

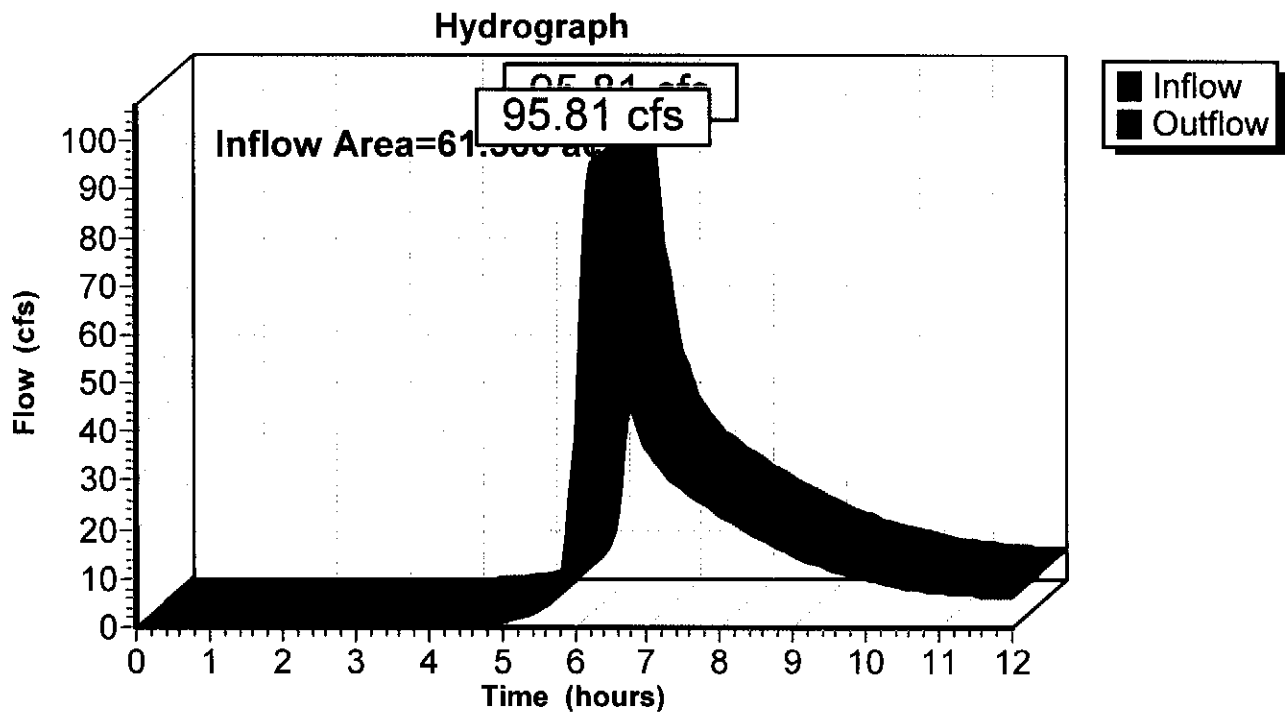
Summary for Reach Creek: Discharge Off-Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 61.560 ac, 23.73% Impervious, Inflow Depth > 2.38" for 25-Year 12hr event
Inflow = 95.81 cfs @ 6.26 hrs, Volume= 12.212 af
Outflow = 95.81 cfs @ 6.26 hrs, Volume= 12.212 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-12.00 hrs, dt= 0.05 hrs

Reach Creek: Discharge Off-Site



2184 HydroCAD BASE

Type II 12-hr 25-Year 12hr Rainfall=4.69"

Prepared by HP

Printed 4/28/2016

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Summary for Pond DB #2: Det. Basin #2

Inflow Area = 34.210 ac, 19.10% Impervious, Inflow Depth > 2.37" for 25-Year 12hr event
 Inflow = 105.11 cfs @ 6.13 hrs, Volume= 6.752 af
 Outflow = 23.53 cfs @ 6.60 hrs, Volume= 6.108 af, Atten= 78%, Lag= 28.3 min
 Primary = 23.53 cfs @ 6.60 hrs, Volume= 6.108 af

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.05 hrs
 Peak Elev= 409.42' @ 6.60 hrs Surf.Area= 46,936 sf Storage= 135,077 cf

Plug-Flow detention time= 84.6 min calculated for 6.108 af (90% of inflow)
 Center-of-Mass det. time= 60.9 min (484.4 - 423.5)

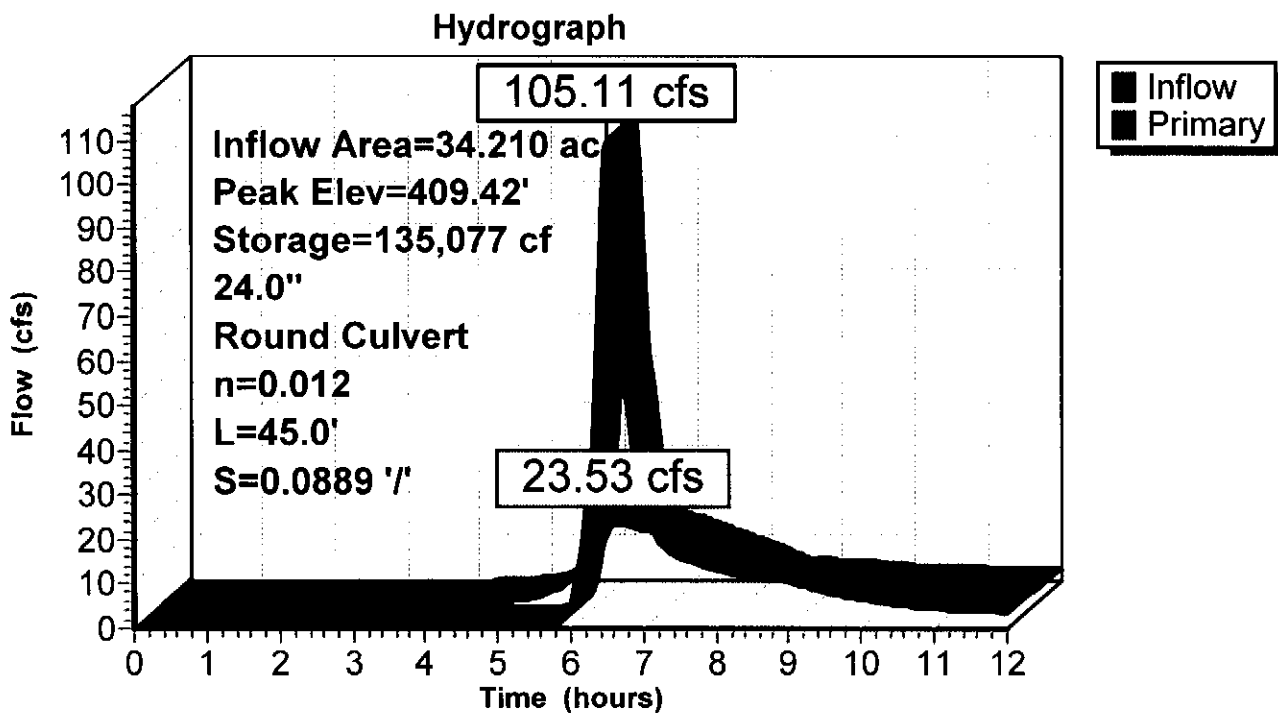
Volume	Invert	Avail.Storage	Storage Description
#1	406.00'	188,459 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	32,268	0	0
407.00	36,437	34,353	34,353
408.00	40,706	38,572	72,924
409.00	45,075	42,891	115,815
409.50	47,297	23,093	138,908
410.00	49,545	24,211	163,118
410.50	51,818	25,341	188,459

