Stormwater Management Report

prepared for:

Choate Rosemary Hall

Hill House Renovations

138 North Elm Street
Wallingford, Connecticut

March 4, 2020
Revised: April 30, 2020

LANDTECH

Civil Engineering · Site Planning
Environmental Science & Engineering
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Executive Summary

Landtech has been retained by Bowie Gridley Architects to provide site drainage design, utility design, and permitting assistance for the project.

The existing Hill House suffered substantial damage from a fire resulting from a lightning strike to the roof of the building. Choate proposes to renovate the existing building and construct a small addition to the north end of the existing building, and reconfigure the rear hardscape areas and entrance to the building to be handicap accessible. The proposed improvements are in an area of their property that is presently developed with predominately impervious surfaces. There will be a slight increase of approximately 450 sf of new impervious surfaces in these areas and thus have the potential to increase the runoff generated during rainfall events. In order to mitigate any potential impacts from the proposed development, Landtech has developed a comprehensive storm water management plan to maintain the rates of runoff to a level at or below the existing condition. Proposed controls include infiltrative underground detention systems. While the native soils in some areas of the project limit the opportunity to infiltrate large volumes of storm water, the proposed design utilizes free-draining imported fill material under the proposed stormwater detention systems to promote infiltration to the greatest extent possible in those areas.

Based on our calculations, the proposed rates of runoff from the project area will not be increased as a result of this project. In addition, the stormwater quality volume from new impervious surfaces will be completely infiltrated into the underlying soils.

Limits of Study and Watershed Description:

For the purposes of our analysis, the existing watershed limits were chosen to encompass all of the site areas that would be affected by the proposed construction. Our analysis included the study of existing and proposed runoff for the 1, 2, 5, 10, 25, 50, and 100-year storm events.

Test pits were performed in the locations of the proposed underground detention systems and falling head permeability testing was performed on representative samples taken from the test holes. See Appendix D for a listing of the results of the soil testing that was performed by Landtech.

Methodology:

We performed our analysis using the NRCS TR-55 methodology, as implemented by the HydroCAD® software implementation. Surface cover characteristics, Slope, Hydrologic soil properties, Time of Concentration, and Rainfall Depth/Distribution are all inputs into the program.

Infiltration computations, pipe calculations, and other necessary hydraulic computation were performed using generally accepted engineering formulae.

Watershed Description:

Existing Conditions:

The existing water shed consists of 0.391 acres as indicated on the “Existing Watershed Map” contained in Appendix A. All soils in the vicinity of the project are categorized in the Hydrologic Group “D”. Please

refer to the NRCS Soils Report prepared for this project and located in Appendix C. Based on the observed permeability of the native soils in the vicinity of the proposed underground detention system (INF-1), we are proposing to over-excavate to a depth of three feet below the bottom of the proposed detention system and backfill with granular fill material having a permeability ("K") of 15.0 ft./day, minimum. We have applied a factor of safety of 5.0 to this value, and used an infiltration rate of 3.0 ft./day for our computations.

To accurately analyze the existing conditions, the overall project watershed was divided into four sub-areas, as follows:

Existing Sub-Area #1: This area contains 0.24 acres and is comprised of approx. half of the existing Hill House and covered connection to the Mellon Library roof area, hardscape areas located to the northwest of the building and a portion of lawn areas. Runoff from the roof area is collected via a system of internal collection piping that exits the building underground and connects into an existing catch basin located to the northwest of the building. Surface runoff over the hardscape and lawn areas are conveyed via sheet flow and then collected by an existing drainage system consisting of network of a catch basins and collection piping.

Existing Sub-Area #2: This area contains 0.09 acres and is comprised of a portion of the existing Hill House northeast roof overhang not connected to the internal roof leader system and other half of the covered connection to the Mellon Library roof area, hardscape areas located to the northeast of the building, a portion of the concrete entry steps and a portion of lawn area. Runoff from the roof area is collected via a system of scuppers and down spouts that discharge onto lawn areas and sheet flow over hardscape and lawns area before entering an existing catch basin (CB 39) located to the northeast of Hill House.

Existing Sub-Area #3: This area contains approximately 0.07 acres and is comprised mostly of lawn areas with a small portion of the existing Hill House southeast roof overhang not connected to the internal roof leader system and a portion of the front concrete entry steps. Runoff from the roof area is collected via a system of scuppers and down spouts that discharge onto lawn areas and sheet flow over hardscape and lawns areas. The runoff is ultimately collected by an existing drainage network that, in turn, is connected to the existing storm drainage system in North Elm Street.

Existing Sub-Area #4: This area contains the remaining half of the existing Hill House roof area. This roof area is collected similarly to Sub-Area #1 except that it is connected to an existing underground detention system that was installed as a part of the new St Johns Student Center Building project in 2016.

Proposed Conditions:

As previously stated, the proposed project will add an incremental amount of new impervious cover to the site. In order to maintain stormwater discharge rates at or below existing conditions, two underground detention systems will be installed. The underground detention system (INF-1) will detain the runoff from the northern half of the Hill House roof area, roof area for the connection to Mellon Library and hardscape areas located to the northwest of building. The other system (INF-2) will detain the runoff from the roof overhang around the perimeter of the eastern side of the building. The drainage areas remain similar, with modifications as follows:

Proposed Sub-Area #1: This area contains 0.26 acres and is comprised of approx. half of the existing Hill House, new addition and covered connection to the Mellon Library roof area, new hardscape areas and handicap accessible building entrance located to the northwest of the building and a portion of lawn/landscape areas. Runoff from the roof area is collected via a system of internal collection piping that exits the building underground and connects to the proposed underground detention system (INF-1). Surface runoff over the hardscape and lawn areas will be collected in INF-1 via a system of yard drains and collection piping located in the new landscaped areas. All new landscaped areas shall be depressed 6" below the hardscape areas to direct runoff into the drainage system. The size of this area has increased slightly compared to the existing conditions due to the inclusion of the new building addition that is located over areas that were formerly a part of Sub-Area #2.

Proposed Sub-Area #2A: This area will remain generally unchanged with exception that a portion of the area that previously discharged to existing Sub-Area #2 has been rerouted due to the construction of the new building addition and the roof area that discharges to Sub-Area #3A will be collected in INF-2. There is a net reduction in impervious area in the proposed conditions for this Sub-Area.

Proposed Area #3A: This area contains the existing roof overhang on the eastern side of the Hill House. As discussed, runoff from this area will be captured in an underground detention system (INF-2) located in the lawn area to the east of the front entrance steps. Runoff collected in INF-2 will discharge via a 24" overflow grate and sheet flow over lawn areas towards EX CB 37.

