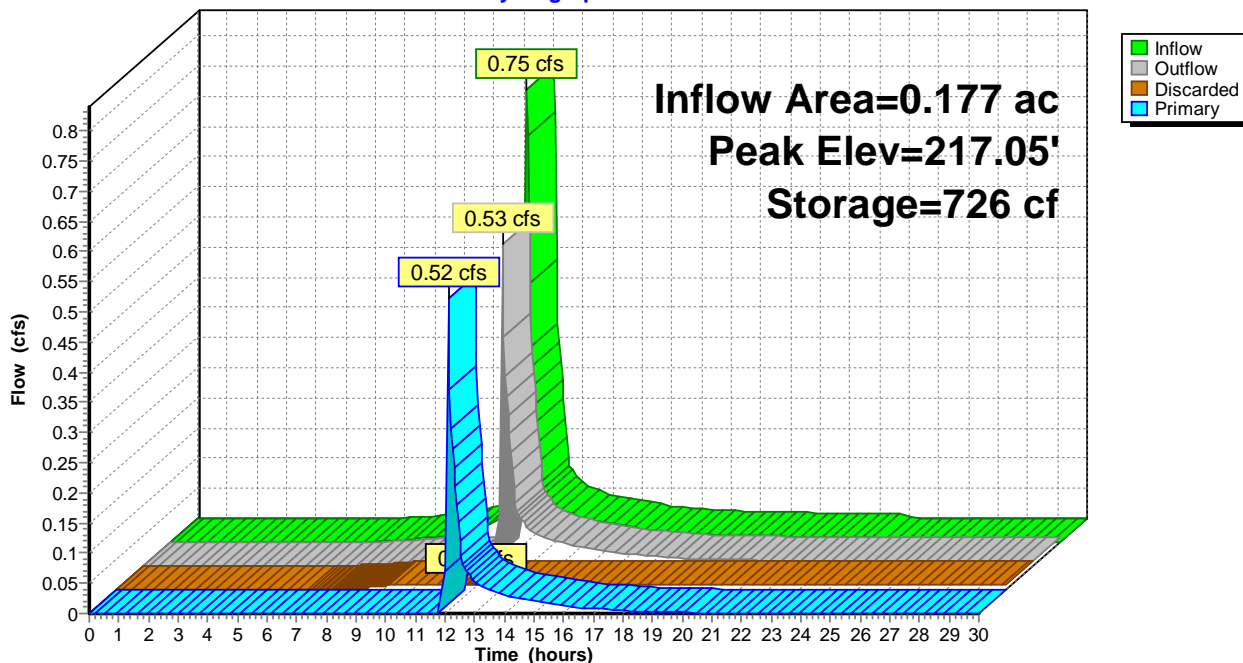
Device	Routing	Invert	Outlet Devices
#1	Discarded	216.50'	0.270 in/hr Exfiltration over Surface area
#2	Primary	217.00'	20.0' long x 6.0' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00			
2.50 3.00 3.50 4.00 4.50 5.00 5.50			
Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65			
2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83			

Discarded OutFlow Max=0.01 cfs @ 12.11 hrs HW=217.05' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.49 cfs @ 12.11 hrs HW=217.05' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 0.49 cfs @ 0.51 fps)

Pond 8P: INFIL-1

Hydrograph



Summary for Pond 9P: INFIL-2

Inflow Area = 0.383 ac, 47.42% Impervious, Inflow Depth = 3.28" for 10-yr event
 Inflow = 1.59 cfs @ 12.04 hrs, Volume= 0.104 af
 Outflow = 1.53 cfs @ 12.06 hrs, Volume= 0.086 af, Atten= 4%, Lag= 1.2 min
 Discarded = 0.01 cfs @ 12.06 hrs, Volume= 0.015 af
 Primary = 1.52 cfs @ 12.06 hrs, Volume= 0.071 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 215.10' @ 12.06 hrs Surf.Area= 1,581 sf Storage= 1,126 cf

Plug-Flow detention time= 149.3 min calculated for 0.086 af (83% of inflow)
 Center-of-Mass det. time= 78.9 min (883.5 - 804.6)

Volume	Invert	Avail.Storage	Storage Description
#1	214.00'	3,224 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
214.00	537	0	0
215.00	1,412	975	975
216.00	3,087	2,250	3,224

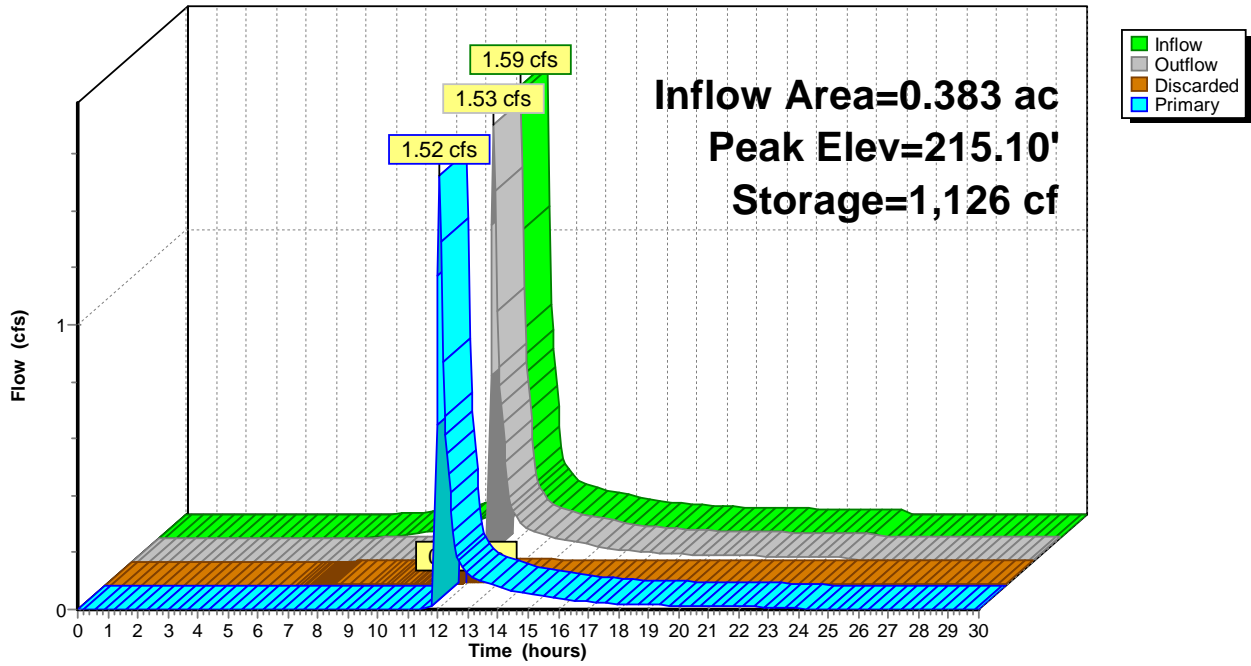
Device	Routing	Invert	Outlet Devices
#1	Discarded	214.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	215.00'	20.0' long x 6.0' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00			
2.50 3.00 3.50 4.00 4.50 5.00 5.50			
Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65			
2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83			

Discarded OutFlow Max=0.01 cfs @ 12.06 hrs HW=215.10' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.50 cfs @ 12.06 hrs HW=215.10' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 1.50 cfs @ 0.75 fps)