Device	Routing	Invert	Outlet Devices
#1	Primary	406.00'	24.0" Round Culvert L= 45.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 406.00' / 402.00' S= 0.0889 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=23.52 cfs @ 6.60 hrs HW=409.42' (Free Discharge)
 ←1=Culvert (Inlet Controls 23.52 cfs @ 7.49 fps)

Pond DB #2: Det. Basin #2



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Type II 12-hr 25-Year 12hr Rainfall=4.69"

Printed 4/28/2016

Stage-Discharge for Pond DB #2: Det. Basin #2

<u>Elevation (feet)</u>	<u>Primary (cfs)</u>
406.00	0.00
406.10	0.06
406.20	0.25
406.30	0.55
406.40	0.96
406.50	1.48
406.60	2.09
406.70	2.79
406.80	3.57
406.90	4.43
407.00	5.35
407.10	6.32
407.20	7.34
407.30	8.39
407.40	9.46
407.50	10.54
407.60	11.60
407.70	12.63
407.80	13.60
407.90	14.47
408.00	15.13
408.10	15.87
408.20	16.57
408.30	17.25
408.40	17.90
408.50	18.53
408.60	19.13
408.70	19.72
408.80	20.29
408.90	20.85
409.00	21.39
409.10	21.92
409.20	22.44
409.30	22.94
409.40	23.43
409.50	23.92
409.60	24.39
409.70	24.86
409.80	25.31
409.90	25.76
410.00	26.20
410.10	26.63
410.20	27.06
410.30	27.48
410.40	27.89
410.50	28.30

Stage-Area-Storage for Pond DB #2: Det. Basin #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
406.00	32,268	0
406.10	32,685	3,248
406.20	33,102	6,537
406.30	33,519	9,868
406.40	33,936	13,241
406.50	34,353	16,655
406.60	34,769	20,111
406.70	35,186	23,609
406.80	35,603	27,148
406.90	36,020	30,730
407.00	36,437	34,353
407.10	36,864	38,018
407.20	37,291	41,725
407.30	37,718	45,476
407.40	38,145	49,269
407.50	38,572	53,105
407.60	38,998	56,983
407.70	39,425	60,904
407.80	39,852	64,868
407.90	40,279	68,875
408.00	40,706	72,924
408.10	41,143	77,016
408.20	41,580	81,153
408.30	42,017	85,332
408.40	42,454	89,556
408.50	42,891	93,823
408.60	43,327	98,134
408.70	43,764	102,489
408.80	44,201	106,887
408.90	44,638	111,329
409.00	45,075	115,815
409.10	45,519	120,344
409.20	45,964	124,918
409.30	46,408	129,537
409.40	46,853	134,200
409.50	47,297	138,908
409.60	47,747	143,660
409.70	48,196	148,457
409.80	48,646	153,299
409.90	49,095	158,186
410.00	49,545	163,118
410.10	50,000	168,095
410.20	50,454	173,118
410.30	50,909	178,186
410.40	51,363	183,300
410.50	51,818	188,459

2184 HydroCAD BASE

Type II 12-hr 25-Year 12hr Rainfall=4.69"

Prepared by HP

Printed 4/28/2016

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Summary for Subcatchment 2: #2 Dev

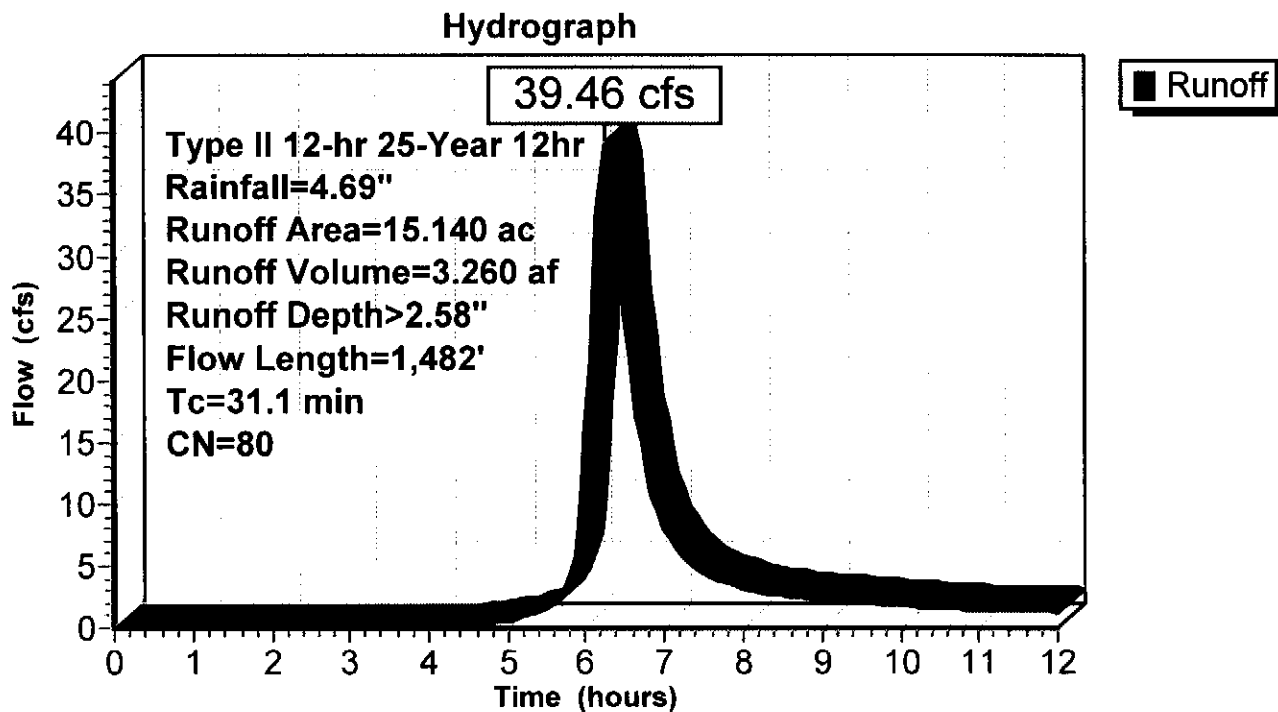
Runoff = 39.46 cfs @ 6.26 hrs, Volume= 3.260 af, Depth> 2.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-12.00 hrs, dt= 0.05 hrs
Type II 12-hr 25-Year 12hr Rainfall=4.69"