Proposed Sub-Area #3B: This area will remain generally unchanged with exception that the roof area that previously discharged to existing Sub-Area #3 and now discharges to Sub-Area #3A will be collected in INF-2.

Proposed Sub-Area #4: As stated above, this area is connected to an existing underground detention system that was installed as a part of the new St Johns Student Center Building project in 2016. This portion of the roof area is to remain unchanged in this proposal. Considering that the roof area was accounted for in the sizing of the underground detention system for the Student Center and there are no changes being proposed to this area, we have excluded it from our analysis of the existing and proposed conditions.

Stormwater Quality:

The proposed design incorporates stormwater quality elements to enhance the stormwater quality for the proposed impervious surfaces.

The discharge from all new hardscape areas, as well as, the roof areas for the existing Hill House and connection between Hill House and the Mellon Library will be collected and discharged to underground detention systems. Runoff from roof areas is generally considered "clean", therefore we have not proposed any pre-treatment of this runoff prior to discharge into the UG detention systems. The proposed detention systems are designed to retain the stormwater quality volume below the overflow grates, thereby promoting infiltration of the "first flush" volumes into the underlying soils.

Summary of Results:

Based on HydroCAD® modelling, we have tabulated the runoff rates and volumes for existing and proposed conditions. We have provided results for the discharge to existing CB 6, discharge to existing CB 39, discharge to existing CB 37, and overall discharge from the project study area.

Discharge to POC-1 (EX CB 6)

Rate of Stormwater Discharge (cfs)					Volume of Stormwater Discharge (cf)			
Storm	Existing	Proposed	Change	%Change	Existing	Proposed	Change	%Change
1-Year	0.57	0.00	-0.57	-100.0%	1811.0	0.0	-1811.00	-100.0%
2-Year	0.72	0.00	-0.72	-100.0%	2282.0	0.0	-2282.00	-100.0%
5-Year	0.92	0.05	-0.87	-94.6%	2980.0	252.0	-2728.00	-91.5%
10-Year	1.11	0.30	-0.81	-73.0%	3633.0	785.0	-2848.00	-78.4%
25-Year	1.42	0.70	-0.72	-50.7%	4696.0	1688.0	-3008.00	-64.1%
50-Year	1.69	0.97	-0.72	-42.6%	5669.0	2551.0	-3118.00	-55.0%
100-Year	2.02	1.26	-0.76	-37.6%	6836.0	3608.0	-3228.00	-47.2%

Discharge to POC-2 (EX CB 39)

Rate of Stormwater Discharge					Volume of Stormwater Discharge			
Storm	Existing	Proposed	Change	%Change	Existing	Proposed	Change	%Change
1-Year	0.20	0.13	-0.07	-35.0%	610.0	409.0	-201.00	-33.0%
2-Year	0.25	0.17	-0.08	-32.0%	785.0	537.0	-248.00	-31.6%
5-Year	0.33	0.24	-0.09	-27.3%	1047.0	732.0	-315.00	-30.1%
10-Year	0.41	0.29	-0.12	-29.3%	1294.0	917.0	-377.00	-29.1%
25-Year	0.53	0.39	-0.14	-26.4%	1698.0	1222.0	-476.00	-28.0%
50-Year	0.63	0.47	-0.16	-25.4%	2070.0	1504.0	-566.00	-27.3%
100-Year	0.76	0.57	-0.19	-25.0%	2517.0	1845.0	-672.00	-26.7%

Discharge to POC-3 EX CB 37

Rate of Stormwater Discharge					Volume of Stormwater Discharge			
Storm	Existing	Proposed	Change	%Change	Existing	Proposed	Change	%Change
1-Year	0.12	0.08	-0.04	-33.3%	380.0	235.0	-145.00	-38.2%
2-Year	0.16	0.1	-0.06	-37.5%	503.0	313.0	-190.00	-37.8%
5-Year	0.22	0.14	-0.08	-36.4%	691.0	432.0	-259.00	-37.5%
10-Year	0.28	0.18	-0.10	-35.7%	869.0	547.0	-322.00	-37.1%
25-Year	0.37	0.23	-0.14	-37.8%	1165.0	736.0	-429.00	-36.8%
50-Year	0.45	0.29	-0.16	-35.6%	1439.0	912.0	-527.00	-36.6%
100-Year	0.55	0.35	-0.20	-36.4%	1770.0	1126.0	-644.00	-36.4%

Overall Discharge from Study Area

Rate of Stormwater Discharge					Volume of Stormwater Discharge			
Storm	Existing	Proposed	Change	%Change	Existing	Proposed	Change	%Change
1-Year	0.9	0.21	-0.69	-76.7%	2802	643	-2159.00	-77.1%
2-Year	1.13	0.27	-0.86	-76.1%	3570	850	-2720.00	-76.2%
5-Year	1.48	0.38	-1.10	-74.3%	4718	1416	-3302.00	-70.0%
10-Year	1.8	0.47	-1.33	-73.9%	5796	2248	-3548.00	-61.2%
25-Year	2.31	1.1	-1.21	-52.4%	7560	3646	-3914.00	-51.8%
50-Year	2.78	1.57	-1.21	-43.5%	9177	4967	-4210.00	-45.9%
100-Year	3.33	2.02	-1.31	-39.3%	11122	6578	-4544.00	-40.9%

As shown, there are significant decreases in both the rate and volume of discharge to all points of concern for all of the storm events studied.

