

Project: Picucci Subdivision
Croton Dam Road, Ossining, NY

Scope: Preliminary Drainage Assessment

Date: June 7, 2022

Introduction:

The proposed subdivision and potential new house, analyzed schematically here in advance of the building permit, requires an assessment of the impact on stormwater runoff. The runoff from the new impervious areas of the house and driveway will be controlled by capturing the runoff in a Detention Basin / Rain Garden. The NYS DEC 90% storm is fully captured in the system through exfiltration. A conservative exfiltration rate of 20 minute per inch is used for this preliminary report. Final soil testing will be conducted prior to building permit to confirm the estimates made herein.

The flow analysis is made using the Hydrocad software. The hydrologic group is taken from the Web Soil Survey and is noted as: Paxton fine sandy loam, 15 to 25 percent slopes. The model and parameters are enclosed in the computer printout.

Results:

Storm Frequency Year	Existing Flow (cfs)	Proposed Flow (cfs)
100	2.725	2.638
10	1.102	1.058
2	0.503	0.336

Discussion:

Given the capture of stormwater the proposed new house would little or no impact on neighboring properties due to stormwater. The computations indicate a reduction in all peak flows studied as a result of the installed stormwater controls.

Submitted by:



Ralph G. Mastromonaco

Figure: Stormwater Site Plan showing Drainage Areas

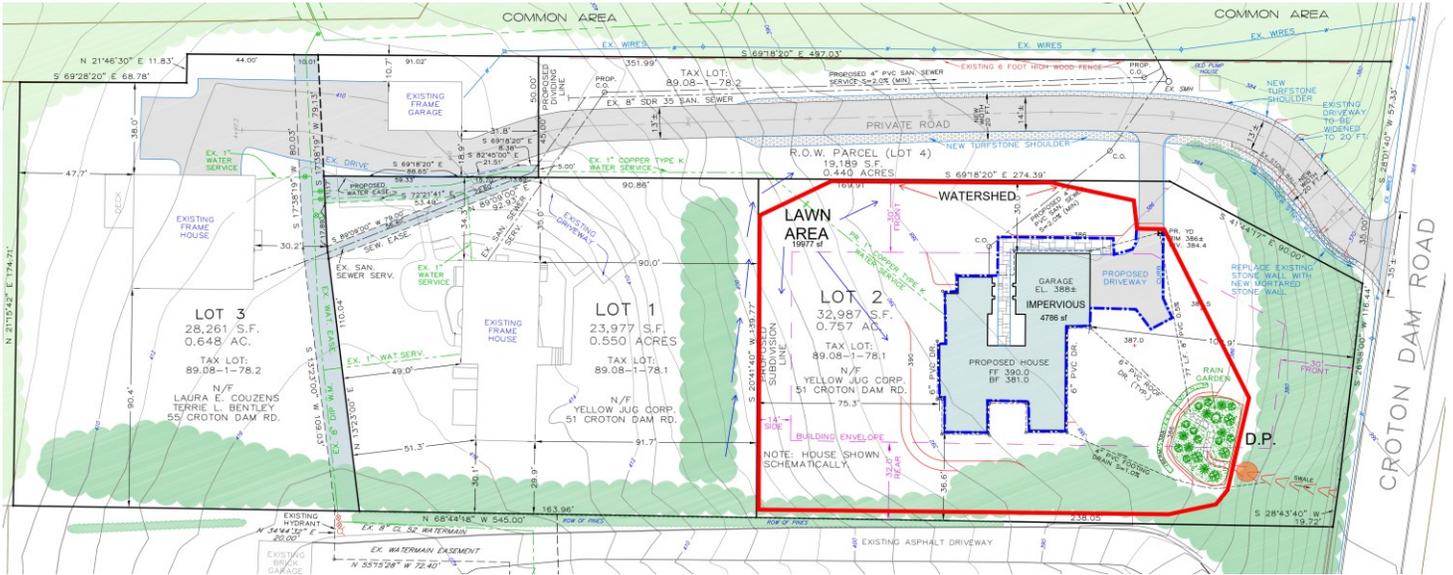
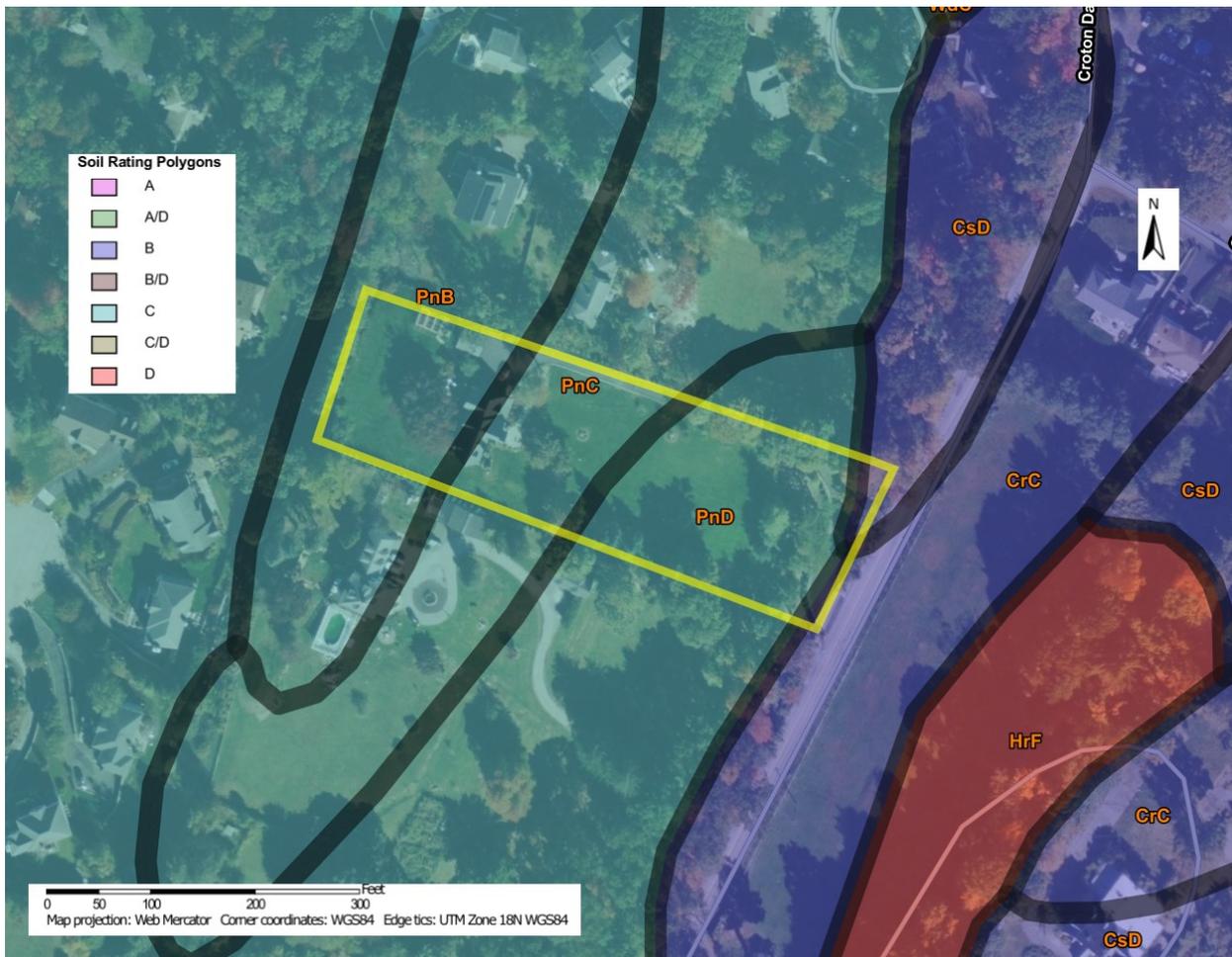