Area (ac)	CN	Description
15.140	80	1/2 acre lots, 25% imp, HSG C
11.355		75.00% Pervious Area
3.785		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.6	300	0.1367	0.21		Sheet Flow, Sheet Flow Woods: Light underbrush n= 0.400 P2= 3.30"
5.5	300	0.0333	0.91		Shallow Concentrated Flow, Shallow Concentrated Flow Woodland Kv= 5.0 fps
2.0	882	0.0215	7.26	72.63	Channel Flow, Ditch Flow Area= 10.0 sf Perim= 10.0' r= 1.00' n= 0.030
31.1	1,482	Total			

Subcatchment 2: #2 Dev



2184 HydroCAD BASE

Type II 12-hr 25-Year 12hr Rainfall=4.69"

Prepared by HP

Printed 4/28/2016

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Summary for Subcatchment 4: #4 Dev

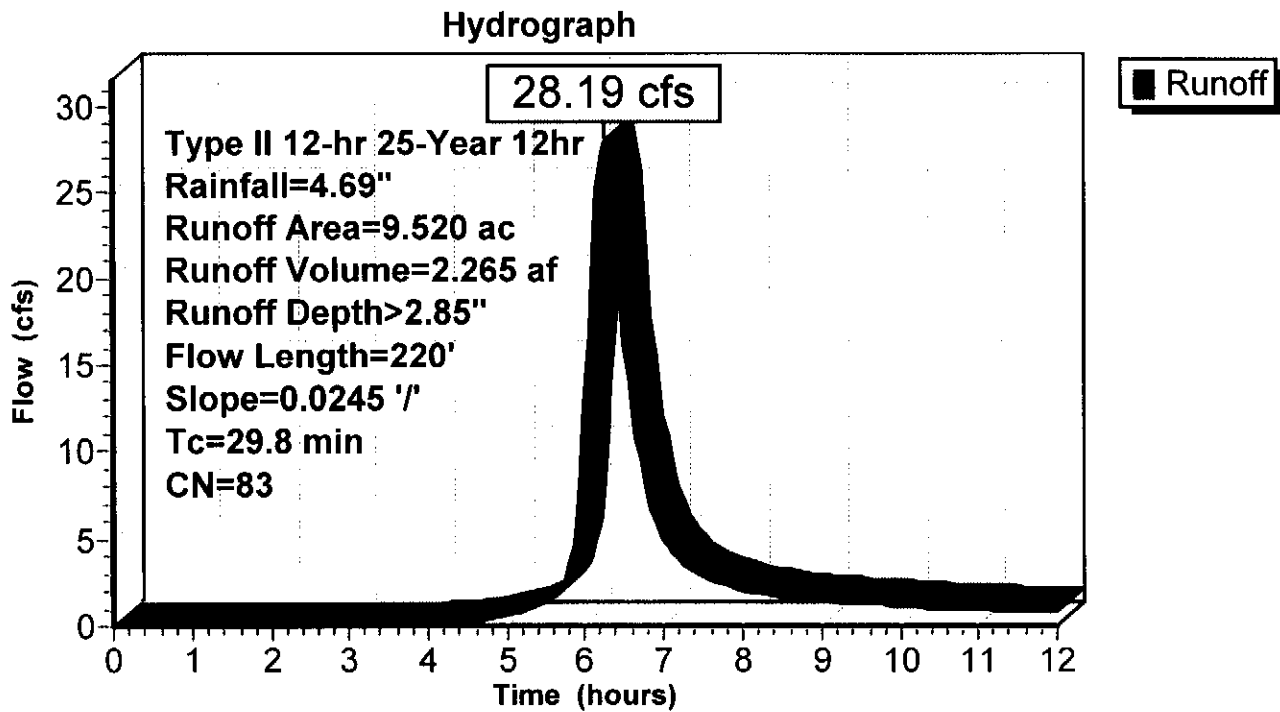
Runoff = 28.19 cfs @ 6.24 hrs, Volume= 2.265 af, Depth> 2.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-12.00 hrs, dt= 0.05 hrs
 Type II 12-hr 25-Year 12hr Rainfall=4.69"

Area (ac)	CN	Description
9.520	83	1/4 acre lots, 38% imp, HSG C
5.902		62.00% Pervious Area
3.618		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	100	0.0245	0.09		Sheet Flow, Sheet Flow
					Woods: Light underbrush n= 0.400 P2= 3.30"
10.3	120	0.0245	0.19		Sheet Flow,
					Grass: Short n= 0.150 P2= 3.30"
29.8	220	Total			

Subcatchment 4: #4 Dev



Summary for Subcatchment 5: #5 Dev

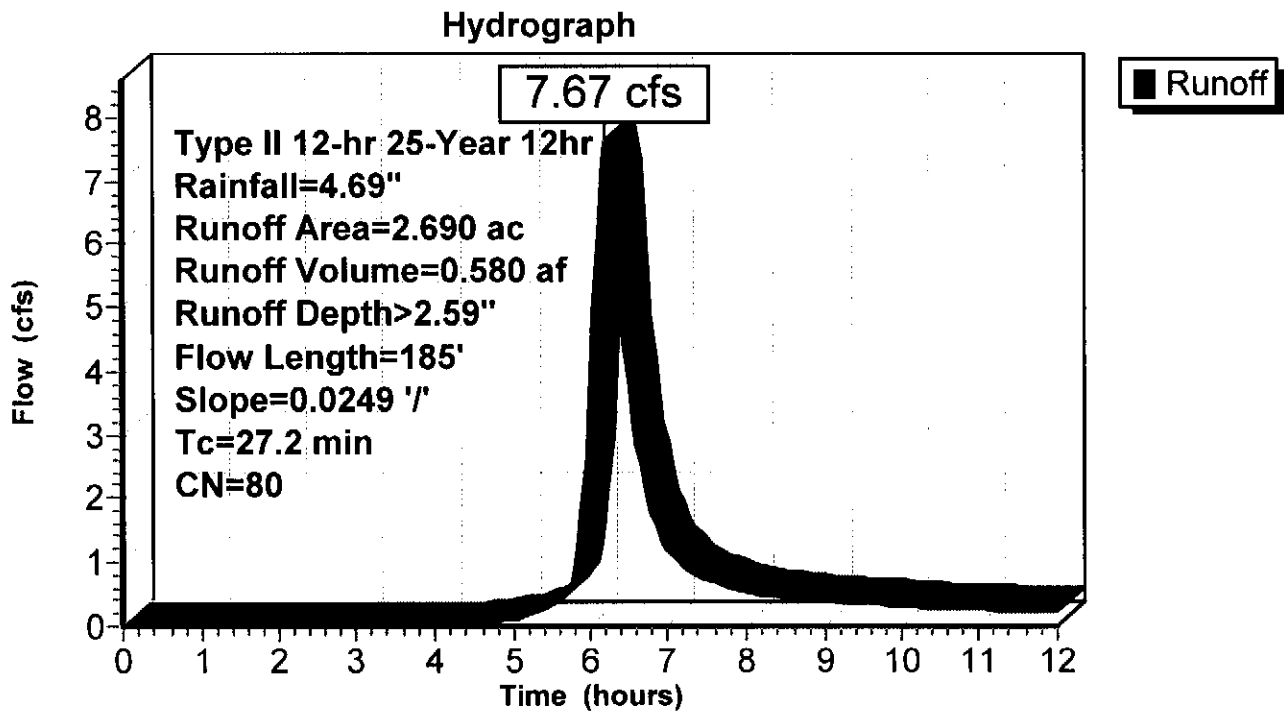
Runoff = 7.67 cfs @ 6.21 hrs, Volume= 0.580 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-12.00 hrs, dt= 0.05 hrs
 Type II 12-hr 25-Year 12hr Rainfall=4.69"