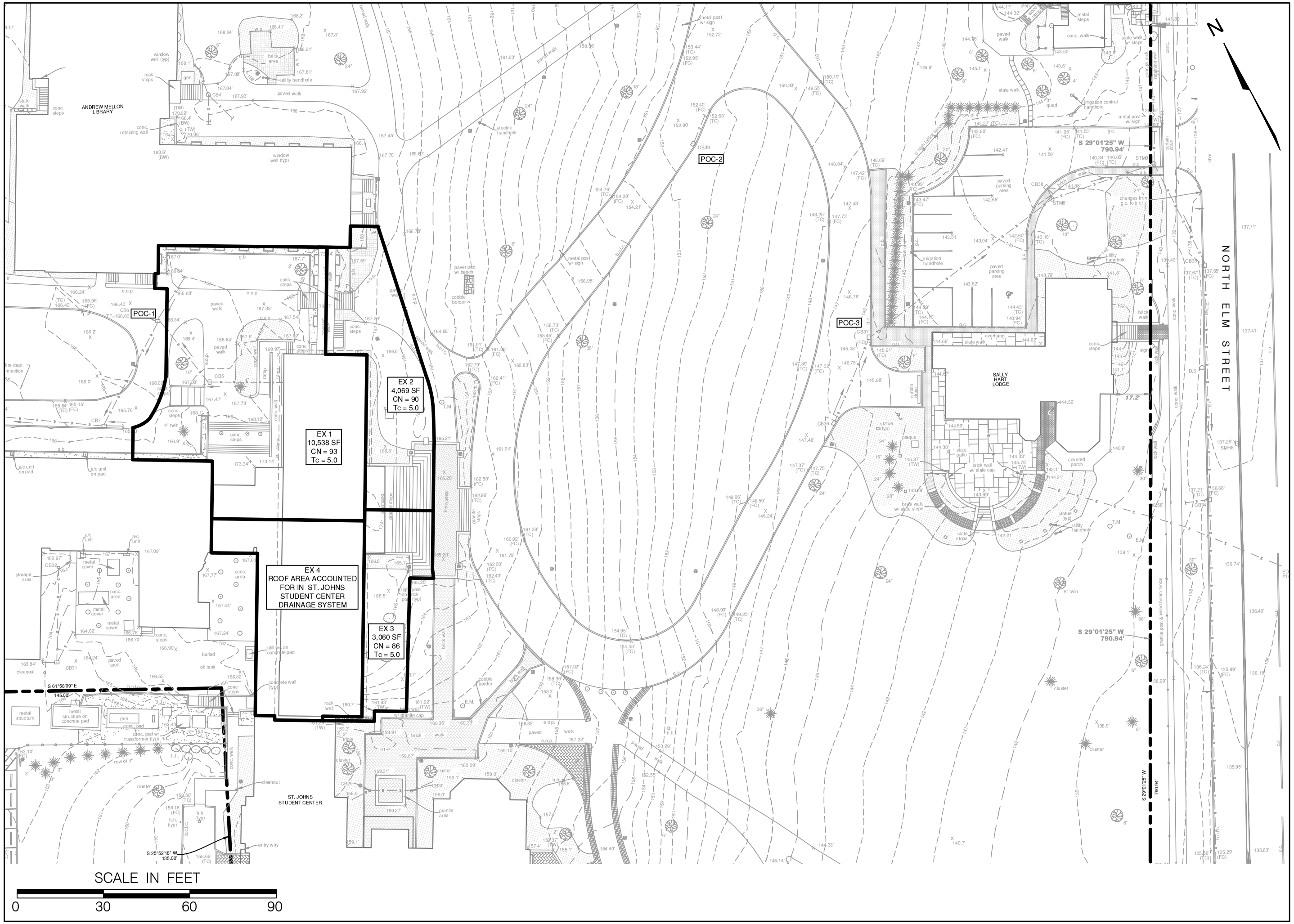
Conclusions:

Based on our computations, the proposed development will not result in any adverse flooding impacts to abutting and downstream property owners. The discharge rates and volumes are decreased for the 1, 2, 5, 10, 25, 50, and 100-year storm events from existing conditions. The proposed stormwater management plan promotes infiltration for the runoff from the proposed improvements. Stormwater Quality Volumes for all new impervious areas are fully infiltrated.

It is our professional opinion and the conclusion of this report that the proposed project will have no adverse impacts to North Elm Street, or upstream and downstream property owners.

Appendix A

Watershed Maps



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No.	Issue-Addendum-Revision	Date
	Permit Set	4/30/20
	Bid Addendum #3	4/14/20
	Early Bid Package	3/25/20

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Choate Rosemary Hall

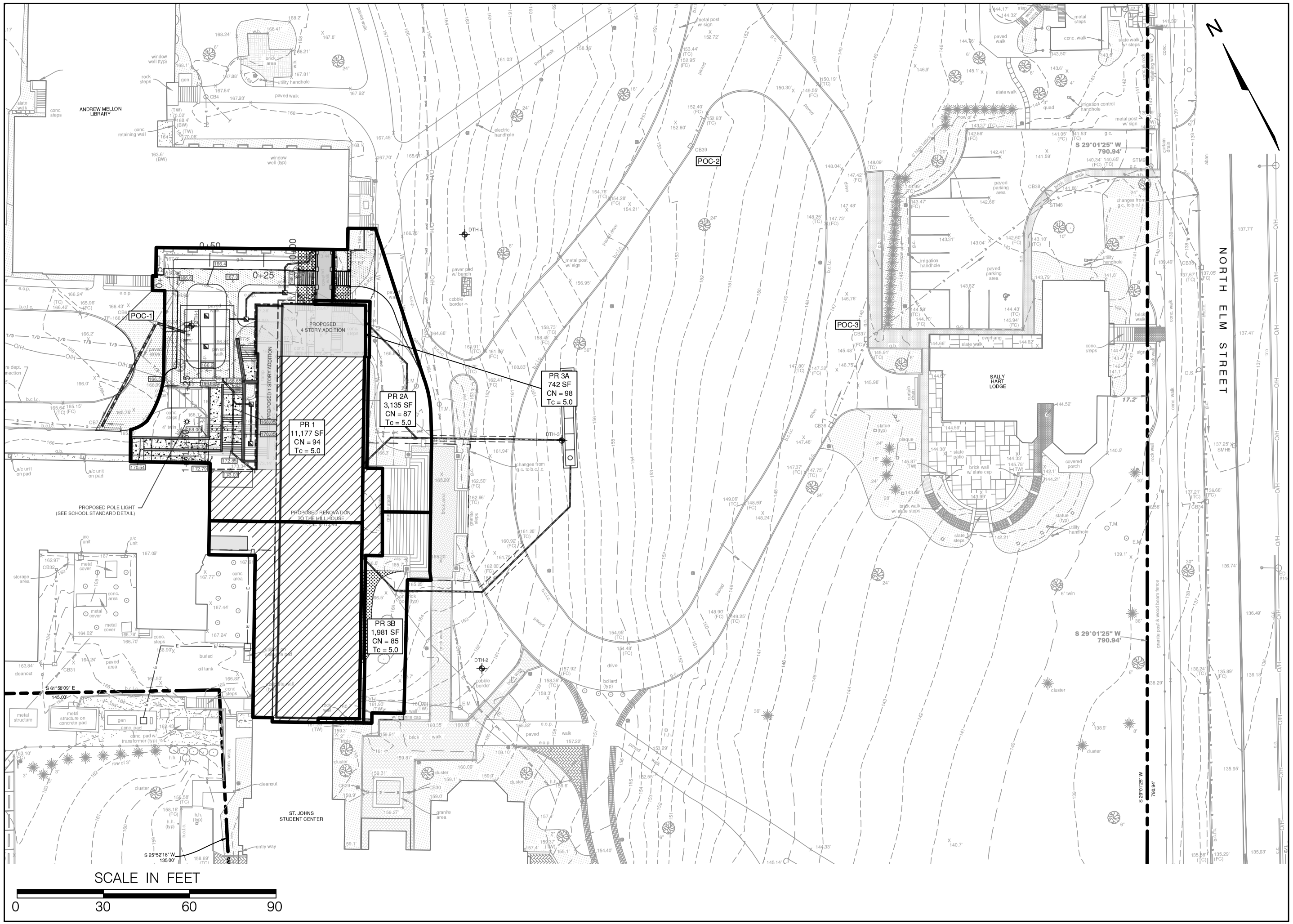
Hill House, 138 North Elm St
Wallingford, CT 06492