Figure: Soil and Hydrologic Groups



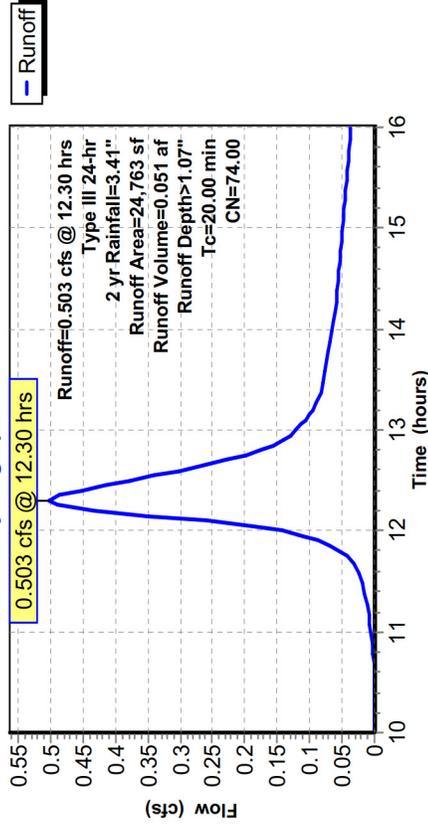
Summary for Subcatchment EX: Existing

Runoff = 0.503 cfs @ 12.30 hrs, Volume= 0.051 af, Depth> 1.07"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2 yr Rainfall=3.41"

Area (sf)	CN	Description		
24,763	74.00	>75% Grass cover, Good, HSG C		
24,763	100.00%	Pervious Area		
Tc (min)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.00				Direct Entry,