Pond 9P: INFIL-2

Hydrograph



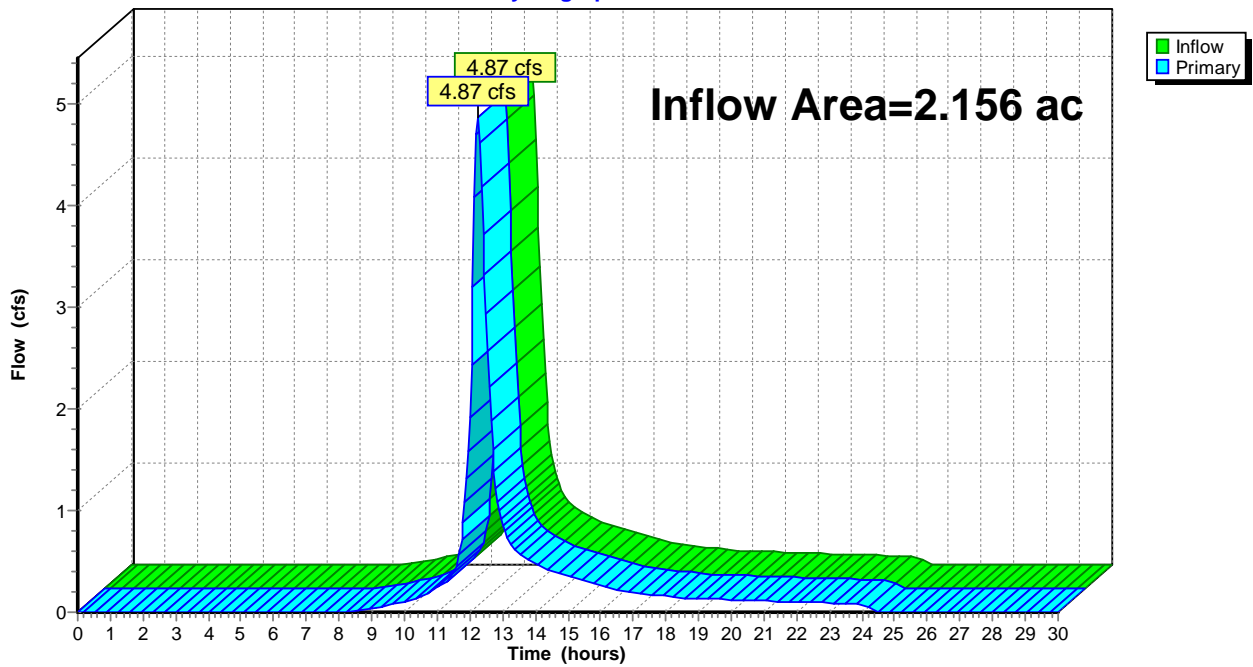
Summary for Link 3L: PRE

Inflow Area = 2.156 ac, 19.28% Impervious, Inflow Depth = 2.72" for 10-yr event
Inflow = 4.87 cfs @ 12.24 hrs, Volume= 0.488 af
Primary = 4.87 cfs @ 12.24 hrs, Volume= 0.488 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 3L: PRE

Hydrograph



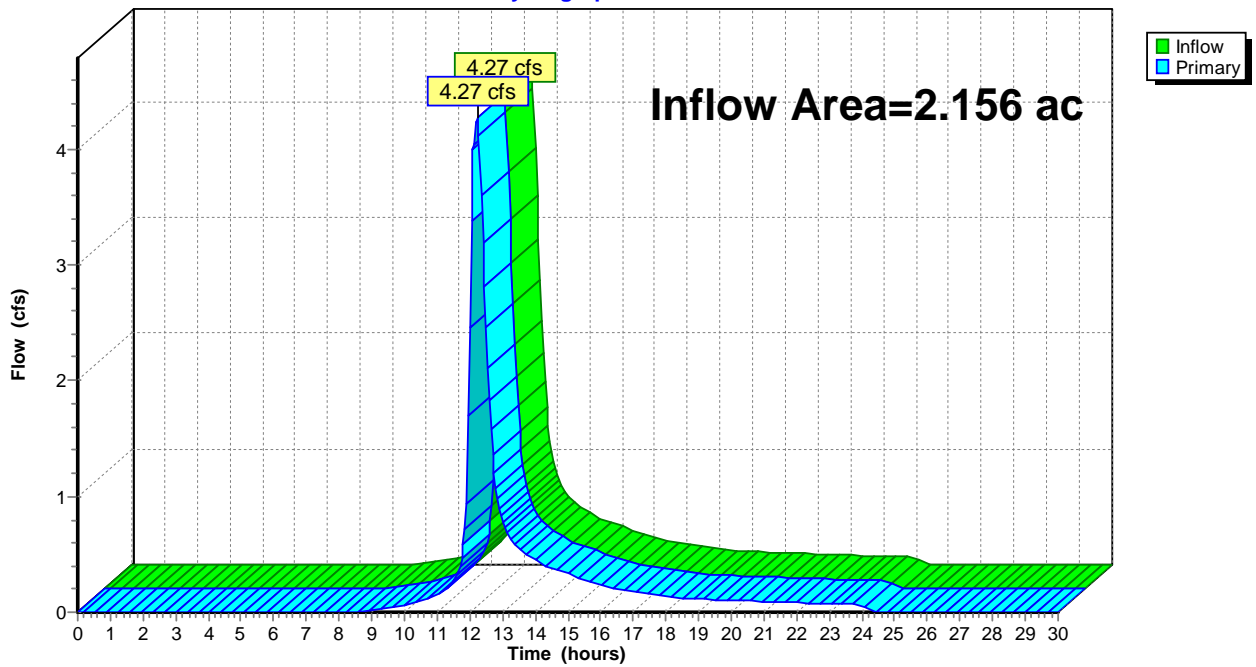
Summary for Link 7L: POST

Inflow Area = 2.156 ac, 22.39% Impervious, Inflow Depth = 2.40" for 10-yr event
Inflow = 4.27 cfs @ 12.23 hrs, Volume= 0.431 af
Primary = 4.27 cfs @ 12.23 hrs, Volume= 0.431 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 7L: POST

Hydrograph



1747 MOORESFIELD - KAB

Type III 24-hr 100-yr Rainfall=8.50"

Prepared by {enter your company name here}

Printed 5/20/2022

HydroCAD® 10.00-26 s/n 08247 © 2020 HydroCAD Software Solutions LLC

Page 27

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 2S: PRE

Runoff Area=93,916 sf 19.28% Impervious Runoff Depth=5.98"
 Flow Length=307' Tc=17.5 min CN=79 Runoff=10.58 cfs 1.074 af

Subcatchment 4S: POST-NORTH

Runoff Area=7,709 sf 44.42% Impervious Runoff Depth=6.70"
 Flow Length=76' Tc=1.0 min CN=85 Runoff=1.49 cfs 0.099 af

Subcatchment 5S: POST-SOUTH

Runoff Area=16,666 sf 47.42% Impervious Runoff Depth=6.70"
 Flow Length=179' Tc=2.0 min CN=85 Runoff=3.14 cfs 0.214 af

Subcatchment 6S: UNC

Runoff Area=69,541 sf 13.94% Impervious Runoff Depth=5.73"
 Flow Length=307' Tc=17.5 min CN=77 Runoff=7.55 cfs 0.763 af

Pond 8P: INFIL-1

Peak Elev=217.10' Storage=796 cf Inflow=1.49 cfs 0.099 af
 Discarded=0.01 cfs 0.017 af Primary=1.41 cfs 0.071 af Outflow=1.42 cfs 0.088 af

Pond 9P: INFIL-2

Peak Elev=215.16' Storage=1,224 cf Inflow=3.14 cfs 0.214 af
 Discarded=0.01 cfs 0.017 af Primary=3.06 cfs 0.179 af Outflow=3.07 cfs 0.195 af

Link 3L: PRE

Inflow=10.58 cfs 1.074 af
 Primary=10.58 cfs 1.074 af

Link 7L: POST

Inflow=9.29 cfs 1.012 af
 Primary=9.29 cfs 1.012 af

Total Runoff Area = 4.312 ac Runoff Volume = 2.149 af Average Runoff Depth = 5.98"
79.17% Pervious = 3.414 ac 20.83% Impervious = 0.898 ac