BGA # 19010

EXISTING CONDITIONS WATERSHED MAP

DRW. BY	CL
CHK. BY	RPP
QAR. BY	RPP
SCALE	1" = 30'

EX-WS



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PROPOSED CONDITIONS WATERSHED MAP

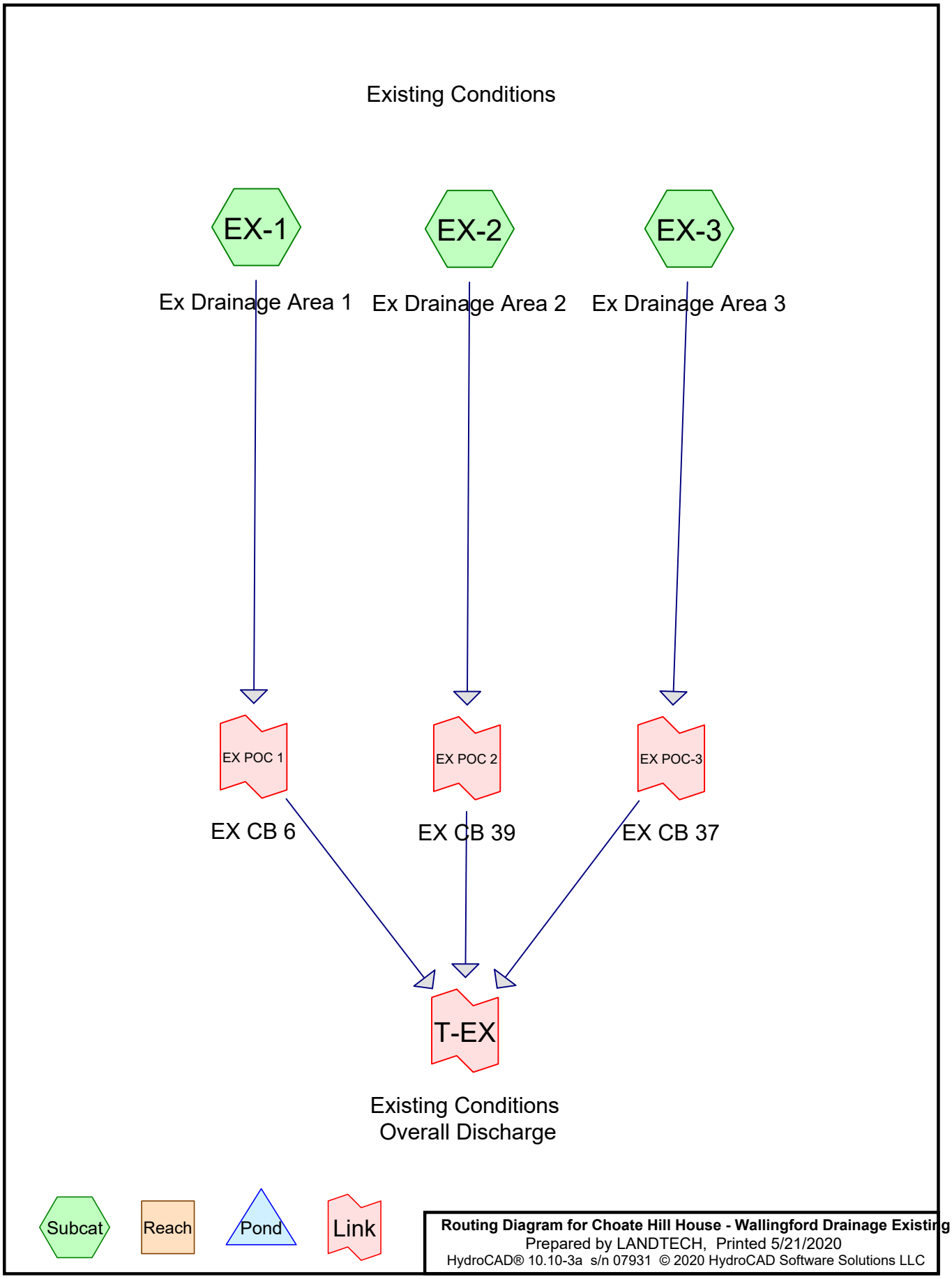
DRN. BY	CL
CHK. BY	RPP
QAR. BY	RPP
SCALE	1" = 30'

PR-WS

Appendix B

HydroCAD® Summary Results

Existing Conditions Summary



Routing Diagram for Choate Hill House - Wallingford Drainage Existing
Prepared by LANDTECH, Printed 5/21/2020
HydroCAD® 10.10-3a s/n 07931 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
7,091	80	>75% Grass cover, Good, HSG D (EX-1, EX-2, EX-3)
10,576	98	Roof / Hardscape Areas (EX-1, EX-2, EX-3)