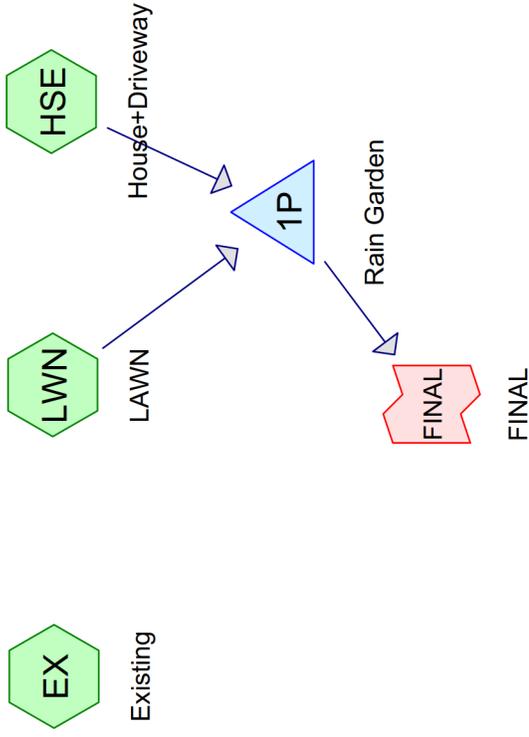
Subcatchment EX: Existing

Hydrograph



RESULTS:

Event	Rainfall (inches)	Existing Runoff (cfs)	Proposed Primary Runoff (cfs)
2 yr	3.41	0.503	0.336
10 yr	5.14	1.102	1.058
100 yr	9.30	2.725	2.638



PIC_1_USE

Prepared by RGMPEPC
 HydroCAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC

PIC_1_USE

Prepared by RGMPEPC
 HydroCAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment LWN: LAWN

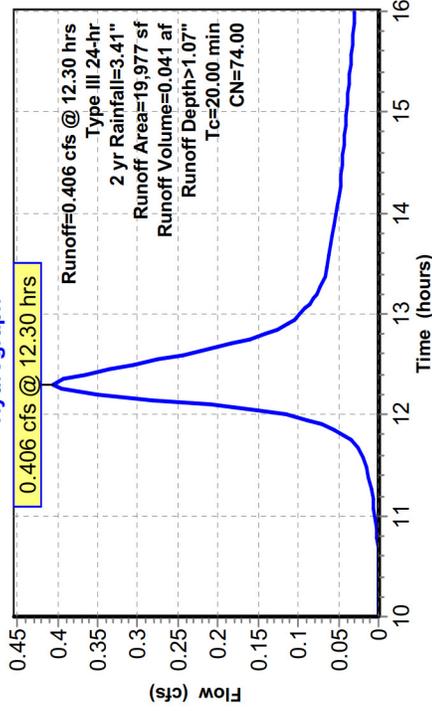
Runoff = 0.406 cfs @ 12.30 hrs, Volume= 0.041 af, Depth> 1.07"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2 yr Rainfall=3.41"

Area (sf)	CN	Description
19,977	74.00	>75% Grass cover, Good, HSG C
19,977		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.00					Direct Entry,

Subcatchment LWN: LAWN

Hydrograph



Summary for Subcatchment HSE: House+Driveway

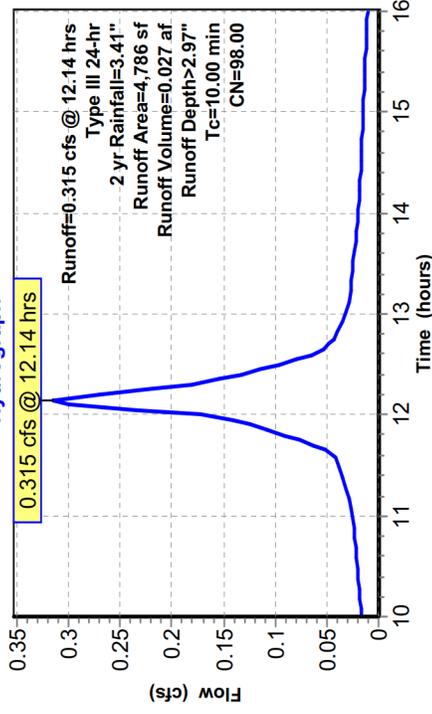
Runoff = 0.315 cfs @ 12.14 hrs, Volume= 0.027 af, Depth> 2.97"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2 yr Rainfall=3.41"

Area (sf)	CN	Description
4,786	98.00	House+Drive Impervious
4,786		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.00					Direct Entry,

Subcatchment HSE: House+Driveway

Hydrograph



PIC_1_USE

Prepared by RGMPEPC
 HydroCAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC

Summary for Pond 1P: Rain Garden

Inflow Area = 0.568 ac, 19.33% Impervious, Inflow Depth > 1.44" for 2 yr event
 Inflow = 0.621 cfs @ 12.21 hrs, Volume= 0.068 af
 Outflow = 0.449 cfs @ 12.46 hrs, Volume= 0.068 af, Atten= 28%, Lag= 14.78 min
 Discarded = 0.113 cfs @ 12.20 hrs, Volume= 0.057 af
 Primary = 0.336 cfs @ 12.46 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 384.39' @ 12.46 hrs Surf.Area= 1,624 sf Storage= 722 cf

Plug-Flow detention time= 56.41 min calculated for 0.068 af (100% of inflow)
 Center-of-Mass det. time= 55.88 min (847.99 - 792.11)

Volume	Invert	Avail.Storage	Storage Description
#1	383.00'	406 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#2	384.00'	1,624 cf	812 cf Overall x 50.0% Voids
		2,030 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
			Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
383.00	812	0	0
384.00	812	812	812

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
384.00	812	0	0
386.00	812	1,624	1,624

Device Routing Invert Outlet Devices

Device	Routing	Invert	Outlet Devices
#1	Primary	384.25'	2.0' long Sharp-Crested Rectangular Weir 2 End Contractions(s)
#2	Discarded	383.00'	3.000 in/hr Exfiltration over Surface area

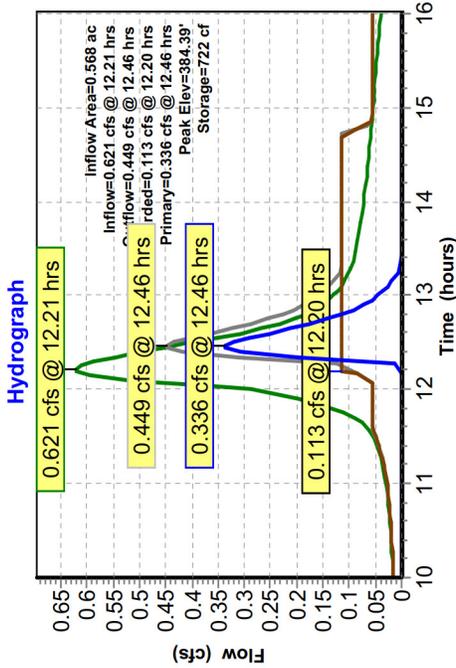
Discarded OutFlow Max=0.113 cfs @ 12.20 hrs HW=384.05' (Free Discharge)
 2=Exfiltration (Exfiltration Controls 0.113 cfs)

Primary OutFlow Max=0.332 cfs @ 12.46 hrs HW=384.39' (Free Discharge)
 1=Sharp-Crested Rectangular Weir (Weir Controls 0.332 cfs @ 1.22 fps)

PIC_1_USE

Prepared by RGMPEPC
 HydroCAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC

Pond 1P: Rain Garden



Summary for Subcatchment EX: Existing

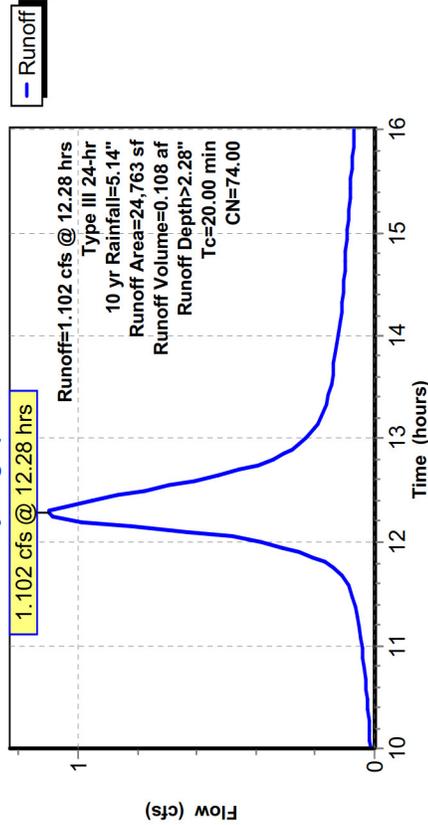
Runoff = 1.102 cfs @ 12.28 hrs, Volume= 0.108 af, Depth> 2.28"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10 yr Rainfall=5.14"

Area (sf)	CN	Description
24,763	74.00	>75% Grass cover, Good, HSG C
24,763	100.00%	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.00					Direct Entry,