Summary for Subcatchment 2S: PRE

Runoff = 10.58 cfs @ 12.24 hrs, Volume= 1.074 af, Depth= 5.98"

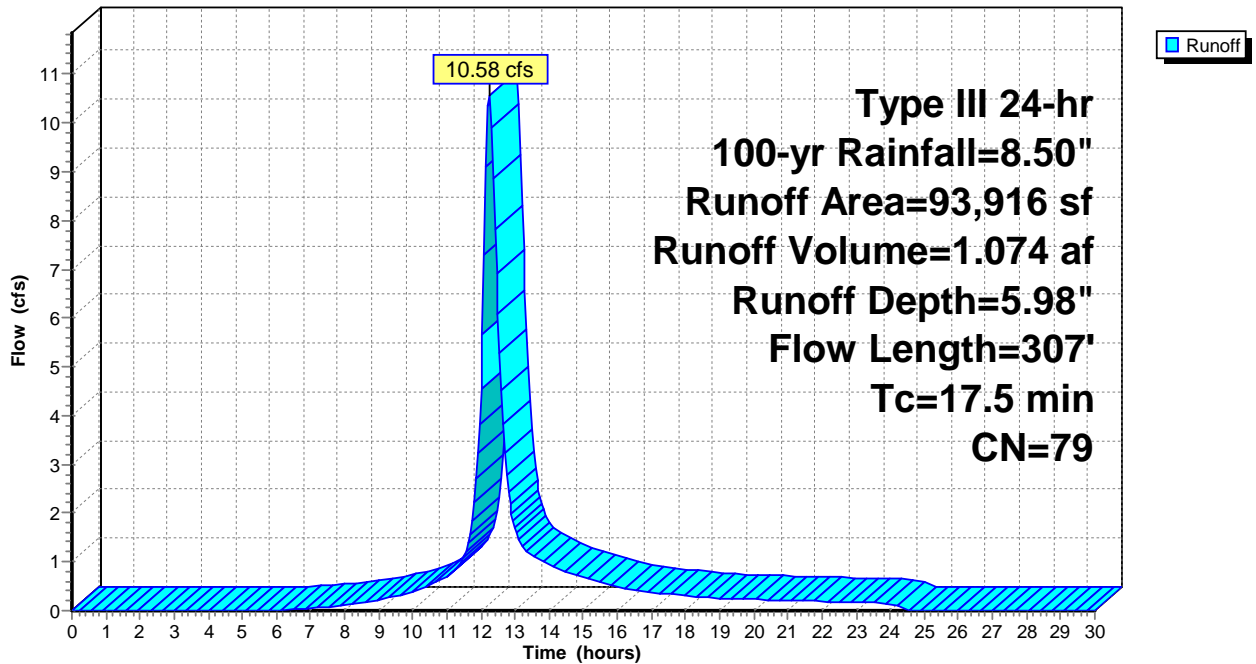
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.50"

Area (sf)	CN	Description
5,864	98	Paved parking, HSG C
* 7,450	98	Tennis Court, HSG C
4,793	98	Roofs, HSG C
75,809	74	>75% Grass cover, Good, HSG C
93,916	79	Weighted Average
75,809	74	80.72% Pervious Area
18,107	98	19.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	210	0.0600	0.21		Sheet Flow, Grass: Dense n= 0.240 P2= 3.33"
0.7	61	0.0050	1.44		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	36	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
17.5	307	Total			

Subcatchment 2S: PRE

Hydrograph



Summary for Subcatchment 4S: POST-NORTH

[49] Hint: Tc<2dt may require smaller dt

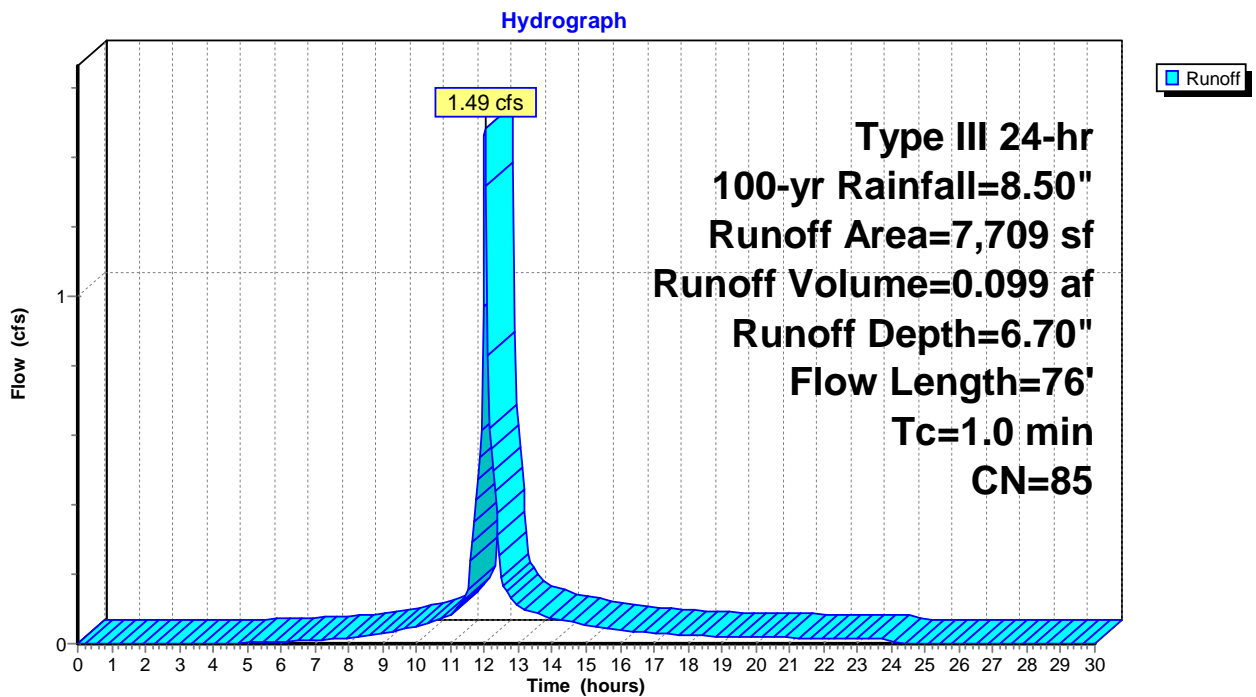
Runoff = 1.49 cfs @ 12.01 hrs, Volume= 0.099 af, Depth= 6.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.50"

Area (sf)	CN	Description
* 780	98	Existing Building, HSG C
2,644	98	Unconnected pavement, HSG C
4,285	74	>75% Grass cover, Good, HSG C
7,709	85	Weighted Average
4,285	74	55.58% Pervious Area
3,424	98	44.42% Impervious Area
2,644		77.22% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	64	0.0140	1.11		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.33"
0.0	12	0.0800	4.55		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
1.0	76	Total			