Summary for Subcatchment EX-1: Ex Drainage Area 1

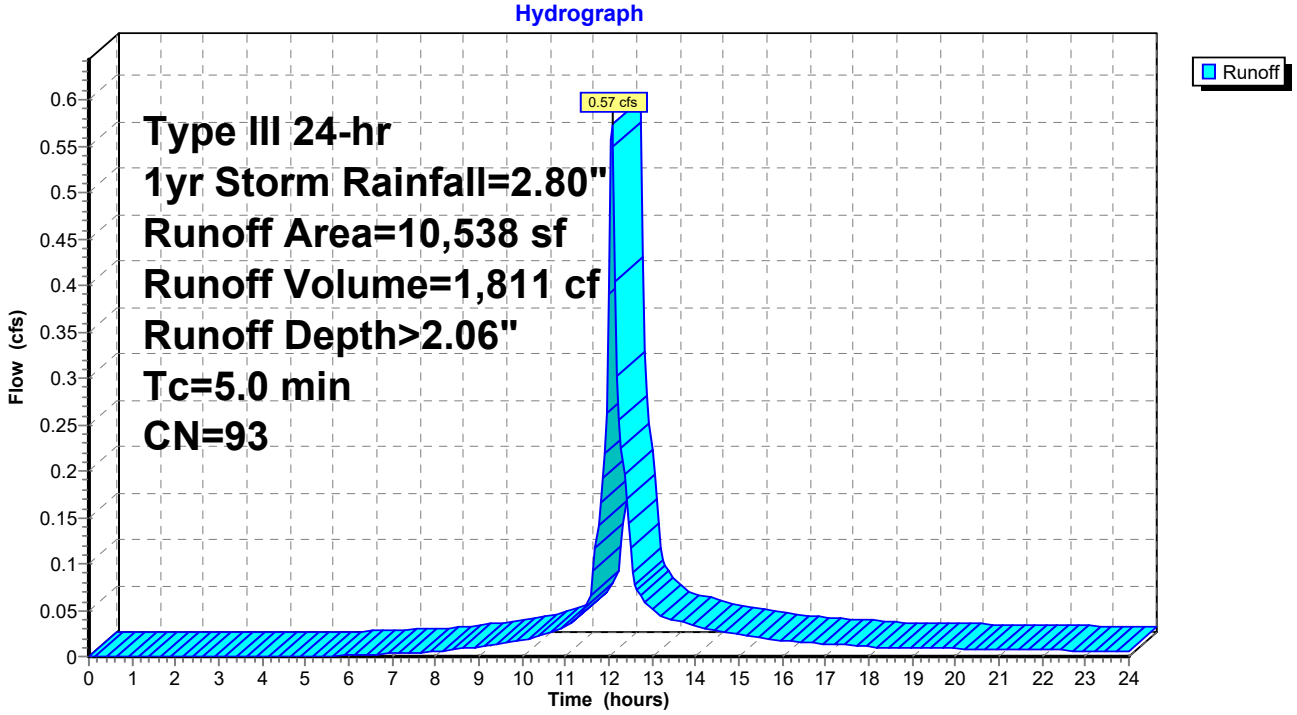
Runoff = 0.57 cfs @ 12.07 hrs, Volume= 1,811 cf, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1yr Storm Rainfall=2.80"

	Area (sf)	CN	Description
*	7,435	98	Roof / Hardscape Areas
	3,103	80	>75% Grass cover, Good, HSG D
	10,538	93	Weighted Average
	3,103		29.45% Pervious Area
	7,435		70.55% Impervious Area

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

Subcatchment EX-1: Ex Drainage Area 1



Summary for Subcatchment EX-2: Ex Drainage Area 2

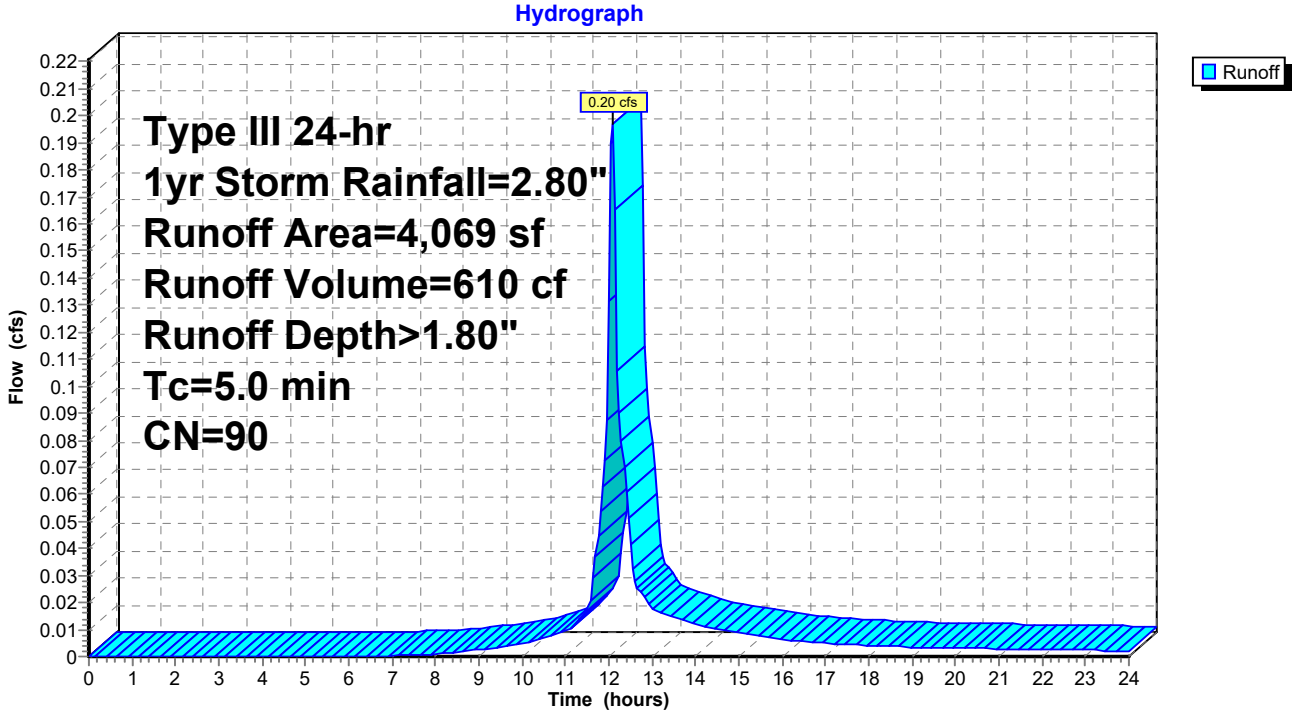
Runoff = 0.20 cfs @ 12.07 hrs, Volume= 610 cf, Depth> 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1yr Storm Rainfall=2.80"

	Area (sf)	CN	Description
*	2,189	98	Roof / Hardscape Areas
	1,880	80	>75% Grass cover, Good, HSG D
	4,069	90	Weighted Average
	1,880		46.20% Pervious Area
	2,189		53.80% Impervious Area