Subcatchment EX: Existing

Hydrograph

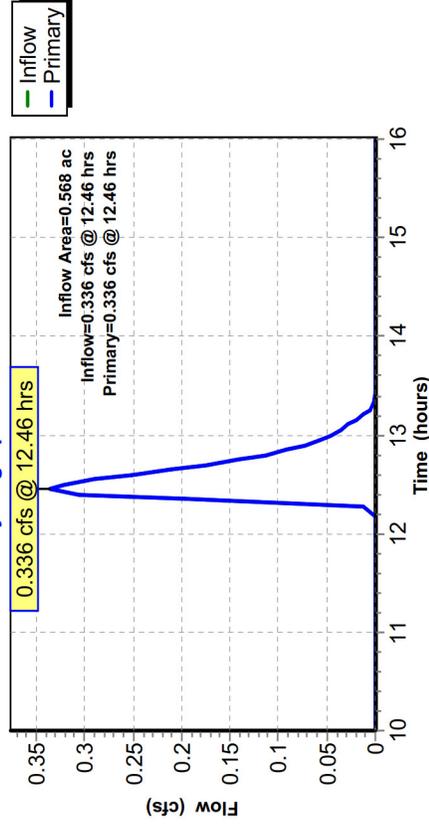


Summary for Link FINAL: FINAL

Inflow Area = 0.568 ac, 19.33% Impervious, Inflow Depth = 0.24" for 2 yr event
 Inflow = 0.336 cfs @ 12.46 hrs, Volume= 0.011 af
 Primary = 0.336 cfs @ 12.46 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.00 min
 Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link FINAL: FINAL

Hydrograph



Summary for Subcatchment LWN: LAWN

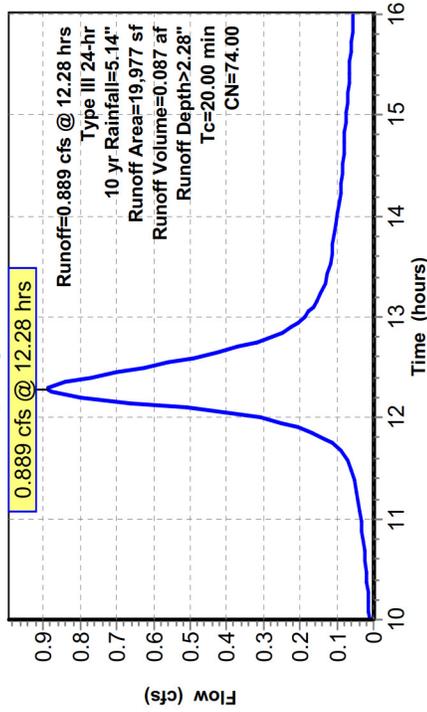
Runoff = 0.889 cfs @ 12.28 hrs, Volume= 0.087 af, Depth> 2.28"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10 yr Rainfall=5.14"

Area (sf)	CN	Description
19,977	74.00	>75% Grass cover, Good, HSG C
19,977	100.00%	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.00					Direct Entry,

Subcatchment LWN: LAWN

Hydrograph



Summary for Subcatchment HSE: House+Driveway

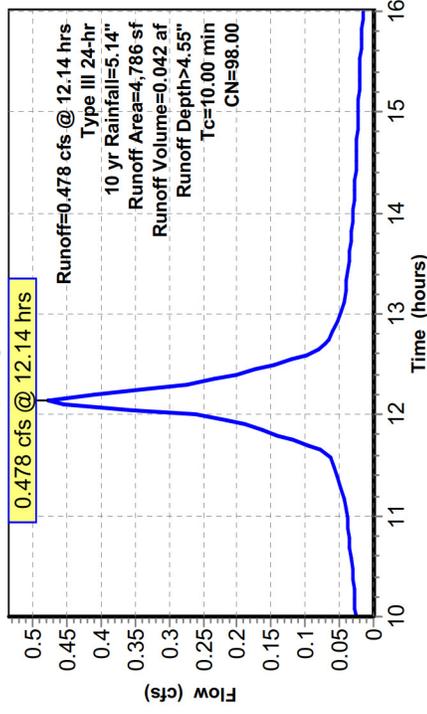
Runoff = 0.478 cfs @ 12.14 hrs, Volume= 0.042 af, Depth> 4.55"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10 yr Rainfall=5.14"

Area (sf)	CN	Description
4,786	98.00	House+Drive Impervious
4,786	100.00%	Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.00					Direct Entry,

Subcatchment HSE: House+Driveway

Hydrograph



PIC_1_USE

Prepared by RGMPEPC
 HydroCAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC

Summary for Pond 1P: Rain Garden

Inflow Area = 0.568 ac, 19.33% Impervious, Inflow Depth > 2.72" for 10 yr event
 Inflow = 1.217 cfs @ 12.22 hrs, Volume= 0.129 af
 Outflow = 1.171 cfs @ 12.29 hrs, Volume= 0.124 af, Atten= 4%, Lag= 4.10 min
 Discarded = 0.113 cfs @ 12.00 hrs, Volume= 0.073 af
 Primary = 1.058 cfs @ 12.29 hrs, Volume= 0.051 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 384.55' @ 12.29 hrs Surf.Area= 1,624 sf Storage= 855 cf

Plug-Flow detention time= 44.03 min calculated for 0.124 af (96% of inflow)
 Center-of-Mass det. time= 28.69 min (815.01 - 786.32)