Subcatchment 4S: POST-NORTH



Summary for Subcatchment 5S: POST-SOUTH

[49] Hint: Tc<2dt may require smaller dt

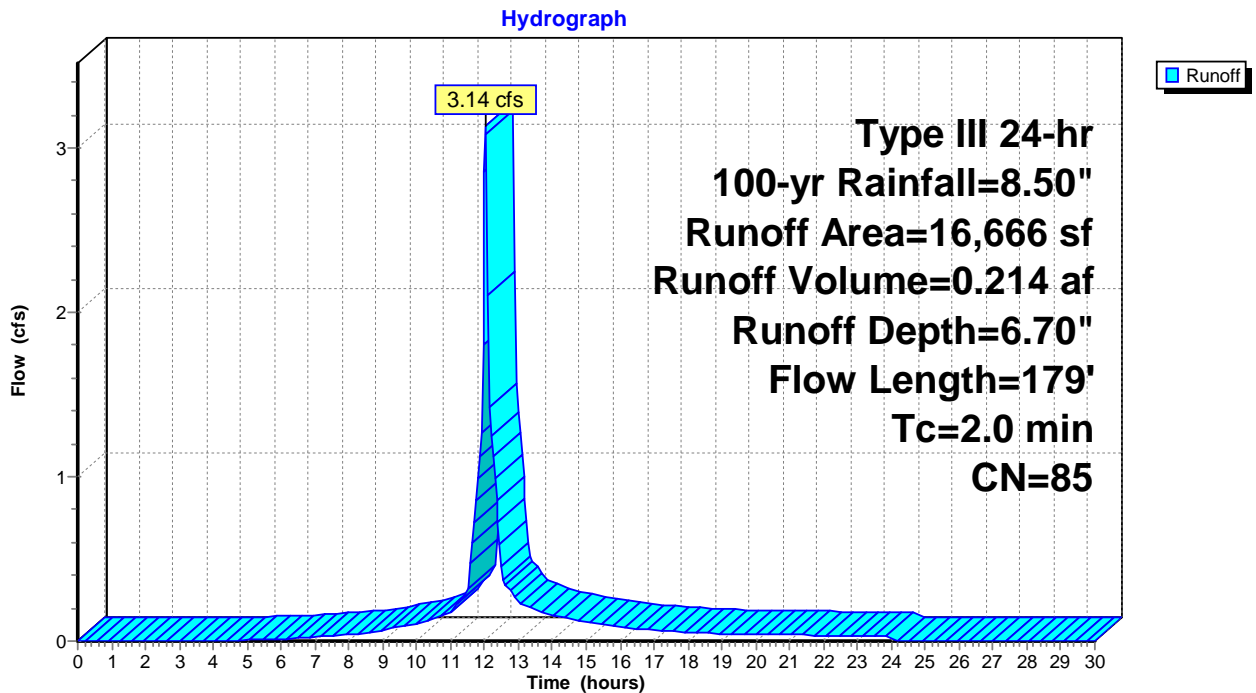
Runoff = 3.14 cfs @ 12.03 hrs, Volume= 0.214 af, Depth= 6.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-yr Rainfall=8.50"

	Area (sf)	CN	Description
*	1,771	98	Existing Building, HSG C
	6,132	98	Unconnected pavement, HSG C
	8,763	74	>75% Grass cover, Good, HSG C
	16,666	85	Weighted Average
	8,763	74	52.58% Pervious Area
	7,903	98	47.42% Impervious Area
	6,132		77.59% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	98	0.0090	1.02		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.33"
0.3	54	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	27	0.0700	4.26		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
2.0	179	Total			

Subcatchment 5S: POST-SOUTH



Summary for Subcatchment 6S: UNC

Runoff = 7.55 cfs @ 12.24 hrs, Volume= 0.763 af, Depth= 5.73"

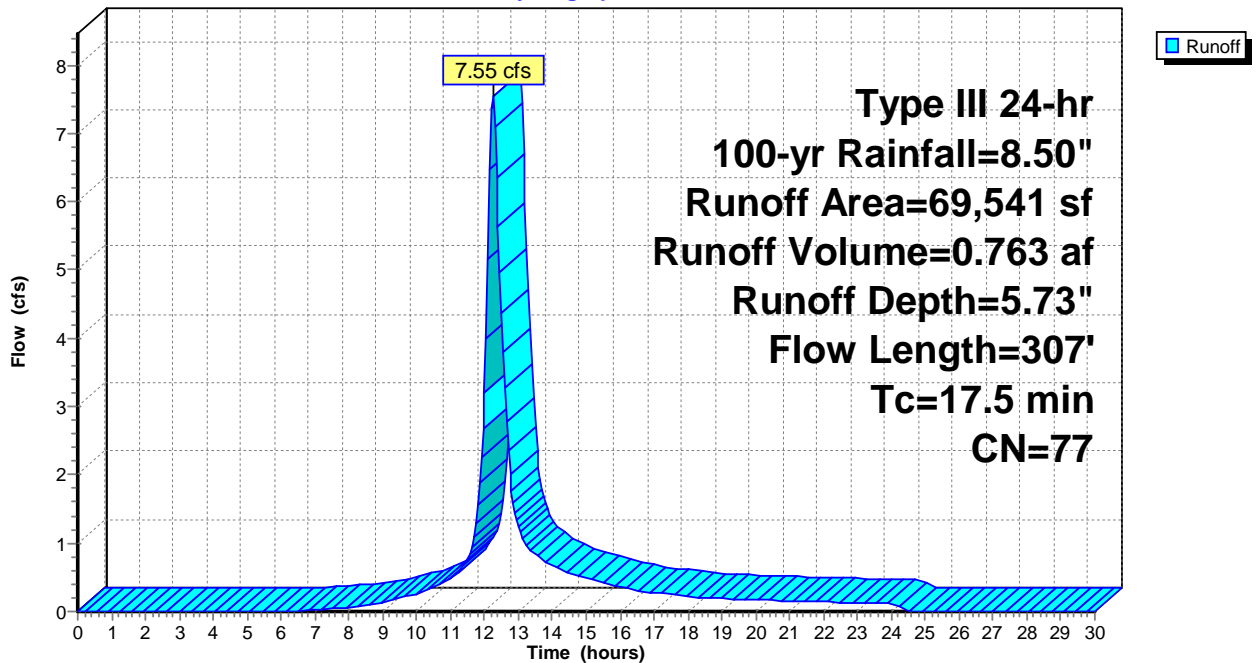
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=8.50"

Area (sf)	CN	Description
59,844	74	>75% Grass cover, Good, HSG C
* 2,247	98	Existing Impervious, HSG C
* 7,450	98	Tennis Court, HSG C
69,541	77	Weighted Average
59,844	74	86.06% Pervious Area
9,697	98	13.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	210	0.0600	0.21		Sheet Flow, Grass: Dense n= 0.240 P2= 3.33"
0.7	61	0.0050	1.44		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	36	0.0050	1.14		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
17.5	307	Total			

Subcatchment 6S: UNC

Hydrograph



Summary for Pond 8P: INFIL-1

Inflow Area = 0.177 ac, 44.42% Impervious, Inflow Depth = 6.70" for 100-yr event
 Inflow = 1.49 cfs @ 12.01 hrs, Volume= 0.099 af
 Outflow = 1.42 cfs @ 12.04 hrs, Volume= 0.088 af, Atten= 5%, Lag= 1.6 min
 Discarded = 0.01 cfs @ 12.04 hrs, Volume= 0.017 af
 Primary = 1.41 cfs @ 12.04 hrs, Volume= 0.071 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 217.10' @ 12.04 hrs Surf.Area= 1,520 sf Storage= 796 cf

Plug-Flow detention time= 122.8 min calculated for 0.088 af (89% of inflow)
 Center-of-Mass det. time= 72.2 min (856.0 - 783.8)

Volume	Invert	Avail.Storage	Storage Description
#1	216.50'	2,613 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
216.50	1,203	0	0
217.00	1,416	655	655
218.00	2,500	1,958	2,613