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

Subcatchment EX-2: Ex Drainage Area 2



Summary for Subcatchment EX-3: Ex Drainage Area 3

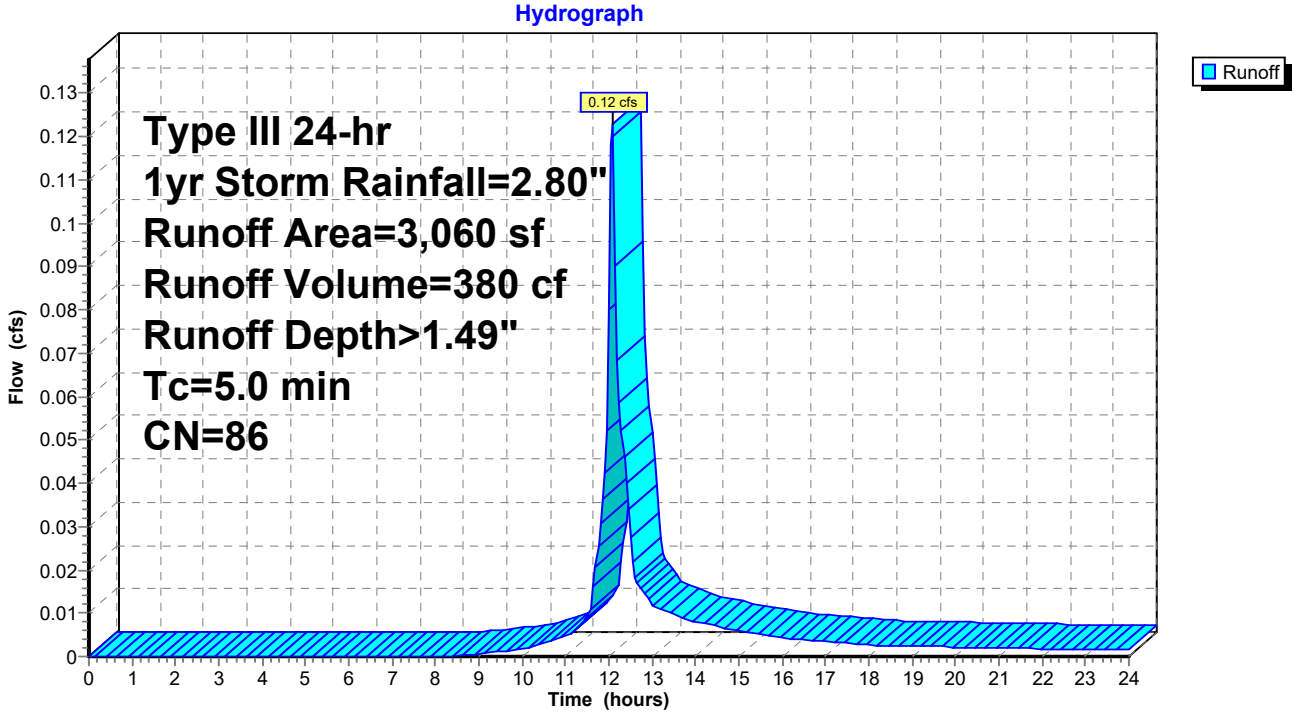
Runoff = 0.12 cfs @ 12.08 hrs, Volume= 380 cf, Depth> 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1yr Storm Rainfall=2.80"

	Area (sf)	CN	Description
*	952	98	Roof / Hardscape Areas
	2,108	80	>75% Grass cover, Good, HSG D
	3,060	86	Weighted Average
	2,108		68.89% Pervious Area
	952		31.11% Impervious Area

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

Subcatchment EX-3: Ex Drainage Area 3

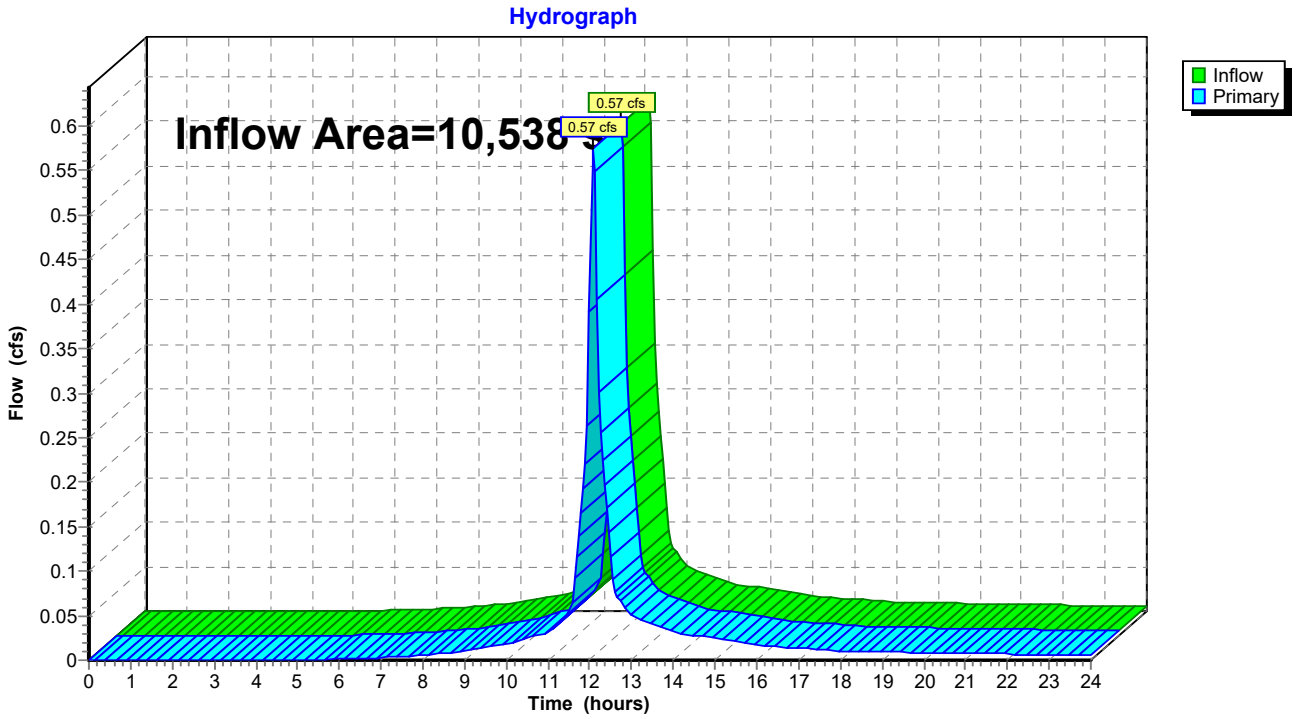


Summary for Link EX POC 1: EX CB 6

Inflow Area = 10,538 sf, 70.55% Impervious, Inflow Depth > 2.06" for 1yr Storm event
Inflow = 0.57 cfs @ 12.07 hrs, Volume= 1,811 cf
Primary = 0.57 cfs @ 12.07 hrs, Volume= 1,811 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC 1: EX CB 6