Volume	Invert	Avail.Storage	Storage Description
#1	383.00'	406 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#2	384.00'	1,624 cf	812 cf Overall x 50.0% Voids
		2,030 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
			Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
383.00	812	0	0
384.00	812	812	812

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
384.00	812	0	0
386.00	812	1,624	1,624

Device Routing Invert Outlet Devices

Device	Routing	Invert	Outlet Devices
#1	Primary	384.25'	2.0' long Sharp-Crested Rectangular Weir 2 End Contractions(s)
#2	Discarded	383.00'	3.000 in/hr Exfiltration over Surface area

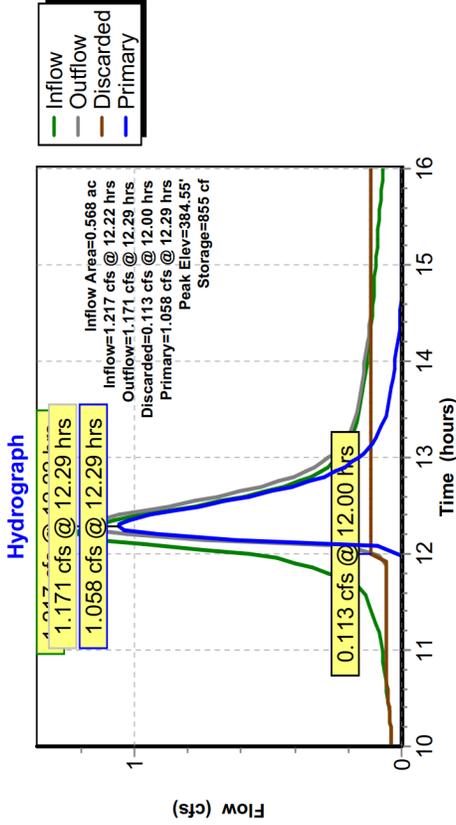
Discarded Outflow Max=0.113 cfs @ 12.00 hrs HW=384.07' (Free Discharge)
 2=Exfiltration (Exfiltration Controls 0.113 cfs)

Primary Outflow Max=1.054 cfs @ 12.29 hrs HW=384.55' (Free Discharge)
 1=Sharp-Crested Rectangular Weir (Weir Controls 1.054 cfs @ 1.80 fps)

PIC_1_USE

Prepared by RGMPEPC
 HydroCAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC

Pond 1P: Rain Garden



PIC_1_USE

Prepared by RGMPEPC
 HydroCAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC

PIC_1_USE

Prepared by RGMPEPC
 HydroCAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC

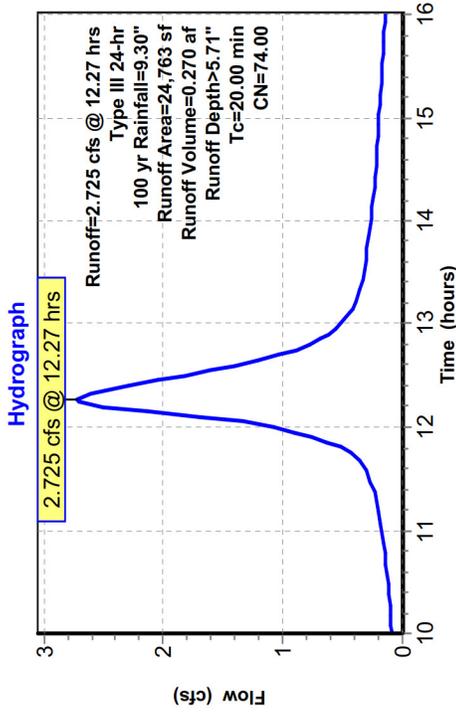
Summary for Subcatchment EX: Existing

Runoff = 2.725 cfs @ 12.27 hrs, Volume= 0.270 af, Depth> 5.71"
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100 yr Rainfall=9.30"

Area (sf)	CN	Description
24,763	74.00	>75% Grass cover, Good, HSG C
24,763	100.00%	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.00					Direct Entry,