Area (ac)	CN	Description
2.690	80	1/2 acre lots, 25% imp, HSG C
2.017		75.00% Pervious Area
0.672		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	85	0.0249	0.18		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.30"
19.4	100	0.0249	0.09		Sheet Flow, Sheet Flow Woods: Light underbrush n= 0.400 P2= 3.30"
27.2	185	Total			

Subcatchment 5: #5 Dev



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Type II 12-hr 10-Year 12hr Rainfall=3.93"

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Summary for Subcatchment UN-2: UN-2

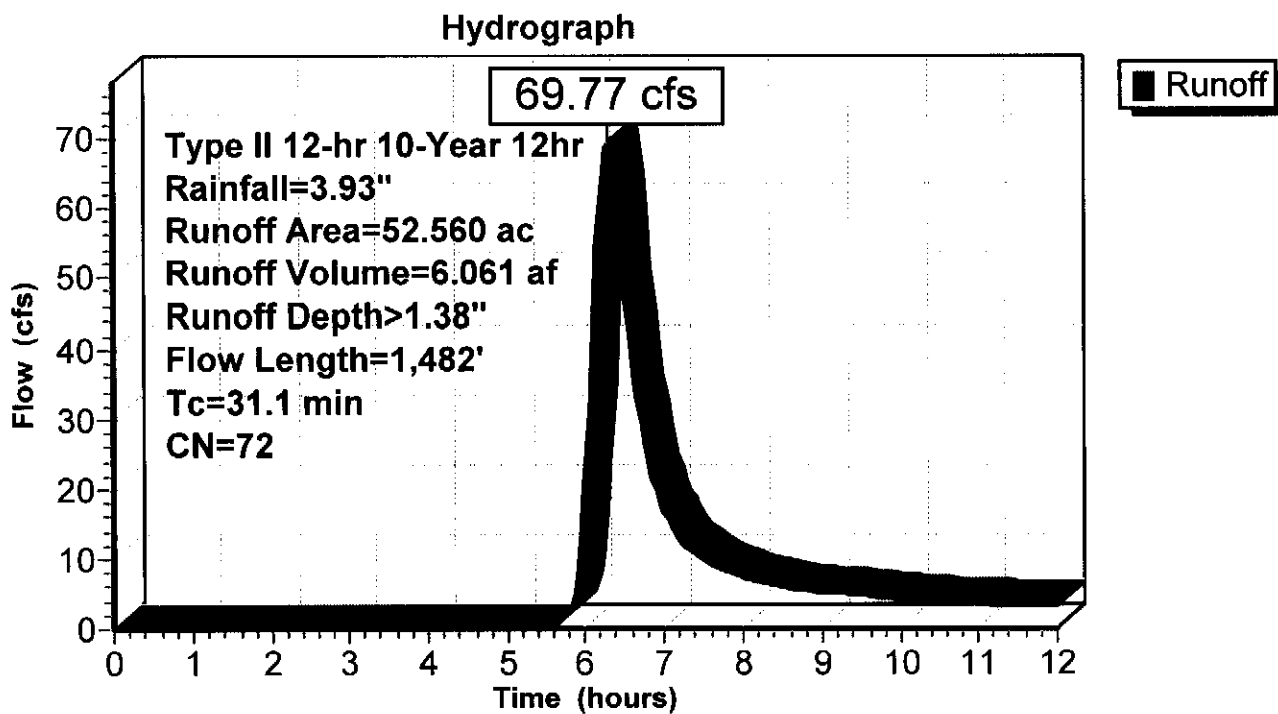
Runoff = 69.77 cfs @ 6.28 hrs, Volume= 6.061 af, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-12.00 hrs, dt= 0.05 hrs
 Type II 12-hr 10-Year 12hr Rainfall=3.93"

Area (ac)	CN	Description
7.940	85	Row crops, straight row, Good, HSG C
44.620	70	Woods, Good, HSG C
52.560	72	Weighted Average
52.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.6	300	0.1367	0.21		Sheet Flow, Sheet Flow Woods: Light underbrush n= 0.400 P2= 3.30"
5.5	300	0.0333	0.91		Shallow Concentrated Flow, Shallow Concentrated Woodland Kv= 5.0 fps
2.0	882	0.0215	7.26	72.63	Channel Flow, Area= 10.0 sf Perim= 10.0' r= 1.00' n= 0.030 Earth, clean & winding
31.1	1,482	Total			