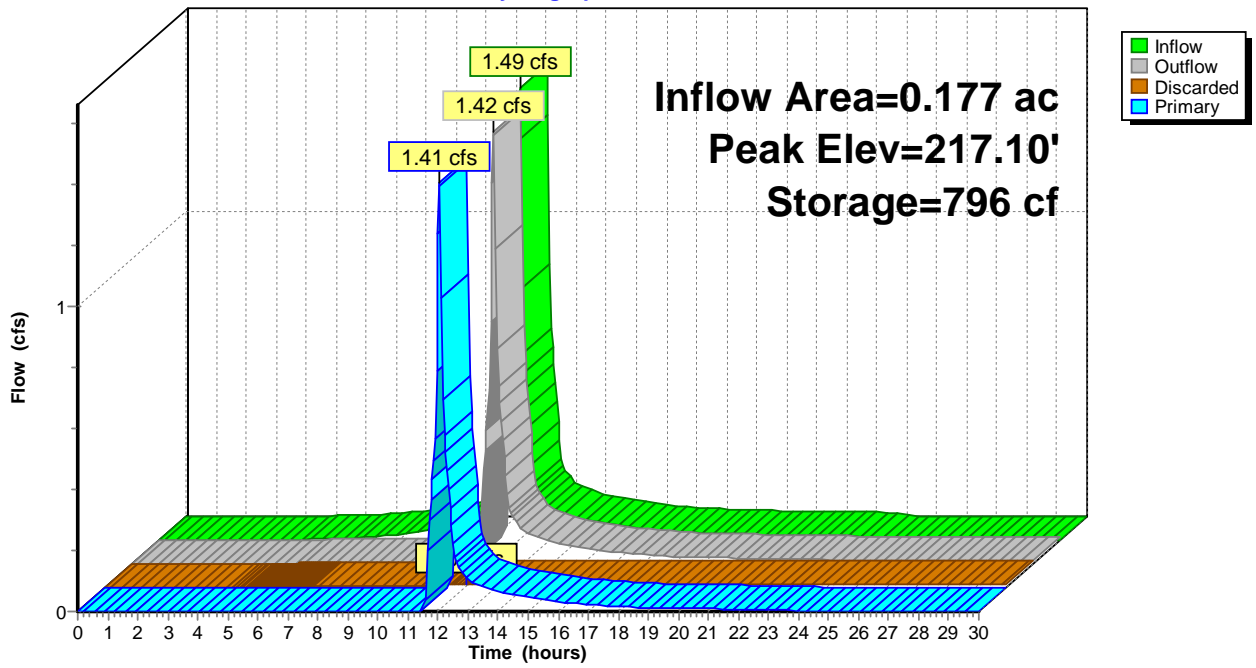
Device	Routing	Invert	Outlet Devices
#1	Discarded	216.50'	0.270 in/hr Exfiltration over Surface area
#2	Primary	217.00'	20.0' long x 6.0' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00			
2.50 3.00 3.50 4.00 4.50 5.00 5.50			
Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65			
2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83			

Discarded OutFlow Max=0.01 cfs @ 12.04 hrs HW=217.09' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.36 cfs @ 12.04 hrs HW=217.09' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 1.36 cfs @ 0.73 fps)

Pond 8P: INFIL-1

Hydrograph



Summary for Pond 9P: INFIL-2

Inflow Area = 0.383 ac, 47.42% Impervious, Inflow Depth = 6.70" for 100-yr event
 Inflow = 3.14 cfs @ 12.03 hrs, Volume= 0.214 af
 Outflow = 3.07 cfs @ 12.05 hrs, Volume= 0.195 af, Atten= 2%, Lag= 1.0 min
 Discarded = 0.01 cfs @ 12.05 hrs, Volume= 0.017 af
 Primary = 3.06 cfs @ 12.05 hrs, Volume= 0.179 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 215.16' @ 12.05 hrs Surf.Area= 1,682 sf Storage= 1,224 cf

Plug-Flow detention time= 89.8 min calculated for 0.195 af (91% of inflow)
 Center-of-Mass det. time= 46.5 min (831.2 - 784.7)

Volume	Invert	Avail.Storage	Storage Description
#1	214.00'	3,224 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
214.00	537	0	0
215.00	1,412	975	975
216.00	3,087	2,250	3,224

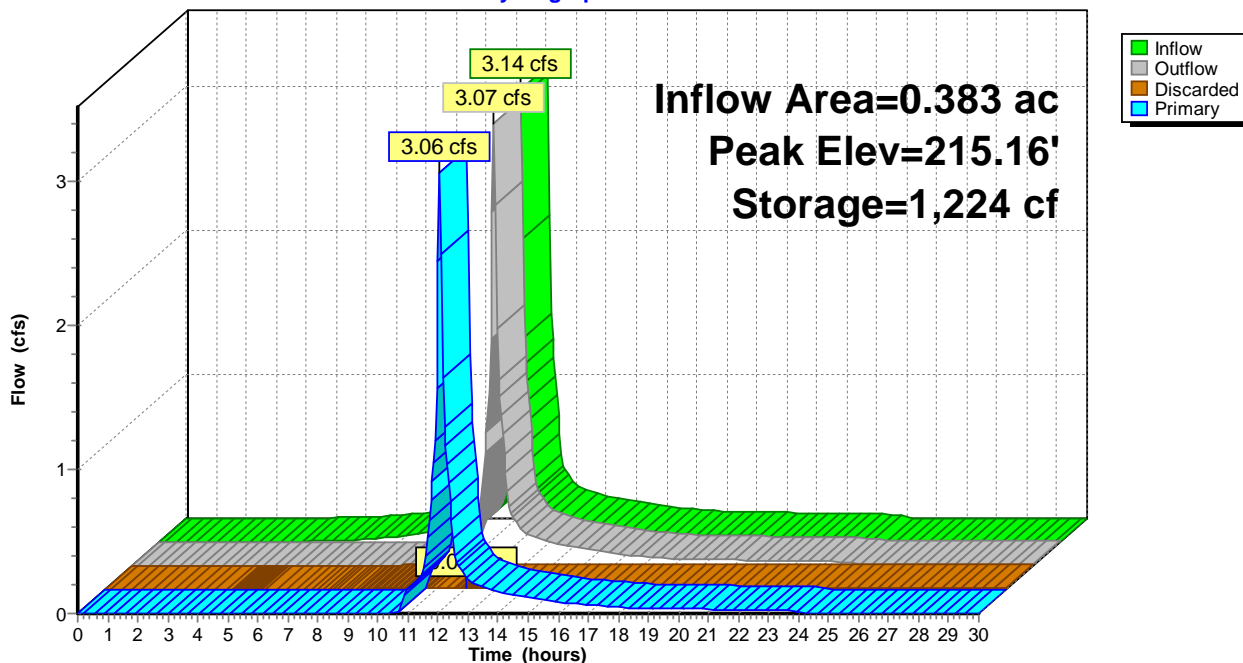
Device	Routing	Invert	Outlet Devices
#1	Discarded	214.00'	0.270 in/hr Exfiltration over Surface area
#2	Primary	215.00'	20.0' long x 6.0' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00			
2.50 3.00 3.50 4.00 4.50 5.00 5.50			
Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65			
2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83			

Discarded OutFlow Max=0.01 cfs @ 12.05 hrs HW=215.16' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=3.05 cfs @ 12.05 hrs HW=215.16' (Free Discharge)
 ↑2=Broad-Crested Rectangular Weir (Weir Controls 3.05 cfs @ 0.95 fps)