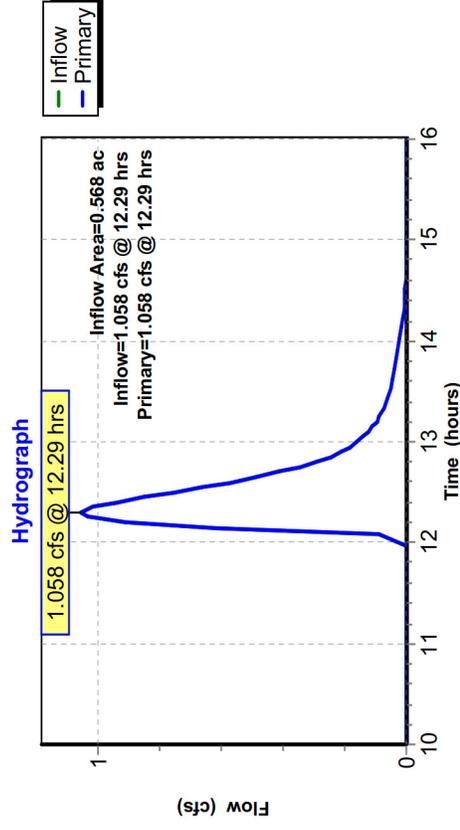
Subcatchment EX: Existing



Summary for Link FINAL: FINAL

Inflow Area = 0.568 ac, 19.33% Impervious, Inflow Depth = 1.07" for 10 yr event
 Inflow = 1.058 cfs @ 12.29 hrs, Volume= 0.051 af
 Primary = 1.058 cfs @ 12.29 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.00 min
 Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link FINAL: FINAL



PIC_1_USE

Prepared by RGMPEPC
 HydroCAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC

PIC_1_USE

Prepared by RGMPEPC
 HydroCAD® 10.10-4a s/n M16359 © 2020 HydroCAD Software Solutions LLC

Summary for Subcatchment LWN: LAWN

Runoff = 2.199 cfs @ 12.27 hrs, Volume= 0.218 af, Depth> 5.71"

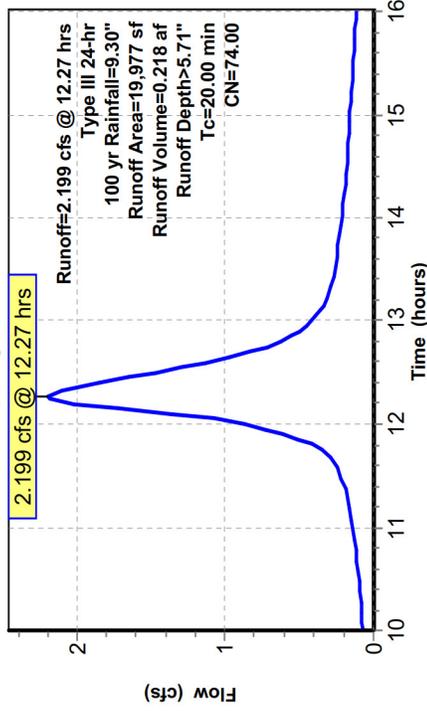
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100 yr Rainfall=9.30"

Area (sf)	CN	Description
19,977	74.00	>75% Grass cover, Good, HSG C
19,977	100.00%	Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.00					Direct Entry,

Subcatchment LWN: LAWN

Hydrograph



Summary for Subcatchment HSE: House+Driveway

Runoff = 0.869 cfs @ 12.14 hrs, Volume= 0.076 af, Depth> 8.32"

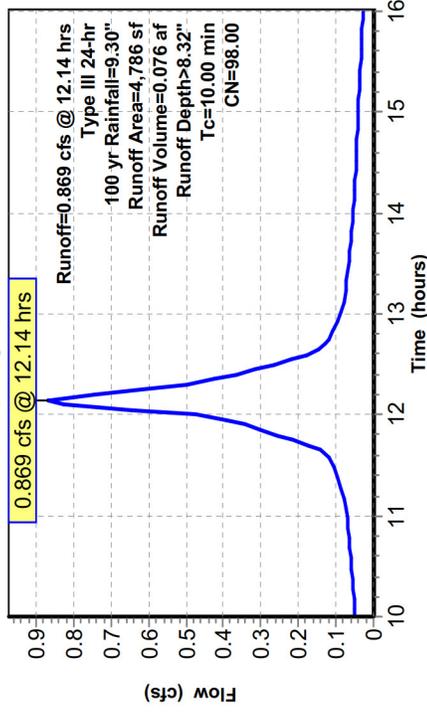
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100 yr Rainfall=9.30"

Area (sf)	CN	Description
4,786	98.00	House+Drive Impervious
4,786	100.00%	Impervious Area

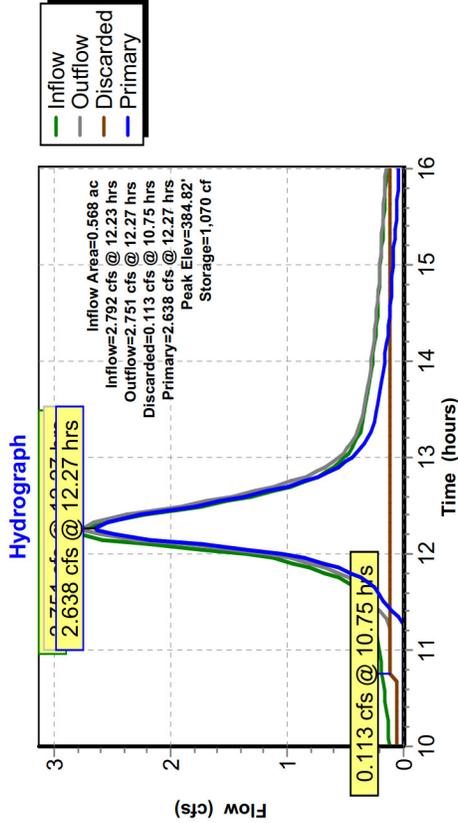
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.00					Direct Entry,