Subcatchment UN-2: UN-2



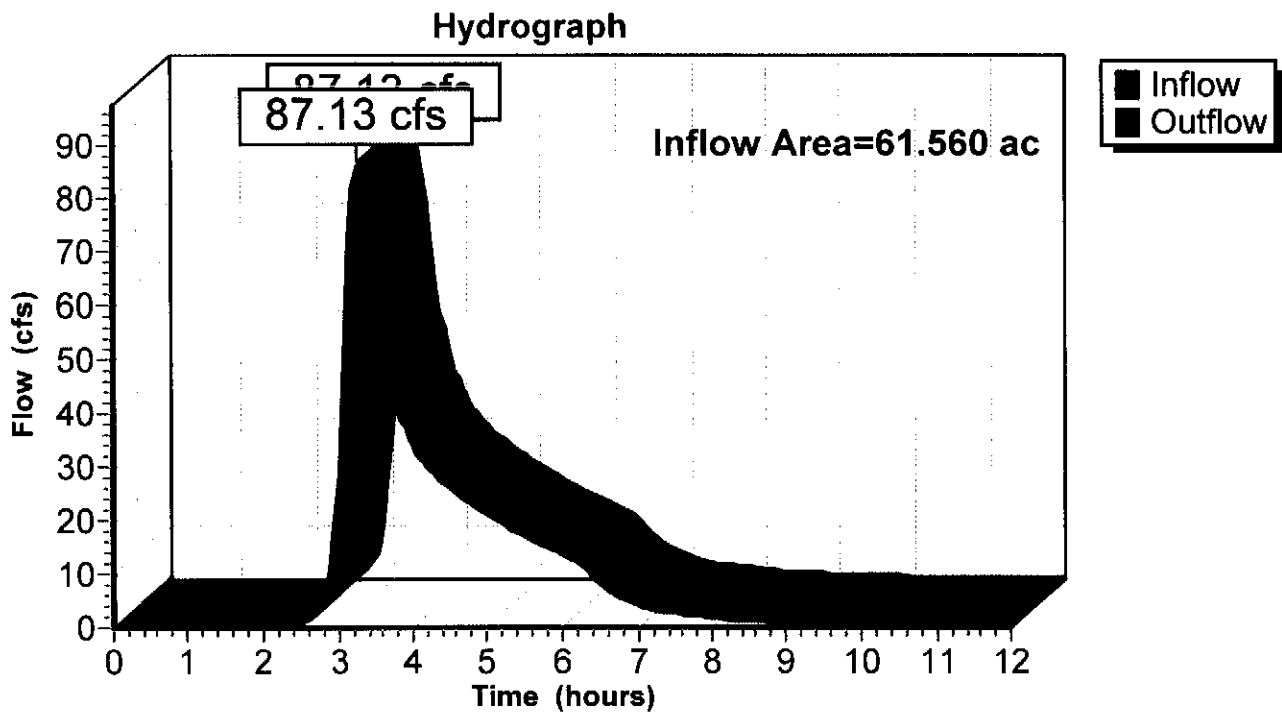
Summary for Reach Creek: Discharge Off-Site

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 61.560 ac, 23.73% Impervious, Inflow Depth > 1.94" for 25-Year 6 hr event
Inflow = 87.13 cfs @ 3.27 hrs, Volume= 9.956 af
Outflow = 87.13 cfs @ 3.27 hrs, Volume= 9.956 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-12.00 hrs, dt= 0.05 hrs

Reach Creek: Discharge Off-Site



2184 HydroCAD BASE

Type II 6-hr 25-Year 6 hr Rainfall=4.01"

Prepared by HP

Printed 4/28/2016

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Summary for Pond DB #2: Det. Basin #2

Inflow Area = 34.210 ac, 19.10% Impervious, Inflow Depth = 1.85" for 25-Year 6 hr event
 Inflow = 95.20 cfs @ 3.14 hrs, Volume= 5.263 af
 Outflow = 21.30 cfs @ 3.63 hrs, Volume= 5.090 af, Atten= 78%, Lag= 29.3 min
 Primary = 21.30 cfs @ 3.63 hrs, Volume= 5.090 af

Routing by Stor-Ind method, Time Span= 0.00-12.00 hrs, dt= 0.05 hrs
 Peak Elev= 408.98' @ 3.63 hrs Surf.Area= 44,997 sf Storage= 115,015 cf

Plug-Flow detention time= 84.3 min calculated for 5.069 af (96% of inflow)
 Center-of-Mass det. time= 80.5 min (301.1 - 220.6)

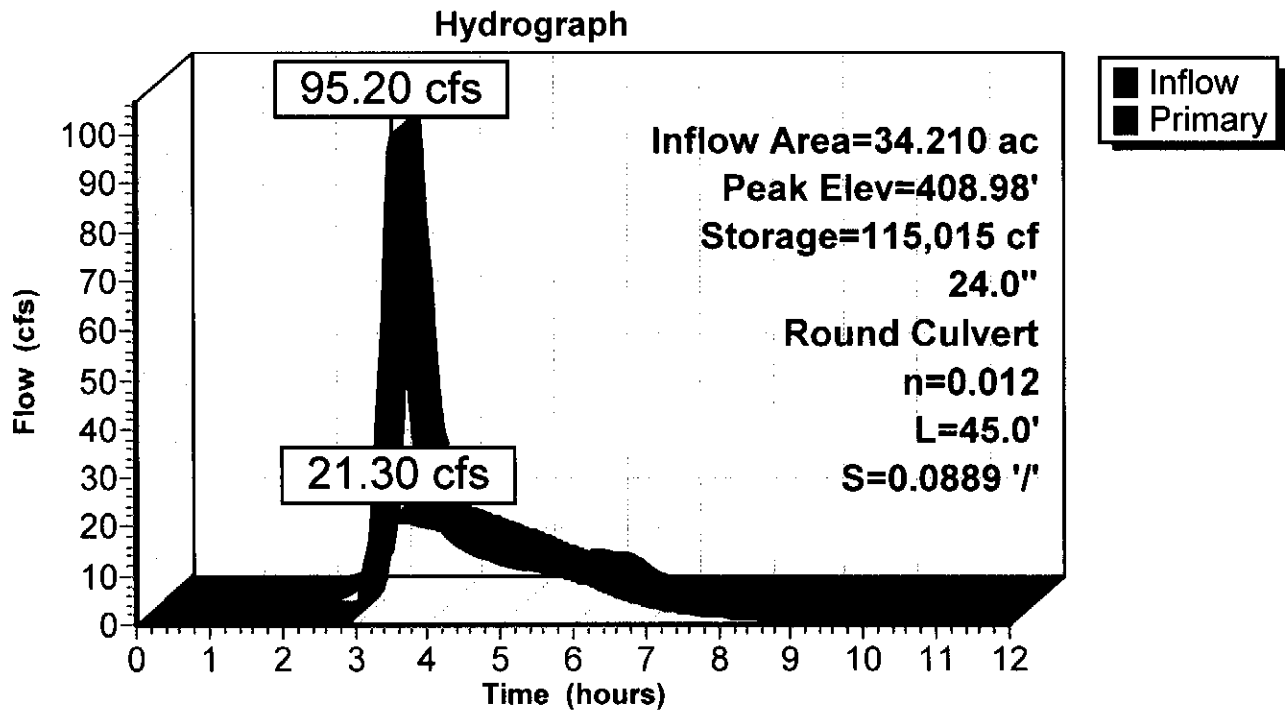
Volume	Invert	Avail.Storage	Storage Description
#1	406.00'	188,459 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	32,268	0	0
407.00	36,437	34,353	34,353
408.00	40,706	38,572	72,924
409.00	45,075	42,891	115,815
409.50	47,297	23,093	138,908
410.00	49,545	24,211	163,118
410.50	51,818	25,341	188,459