Pond 9P: INFIL-2

Hydrograph



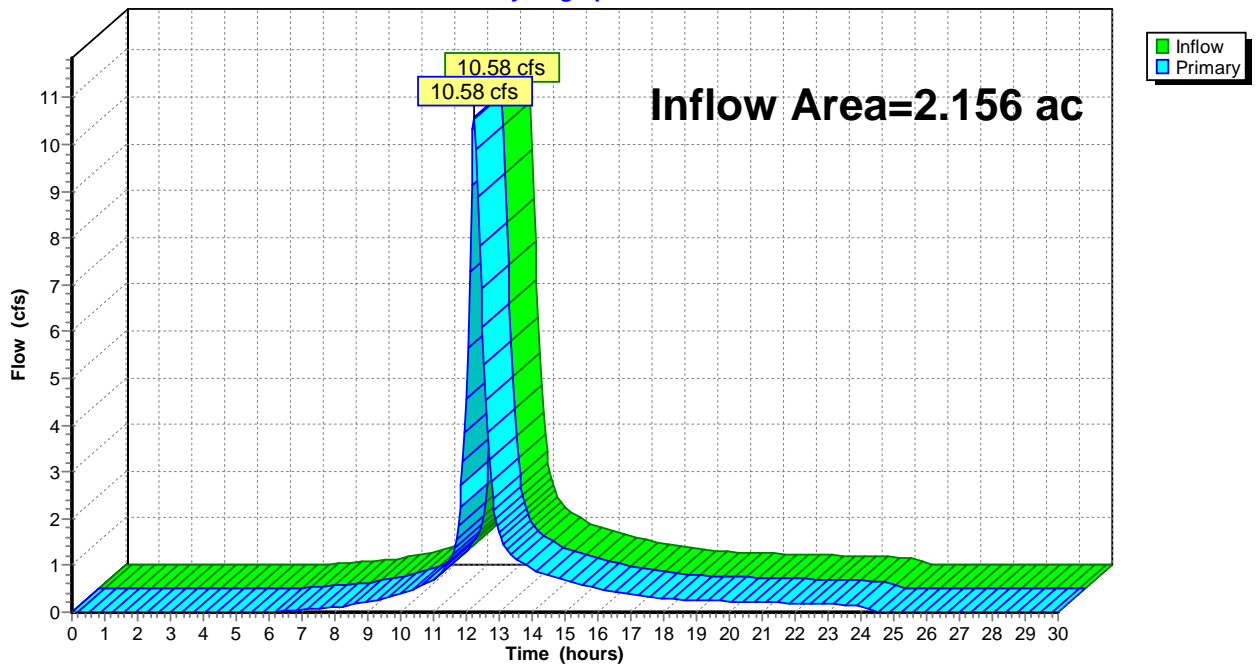
Summary for Link 3L: PRE

Inflow Area = 2.156 ac, 19.28% Impervious, Inflow Depth = 5.98" for 100-yr event
Inflow = 10.58 cfs @ 12.24 hrs, Volume= 1.074 af
Primary = 10.58 cfs @ 12.24 hrs, Volume= 1.074 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 3L: PRE

Hydrograph



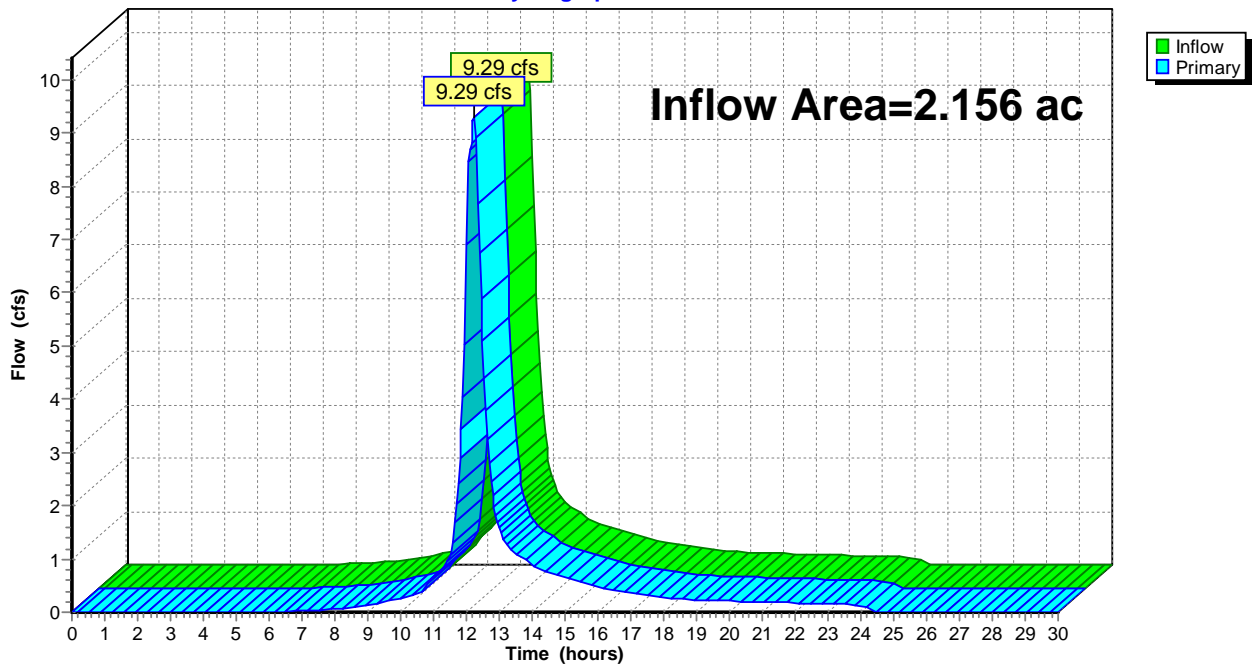
Summary for Link 7L: POST

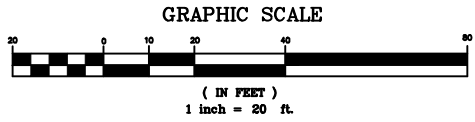
Inflow Area = 2.156 ac, 22.39% Impervious, Inflow Depth = 5.64" for 100-yr event
Inflow = 9.29 cfs @ 12.22 hrs, Volume= 1.012 af
Primary = 9.29 cfs @ 12.22 hrs, Volume= 1.012 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Link 7L: POST

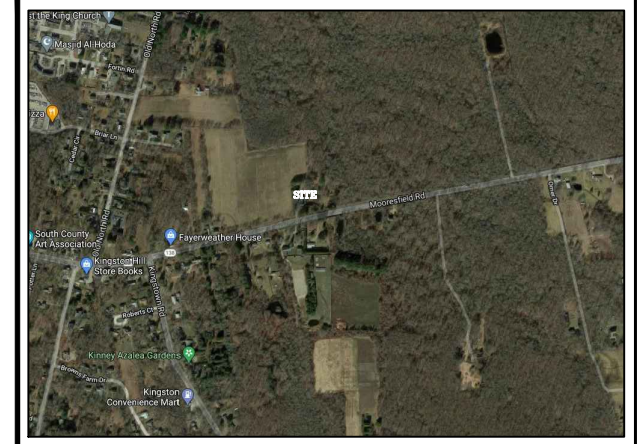
Hydrograph





LEGEND

- PERIMETER LINE
- ABUTTER LINE
- FENCE
- CONTOUR LINE
- SURVEY BOUND
- UTILITY POLE
- LIGHT POLE
- OVERHEAD WIRE
- CATCH BASIN
- DRAIN MANHOLE
- DRAINLINE
- WATERLINE
- SEWER MANHOLE
- SEWERLINE
- GAS LINE
- TREE
- EX. WELL
- EX. TREETLINE
- EX. RETAINING WALL