Subcatchment HSE: House+Driveway

Hydrograph



Pond 1P: Rain Garden



Summary for Pond 1P: Rain Garden

Inflow Area = 0.568 ac, 19.33% Impervious, Inflow Depth > 6.21" for 100 yr event
 Inflow = 2,792 cfs @ 12.23 hrs, Volume= 0.294 af
 Outflow = 2,751 cfs @ 12.27 hrs, Volume= 0.285 af, Atten= 1%, Lag= 2.31 min
 Discarded = 0.113 cfs @ 10.75 hrs, Volume= 0.101 af
 Primary = 2,638 cfs @ 12.27 hrs, Volume= 0.184 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 384.82' @ 12.27 hrs Surf.Area= 1,624 sf Storage= 1,070 cf
 Plug-Flow detention time= 28.02 min calculated for 0.284 af (97% of inflow)
 Center-of-Mass det. time= 15.91 min (790.74 - 774.83)

Volume	Invert	Avail.Storage	Storage Description
#1	383.00'	406 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
#2	384.00'	1,624 cf	812 cf Overall x 50.0% Voids
		2,030 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
			Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
383.00	812	0	0
384.00	812	812	812

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
384.00	812	0	0
386.00	812	1,624	1,624

Device Routing Invert Outlet Devices

Device	Routing	Invert	Outlet Devices
#1	Primary	384.25'	2.0' long Sharp-Crested Rectangular Weir 2 End Contractions(s)
#2	Discarded	383.00'	3.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.113 cfs @ 10.75 hrs HW=384.01' (Free Discharge)
 ↓
 2=Exfiltration (Exfiltration Controls 0.113 cfs)

Primary OutFlow Max=2.619 cfs @ 12.27 hrs HW=384.81' (Free Discharge)
 ↓
 1=Sharp-Crested Rectangular Weir (Weir Controls 2.619 cfs @ 2.46 fps)

Events for Subcatchment EX: Existing

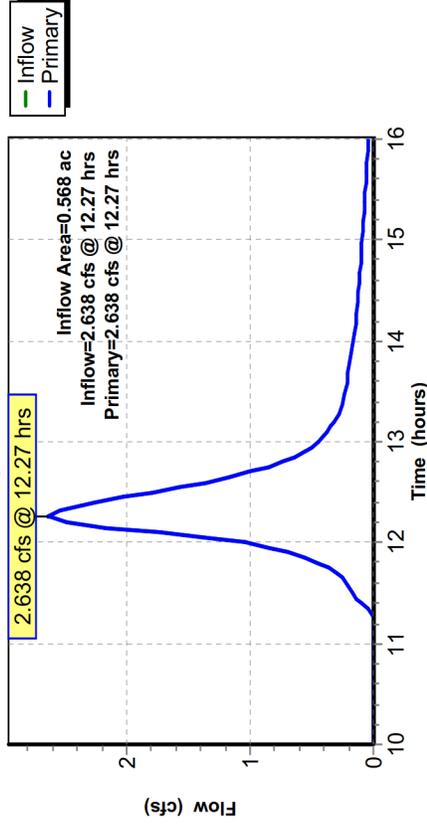
Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2 yr	3.41	0.503	0.051	1.07
10 yr	5.14	1.102	0.108	2.28
100 yr	9.30	2.725	0.270	5.71

Summary for Link FINAL: FINAL

Inflow Area = 0.568 ac, 19.33% Impervious, Inflow Depth = 3.88" for 100 yr event
 Inflow = 2.638 cfs @ 12.27 hrs, Volume= 0.184 af
 Primary = 2.638 cfs @ 12.27 hrs, Volume= 0.184 af, Atten= 0%, Lag= 0.00 min
 Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link FINAL: FINAL

Hydrograph



Events for Subcatchment LWN: LAWN

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2 yr	3.41	0.406	0.041	1.07
10 yr	5.14	0.889	0.087	2.28
100 yr	9.30	2.199	0.218	5.71

Events for Subcatchment HSE: House+Driveway

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2 yr	3.41	0.315	0.027	2.97
10 yr	5.14	0.478	0.042	4.55
100 yr	9.30	0.869	0.076	8.32

Events for Link FINAL: FINAL

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
2 yr	0.336	0.336	0.00
10 yr	1.058	1.058	0.00
100 yr	2.638	2.638	0.00

Events for Pond 1P: Rain Garden

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
2 yr	0.621	0.449	0.113	0.336	384.39	722
10 yr	1.217	1.171	0.113	1.058	384.55	855
100 yr	2.792	2.751	0.113	2.638	384.82	1,070