Device	Routing	Invert	Outlet Devices
#1	Primary	406.00'	24.0" Round Culvert L= 45.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 406.00' / 402.00' S= 0.0889 ' / Cc= 0.900 n= 0.012

Primary OutFlow Max=21.29 cfs @ 3.63 hrs HW=408.98' (Free Discharge)
 ↑1=Culvert (Inlet Controls 21.29 cfs @ 6.78 fps)

Pond DB #2: Det. Basin #2



Stage-Discharge for Pond DB #2: Det. Basin #2

<u>Elevation (feet)</u>	<u>Primary (cfs)</u>
406.00	0.00
406.10	0.06
406.20	0.25
406.30	0.55
406.40	0.96
406.50	1.48
406.60	2.09
406.70	2.79
406.80	3.57
406.90	4.43
407.00	5.35
407.10	6.32
407.20	7.34
407.30	8.39
407.40	9.46
407.50	10.54
407.60	11.60
407.70	12.63
407.80	13.60
407.90	14.47
408.00	15.13
408.10	15.87
408.20	16.57
408.30	17.25
408.40	17.90
408.50	18.53
408.60	19.13
408.70	19.72
408.80	20.29
408.90	20.85
409.00	21.39
409.10	21.92
409.20	22.44
409.30	22.94
409.40	23.43
409.50	23.92
409.60	24.39
409.70	24.86
409.80	25.31
409.90	25.76
410.00	26.20
410.10	26.63
410.20	27.06
410.30	27.48
410.40	27.89
410.50	28.30

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Type II 6-hr 25-Year 6 hr Rainfall=4.01"

Printed 4/28/2016

Stage-Area-Storage for Pond DB #2: Det. Basin #2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
406.00	32,268	0
406.10	32,685	3,248
406.20	33,102	6,537
406.30	33,519	9,868
406.40	33,936	13,241
406.50	34,353	16,655
406.60	34,769	20,111
406.70	35,186	23,609
406.80	35,603	27,148
406.90	36,020	30,730
407.00	36,437	34,353
407.10	36,864	38,018
407.20	37,291	41,725
407.30	37,718	45,476
407.40	38,145	49,269
407.50	38,572	53,105
407.60	38,998	56,983
407.70	39,425	60,904
407.80	39,852	64,868
407.90	40,279	68,875
408.00	40,706	72,924
408.10	41,143	77,016
408.20	41,580	81,153
408.30	42,017	85,332
408.40	42,454	89,556
408.50	42,891	93,823
408.60	43,327	98,134
408.70	43,764	102,489
408.80	44,201	106,887
408.90	44,638	111,329
409.00	45,075	115,815
409.10	45,519	120,344
409.20	45,964	124,918
409.30	46,408	129,537
409.40	46,853	134,200
409.50	47,297	138,908
409.60	47,747	143,660
409.70	48,196	148,457
409.80	48,646	153,299
409.90	49,095	158,186
410.00	49,545	163,118
410.10	50,000	168,095
410.20	50,454	173,118
410.30	50,909	178,186
410.40	51,363	183,300
410.50	51,818	188,459

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Type II 6-hr 25-Year 6 hr Rainfall=4.01"

Printed 4/28/2016

Summary for Subcatchment 2: #2 Dev

Runoff = 35.88 cfs @ 3.27 hrs, Volume= 2.586 af, Depth= 2.05"

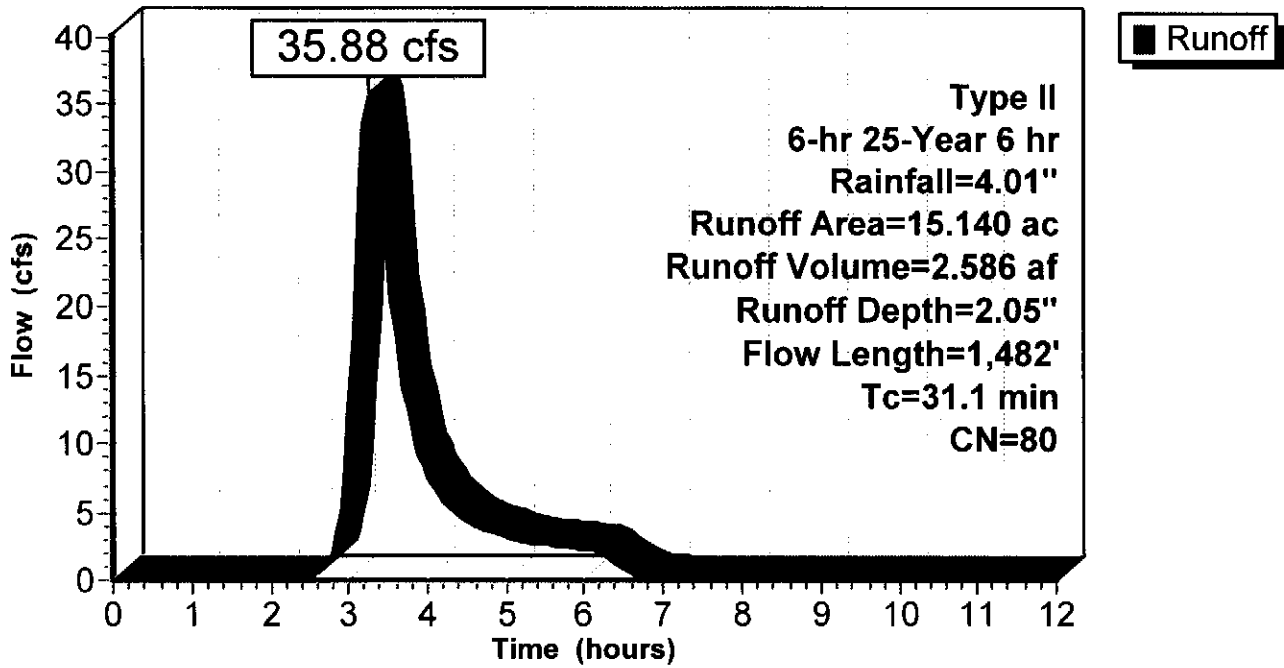
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-12.00 hrs, dt= 0.05 hrs
Type II 6-hr 25-Year 6 hr Rainfall=4.01"

Area (ac)	CN	Description
15.140	80	1/2 acre lots, 25% imp, HSG C
11.355		75.00% Pervious Area
3.785		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.6	300	0.1367	0.21		Sheet Flow, Sheet Flow Woods: Light underbrush n= 0.400 P2= 3.30"
5.5	300	0.0333	0.91		Shallow Concentrated Flow, Shallow Concentrated Flow Woodland Kv= 5.0 fps
2.0	882	0.0215	7.26	72.63	Channel Flow, Ditch Flow Area= 10.0 sf Perim= 10.0' r= 1.00' n= 0.030
31.1	1,482	Total			