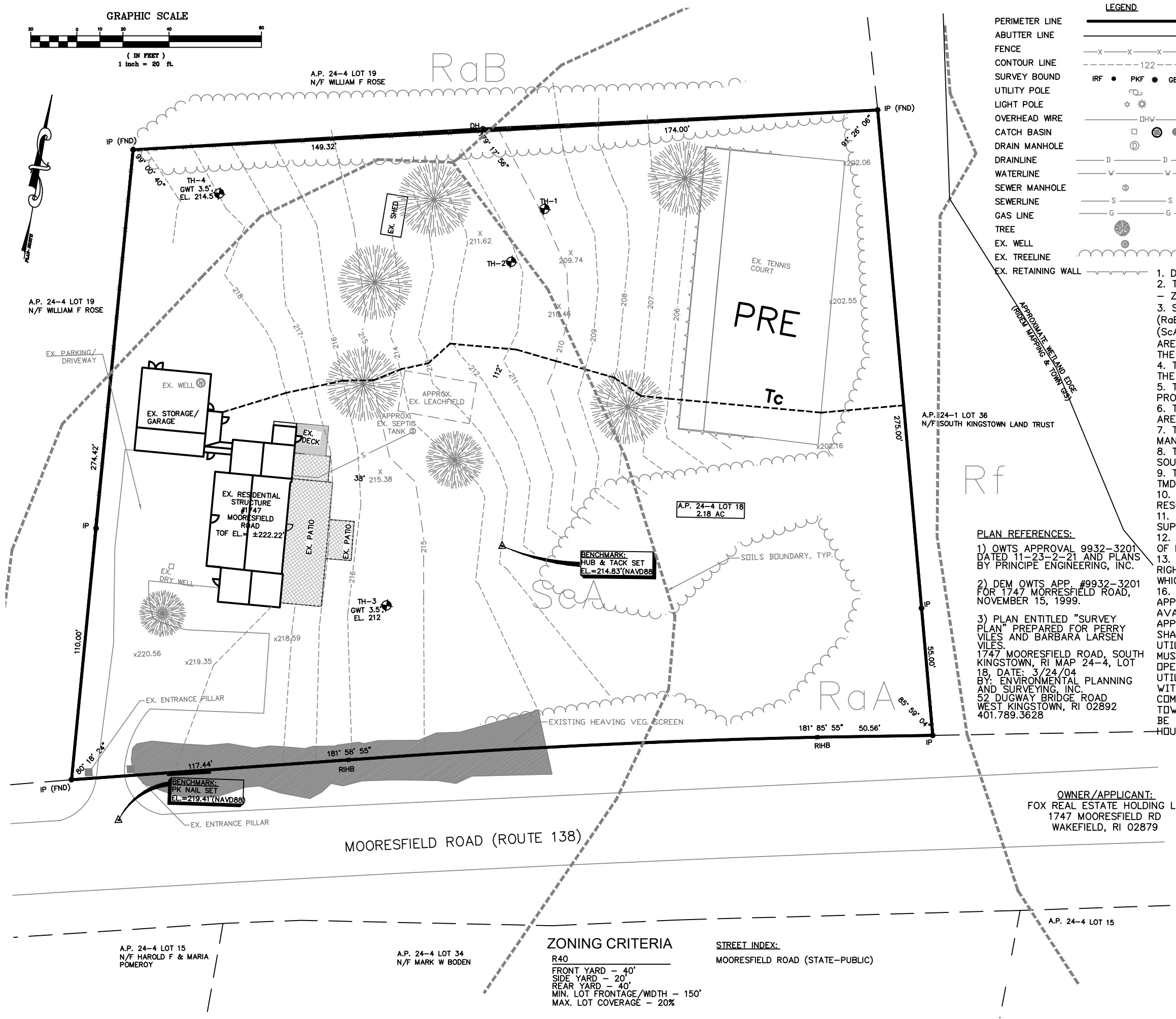
SITE LOCUS
NOT TO SCALE

GENERAL NOTES:

1. DEED REFERENCE: BK 1759, PAGE 156.
2. THIS PROPERTY FALLS WITHIN AN AREA OF MINIMAL FLOOD HAZARD - ZONE X AS MAPPED BY FIRM #44009C0185J DATED 4/3/2020.
3. SOILS ON SITE ARE CLASSIFIED AS RAINBOW SILT LOAM (RaB) AND (RaB), RIDGEBURY, LEICESTER, WHITMAN (Rf) AND SCIO SILT LOAM (ScA) AS IDENTIFIED BY THE USDA RI SOIL SURVEY. THERE ARE AREAS OF PRIME AGRICULTURAL SOIL AND/OR FARMLAND SOILS ON THE PROPERTY.
4. THERE ARE NO AREAS OF EXISTING, ACTIVE AGRICULTURAL USE ON THE SUBJECT PROPERTY.
5. THERE ARE NO HISTORIC CEMETERIES PRESENT ON THE SUBJECT PROPERTY.
6. THE SUBJECT PARCEL IS LOCATED WITHIN A NATURAL HERITAGE AREA AS DEFINED BY RIDEM.
7. THE SUBJECT PARCEL IS NOT LOCATED WITHIN ANY SPECIAL AREA MANAGEMENT PLAN OF THE RI CRMC.
8. THE SUBJECT PARCEL IS NOT LOCATED WITHIN THE TOWN OF SOUTH KINGSTOWN GROUNDWATER PROTECTION OVERLAY DISTRICT.
9. THE SUBJECT PARCEL IS LOCATED WITHIN THE SAUGATUCKET RIVER TMDL.
10. THE SUBJECT PARCEL IS NOT LOCATED WITHIN AN OWTS CRITICAL RESOURCE AREA AS DEFINED BY RIDEM.
11. THE SUBJECT PARCEL IS NOT LOCATED WITHIN A DRINKING WATER SUPPLY WATERSHED AS DEFINED BY RIDEM.
12. THE DEVELOPMENT PARCEL IS LISTED ON THE NATIONAL REGISTER OF HISTORIC PLACES.
13. THE SUBJECT PROPERTY IS SUBJECT TO ANY EASEMENTS, RIGHTS-OF-WAY, RESTRICTIONS, RESERVATIONS OR OTHER LIMITATIONS WHICH MAY BE REVEALED BY A FULL EXAMINATION OF THE TITLE.
16. THE LOCATION AND DEPTH OF EXISTING UTILITIES ARE APPROXIMATE AND HAVE BEEN PLOTTED FROM THE LATEST AVAILABLE INFORMATION. THE UTILITY LOCATIONS ARE APPROXIMATE AND MAY NOT BE ALL INCLUSIVE. THE CONTRACTOR SHALL CHECK AND VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES, BOTH OVERHEAD AND UNDERGROUND, AND "DIG-SAFE" MUST BE NOTIFIED PRIOR TO COMMENCING ANY CONSTRUCTION OPERATIONS. RESTORATION AND REPAIR OF DAMAGE TO EXISTING UTILITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR WITH NO ADDITIONAL COST TO THE OWNER. NO EXCAVATION SHALL COMMENCE UNTIL ALL INVOLVED UTILITY COMPANIES AND/OR TOWN WHOSE FACILITIES MIGHT BE AFFECTED BY ANY WORK TO BE PERFORMED BY THE CONTRACTOR ARE NOTIFIED AT LEAST 72 HOURS IN ADVANCE.

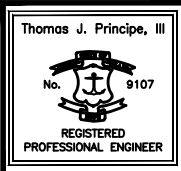
PLAN REFERENCES:

- 1) OWTS APPROVAL 9932-3201 DATED 11-23-2-21 AND PLANS BY PRINCIPE ENGINEERING, INC.
- 2) DEM OWTS APP. #9932-3201 FOR 1747 MOORESFIELD ROAD, NOVEMBER 15, 1999.
- 3) PLAN ENTITLED "SURVEY PLAN" PREPARED FOR PERRY VILES AND BARBARA LARSEN VILES. 1747 MOORESFIELD ROAD, SOUTH KINGSTOWN, RI MAP 24-4, LOT 18, DATE: 3/24/04 BY: ENVIRONMENTAL PLANNING AND SURVEYING, INC. 52 DUGWAY BRIDGE ROAD WEST KINGSTOWN, RI 02892 401.789.3628



PRE-WATERSHED PLAN

OWNER/APPLICANT:
FOX REAL ESTATE HOLDING LP
1747 MOORESFIELD RD
WAKEFIELD, RI 02879



PRINCIPE COMPANY, INC.
ENGINEERING DIVISION
PO BOX 298
TIVERTON, RI 02878
401.816.5385
WWW.PRINCIPEENGINEERING.COM

REVISIONS

No.	DATE	DRWN	CHKD

DEVELOPMENT PLAN REVIEW
for
"MOORESFIELD MEADOWS"
AT
1747 MOORESFIELD ROAD
AP 24-4 LOT 18
in
SOUTH KINGSTOWN, RHODE ISLAND