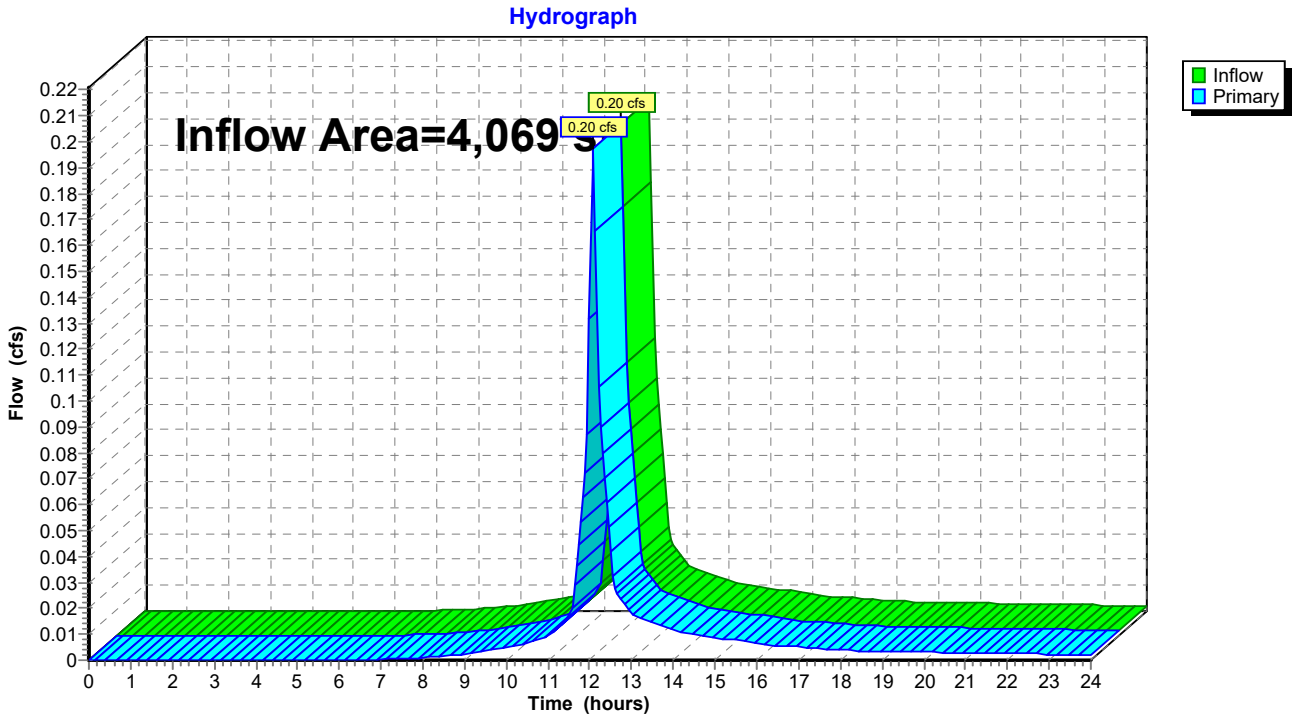


Summary for Link EX POC 2: EX CB 39

Inflow Area = 4,069 sf, 53.80% Impervious, Inflow Depth > 1.80" for 1yr Storm event
Inflow = 0.20 cfs @ 12.07 hrs, Volume= 610 cf
Primary = 0.20 cfs @ 12.07 hrs, Volume= 610 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC 2: EX CB 39

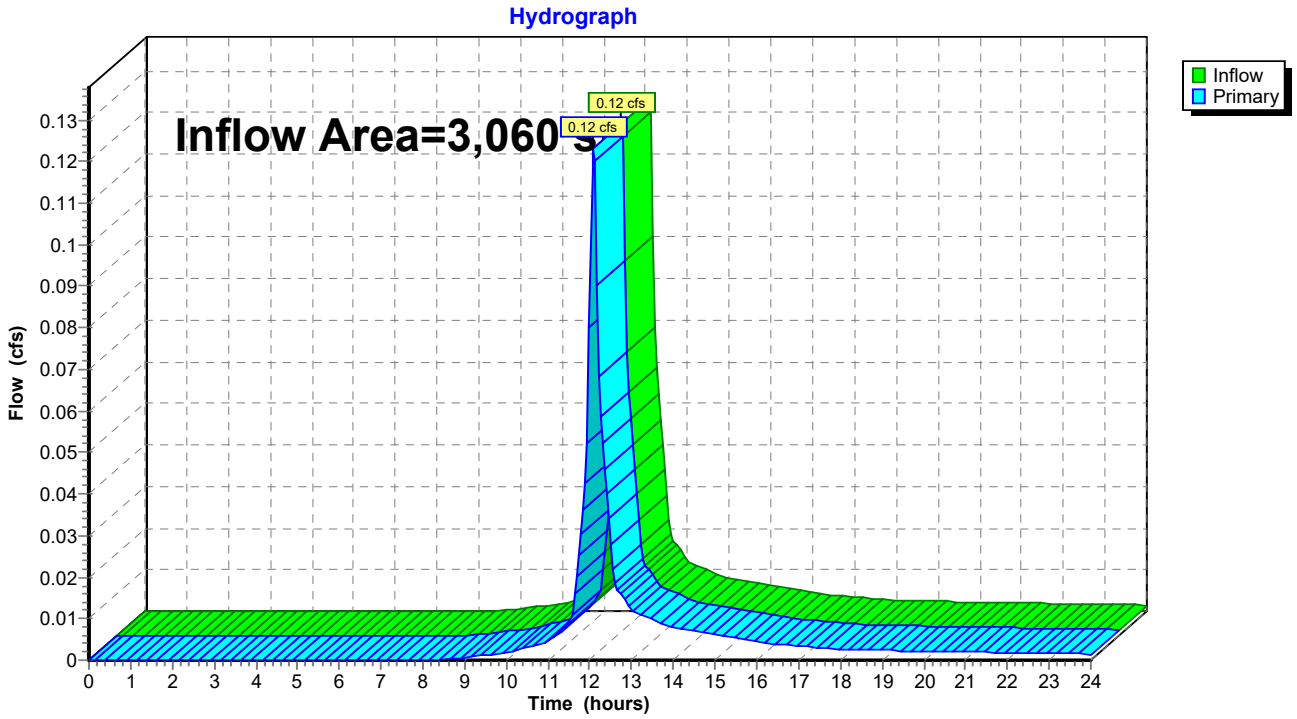


Summary for Link EX POC-3: EX CB 37

Inflow Area = 3,060 sf, 31.11% Impervious, Inflow Depth > 1.49" for 1yr Storm event
Inflow = 0.12 cfs @ 12.08 hrs, Volume= 380 cf
Primary = 0.12 cfs @ 12.08 hrs, Volume= 380 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC-3: EX CB 37