Subcatchment 2: #2 Dev

Hydrograph



2184 HydroCAD BASE

Prepared by HP

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Type II 6-hr 25-Year 6 hr Rainfall=4.01"

Printed 4/28/2016

Summary for Subcatchment 4: #4 Dev

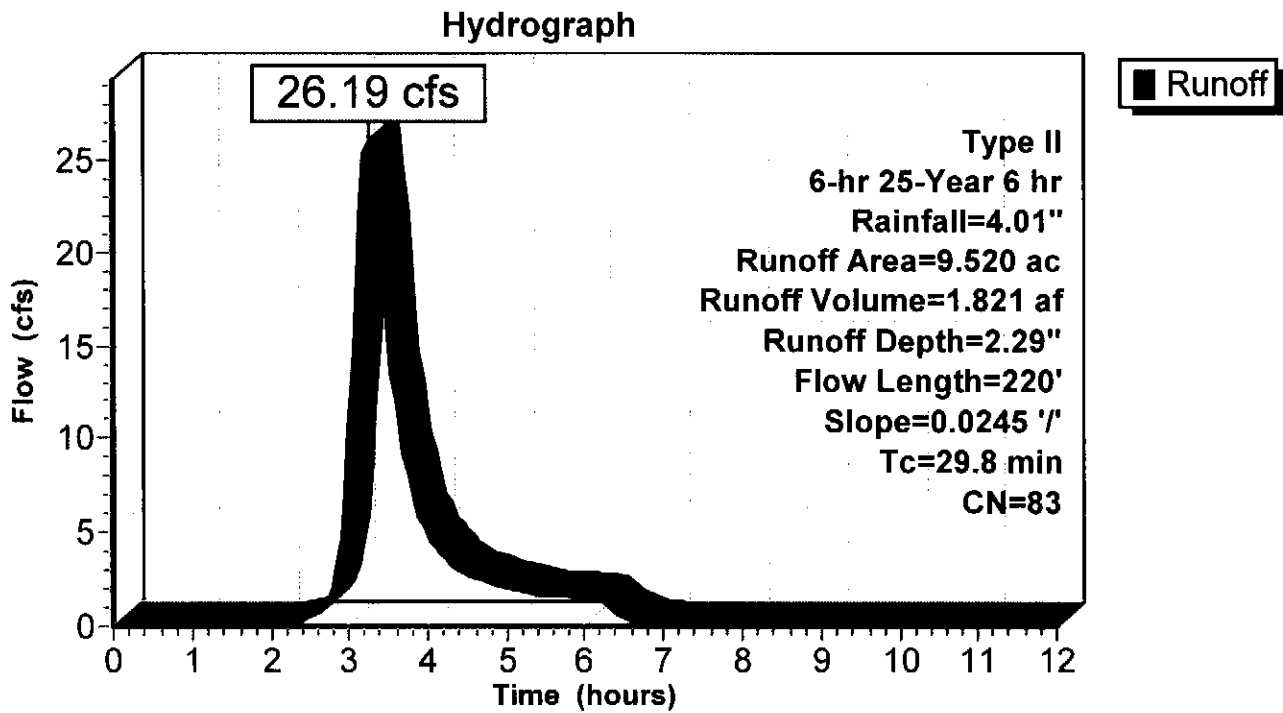
Runoff = 26.19 cfs @ 3.25 hrs, Volume= 1.821 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-12.00 hrs, dt= 0.05 hrs
Type II 6-hr 25-Year 6 hr Rainfall=4.01"

Area (ac)	CN	Description
9.520	83	1/4 acre lots, 38% imp, HSG C
5.902		62.00% Pervious Area
3.618		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	100	0.0245	0.09		Sheet Flow, Sheet Flow Woods: Light underbrush n= 0.400 P2= 3.30"
10.3	120	0.0245	0.19		Sheet Flow, Grass: Short n= 0.150 P2= 3.30"
29.8	220	Total			

Subcatchment 4: #4 Dev



2184 HydroCAD BASE

Type II 6-hr 25-Year 6 hr Rainfall=4.01"

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Printed 4/28/2016

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Summary for Subcatchment 5: #5 Dev

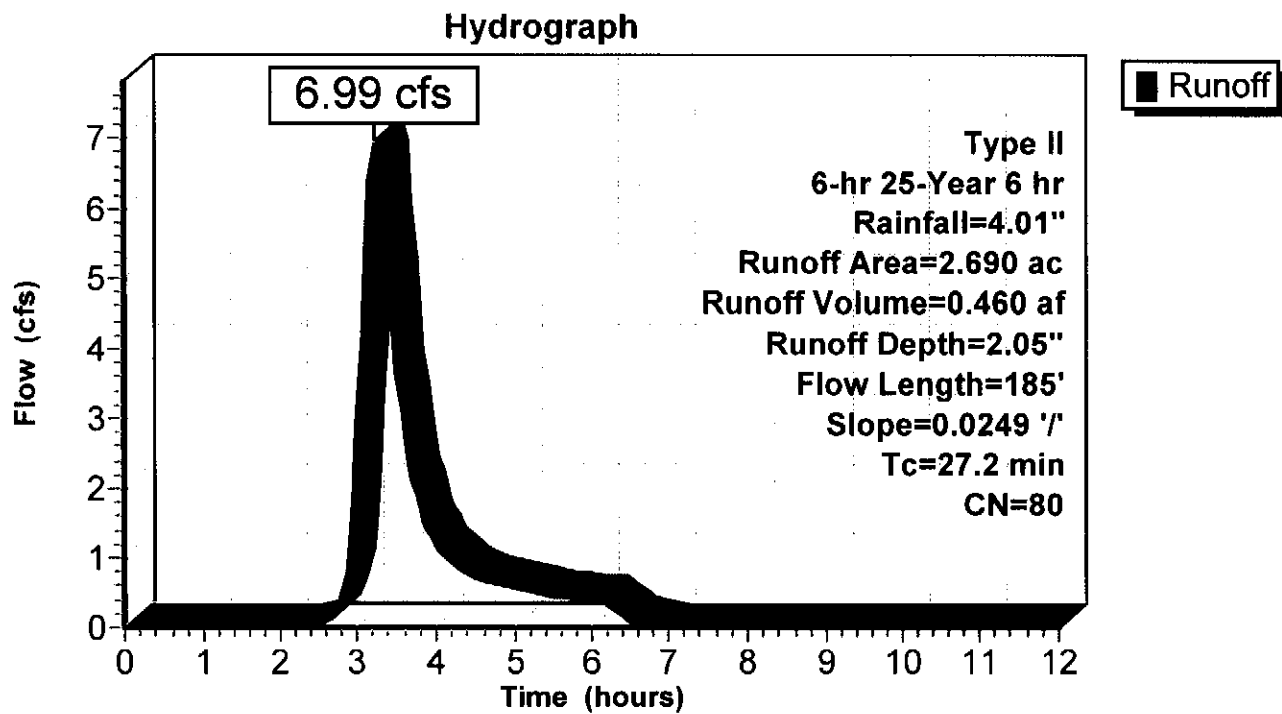
Runoff = 6.99 cfs @ 3.22 hrs, Volume= 0.460 af, Depth= 2.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-12.00 hrs, dt= 0.05 hrs
Type II 6-hr 25-Year 6 hr Rainfall=4.01"