SCALE: 1"=20'	SHEET NO: 1 OF 2
DRAWN BY: JAR	DESIGN BY: JAR
DATE: 4/28/22	CHECKED BY: JAR
PROJECT NO.: LD-2020-20	

ZONING CRITERIA
R40
FRONT YARD - 40'
SIDE YARD - 20'
REAR YARD - 40'
MIN. LOT FRONTAGE/WIDTH - 150'
MAX. LOT COVERAGE - 20%

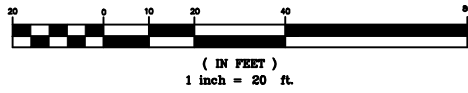
STREET INDEX:
MOORESFIELD ROAD (STATE-PUBLIC)

A.P. 24-4 LOT 15
N/F HAROLD F & MARIA POMEROY

A.P. 24-4 LOT 34
N/F MARK W BODEN

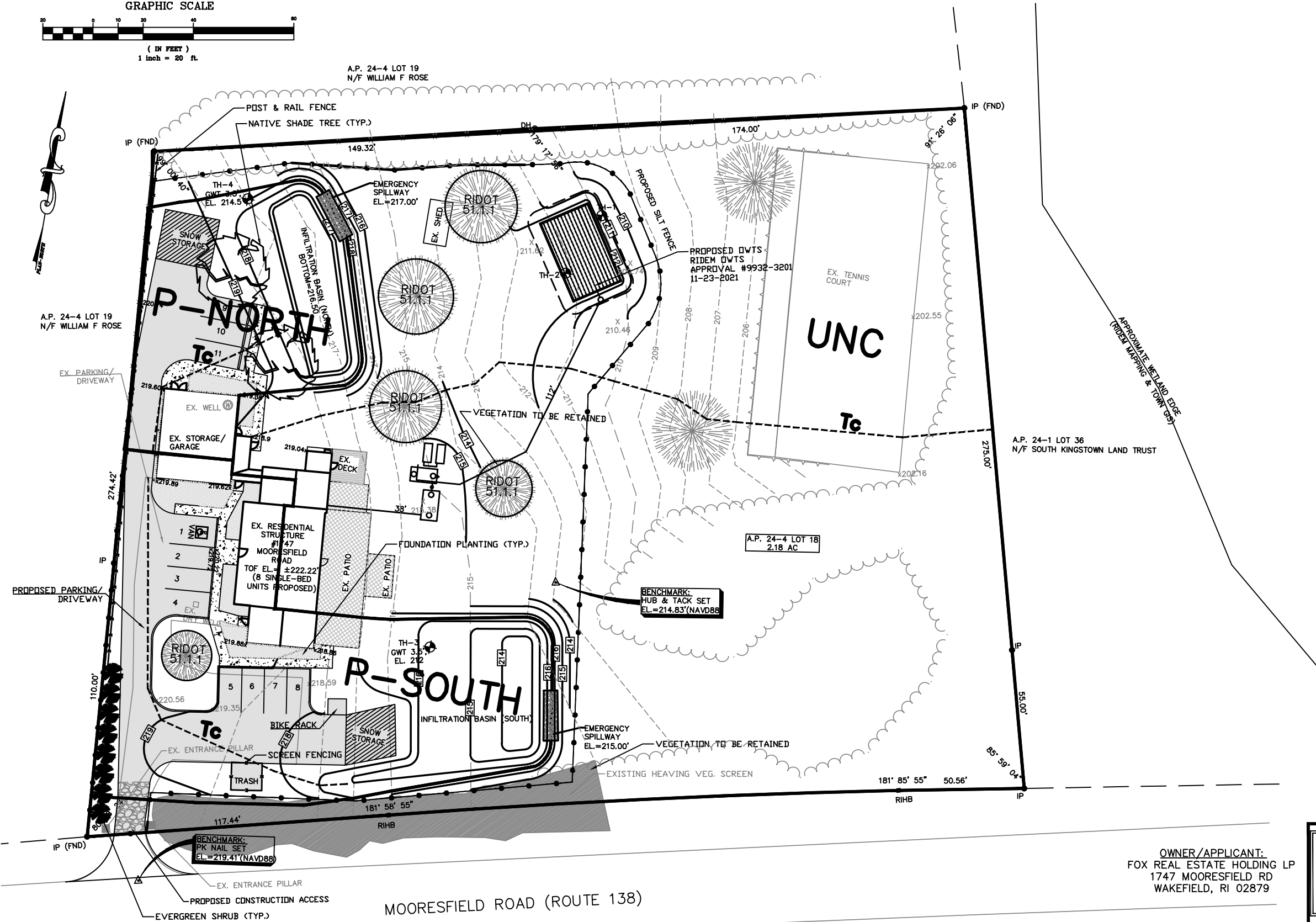
A.P. 24-4 LOT 15

GRAPHIC SCALE



LEGEND

PERIMETER LINE	—————
ABUTTER LINE	—————
FENCE	-X-X-X-X-
CONTOUR LINE	- - - - - 122
SURVEY BOUND	IRF ● PKF ● GBF □
UTILITY POLE	○
LIGHT POLE	☆
OVERHEAD WIRE	— OHW —
CATCH BASIN	□
DRAIN MANHOLE	⊙
DRAINLINE	— D — D —
WATERLINE	— W — W —
SEWER MANHOLE	⊙
SEWERLINE	— S — S —
GAS LINE	— G — G —
TREE	⊙
EX. WELL	⊙
EX. TREELINE	⊙
EX. RETAINING WALL	—
PROPOSED CONTOUR	— 122 —
PROPOSED FENCE	-X-X-X-
PROPOSED EROSION CONTROL	—



PLAN REFERENCES:

- 1) OWTS APPROVAL 9932-3201 DATED 11-23-21 AND PLANS BY PRINCIPE ENGINEERING, INC.
- 2) DEM OWTS APP. #9932-3201 FOR 1747 MOORESFIELD ROAD, NOVEMBER 15, 1999.
- 3) PLAN ENTITLED "SURVEY PLAN" PREPARED FOR PERRY VILES AND BARBARA LARSEN VILES. 1747 MOORESFIELD ROAD, SOUTH KINGSTOWN, RI MAP 24-4, LOT 18, DATE: 3/24/04 BY: ENVIRONMENTAL PLANNING AND SURVEYING, INC. 52 DUGWAY BRIDGE ROAD WEST KINGSTOWN, RI 02892 401.789.3628

OWNER/APPLICANT:
FOX REAL ESTATE HOLDING LP
1747 MOORESFIELD RD
WAKEFIELD, RI 02879

POST WATERSHED PLAN

Thomas J. Principe, III
No. 9107
REGISTERED PROFESSIONAL ENGINEER

PRINCIPE ENGINEERING COMPANY
PRINCIPE COMPANY, INC.
ENGINEERING DIVISION
PO BOX 298
TIVERTON, RI 02878
401.816.5385
WWW.PRINCIPEENGINEERING.COM

REVISIONS

No.	DATE	DRWN	CHKD
1.	5/20/2022	KAB	JAR

DEVELOPMENT PLAN REVIEW
for
"MOORESFIELD MEADOWS"
AT
1747 MOORESFIELD ROAD
AP 24-4 LOT 18
in
SOUTH KINGSTOWN, RHODE ISLAND

SCALE: 1"=20'
SHEET NO: 2 OF 2
DRAWN BY: JAR DESIGN BY: JAR CHECKED BY: JAR
DATE: 4/28/22 PROJECT NO.: LD-2020-20

A.P. 24-4 LOT 15
N/F HAROLD F & MARIA POMEROY

A.P. 24-4 LOT 34
N/F MARK W BODEN

ZONING CRITERIA

R40
FRONT YARD - 40'
SIDE YARD - 20'
REAR YARD - 40'
MIN. LOT FRONTAGE/WIDTH - 150'
MAX. LOT COVERAGE - 20%

STREET INDEX:

MOORESFIELD ROAD (STATE-PUBLIC)

A.P. 24-4 LOT 15