Area (ac)	CN	Description
2.690	80	1/2 acre lots, 25% imp, HSG C
2.017		75.00% Pervious Area
0.672		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	85	0.0249	0.18		Sheet Flow, Sheet Flow Grass: Short n= 0.150 P2= 3.30"
19.4	100	0.0249	0.09		Sheet Flow, Sheet Flow Woods: Light underbrush n= 0.400 P2= 3.30"
27.2	185	Total			

Subcatchment 5: #5 Dev



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Type II 6-hr 10-Year 6 hr Rainfall=3.35"

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Summary for Subcatchment UN-2: UN-2

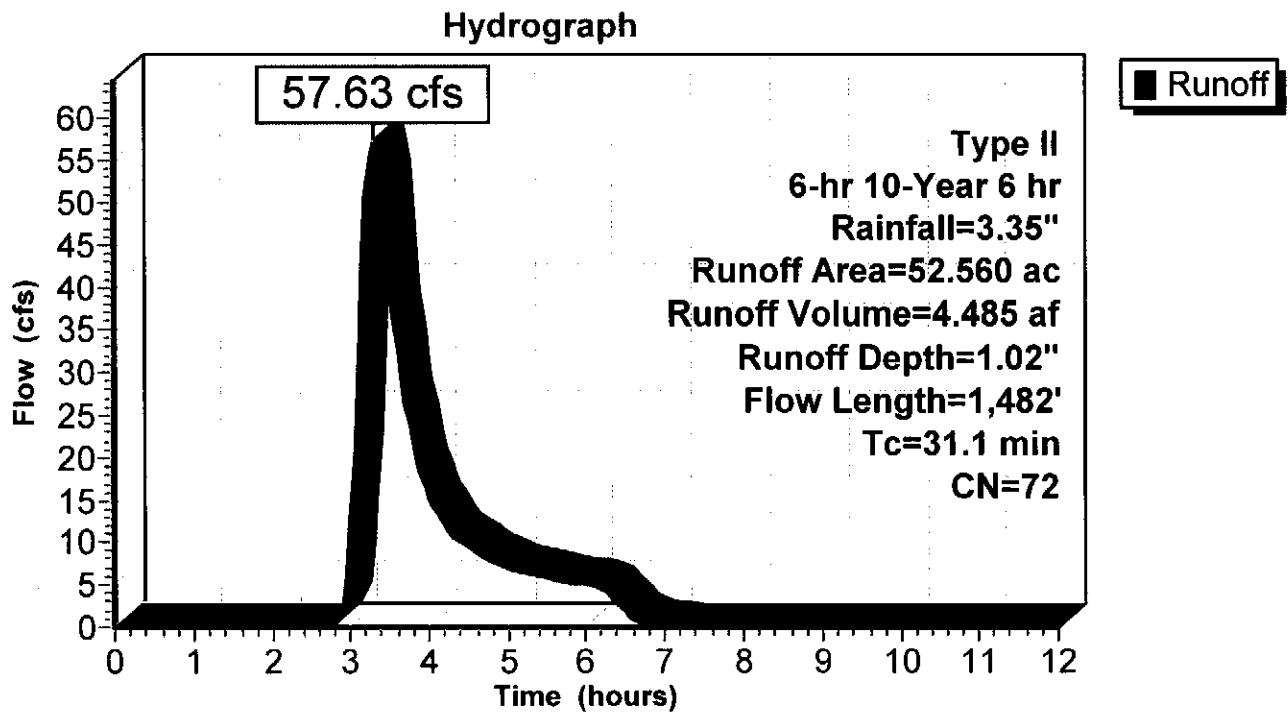
Runoff = 57.63 cfs @ 3.30 hrs, Volume= 4.485 af, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-12.00 hrs, dt= 0.05 hrs
 Type II 6-hr 10-Year 6 hr Rainfall=3.35"

Area (ac)	CN	Description
7.940	85	Row crops, straight row, Good, HSG C
44.620	70	Woods, Good, HSG C
52.560	72	Weighted Average
52.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.6	300	0.1367	0.21		Sheet Flow, Sheet Flow Woods: Light underbrush n= 0.400 P2= 3.30"
5.5	300	0.0333	0.91		Shallow Concentrated Flow, Shallow Concentrated Woodland Kv= 5.0 fps
2.0	882	0.0215	7.26	72.63	Channel Flow, Area= 10.0 sf Perim= 10.0' r= 1.00' n= 0.030 Earth, clean & winding
31.1	1,482	Total			

Subcatchment UN-2: UN-2





DATE: 04.25.16

ATTENTION: Jeff Mueller

PROJECT NO.: 15-2184

COMPANY: Vanderburgh County Surveyor

REFERENCE: Saddle Creek Estates

ADDRESS: Civic Center Complex - Room 325

YOUR FILE NO.:

CITY, ST, ZIP: Evansville, IN 47708

PHONE:

THE FOLLOWING ITEMS:

COPIES:	ORIG./LAST REV. DATE:	DESCRIPTION:
1	04.25.16	Drainage Plan (Sheet C-101 and C-102)
1	04.25.16	Undeveloped Sub-basin Exhibit
1	04.25.16	Developed Sub-basin Exhibit
1	04.25.16	Drainage Report

LETTER OF TRANSMITTAL

ARE TRANSMITTED:

- PER YOUR REQUEST
- FOR YOUR FILES
- FOR REVIEW & COMMENT
- OTHER

FOR YOUR:

- APPROVAL
- USE
- INFORMATION
- OTHER

VIA:

- COURIER
- FOR PICK UP
- USPS
- NEXT DAY
- FED EX
- UPS
- DHL
- SATURDAY DELIVERY
- TRACKING # _____
- OTHER DELIVERED

COMMENTS:

Please review the attached drainage plan and report. If you have any questions or comments, please give me a call. Thank you

FROM:

GLEN MERITT, JR., P.E.

cc: File

RECEIVED BY THE
 VANDERBURGH COUNTY
 SURVEYOR'S OFFICE

4/25/16 CA

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