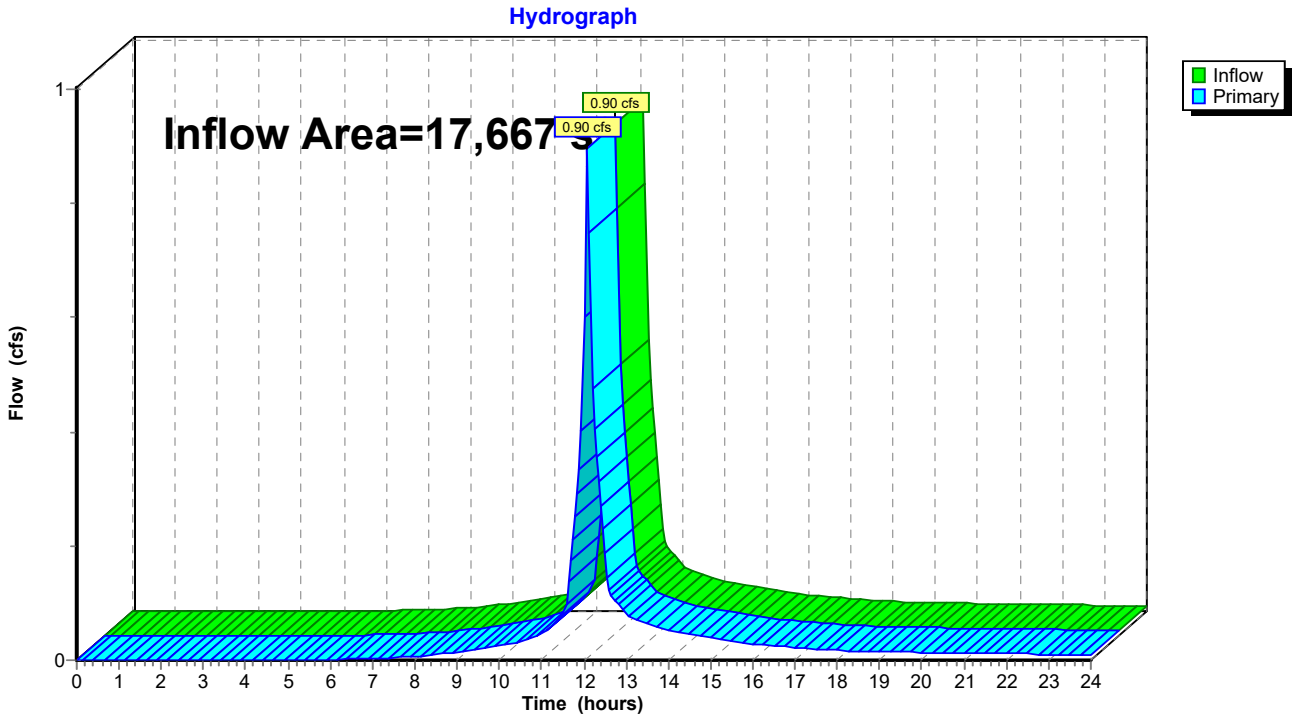


Summary for Link T-EX: Existing Conditions Overall Discharge

Inflow Area = 17,667 sf, 59.86% Impervious, Inflow Depth > 1.90" for 1yr Storm event
Inflow = 0.90 cfs @ 12.07 hrs, Volume= 2,802 cf
Primary = 0.90 cfs @ 12.07 hrs, Volume= 2,802 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link T-EX: Existing Conditions Overall Discharge



Summary for Subcatchment EX-1: Ex Drainage Area 1

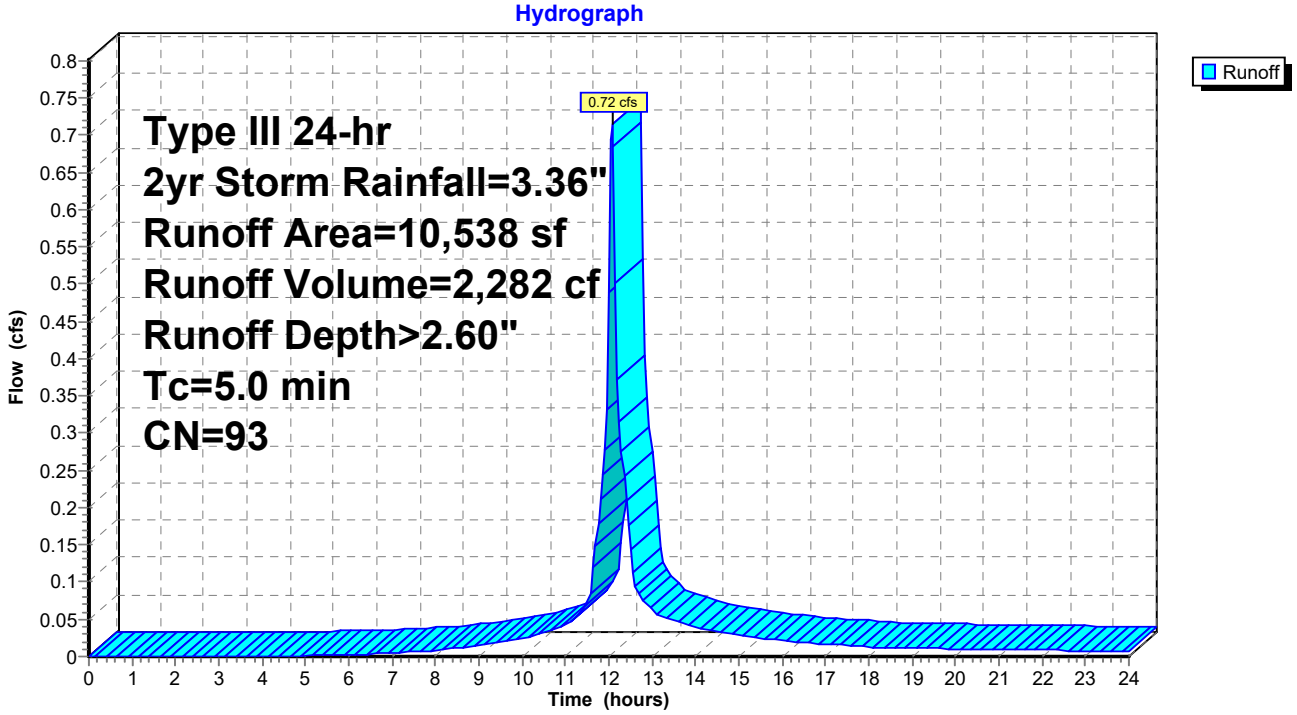
Runoff = 0.72 cfs @ 12.07 hrs, Volume= 2,282 cf, Depth> 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2yr Storm Rainfall=3.36"

	Area (sf)	CN	Description
*	7,435	98	Roof / Hardscape Areas
	3,103	80	>75% Grass cover, Good, HSG D
	10,538	93	Weighted Average
	3,103		29.45% Pervious Area
	7,435		70.55% Impervious Area

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

Subcatchment EX-1: Ex Drainage Area 1



Summary for Subcatchment EX-2: Ex Drainage Area 2

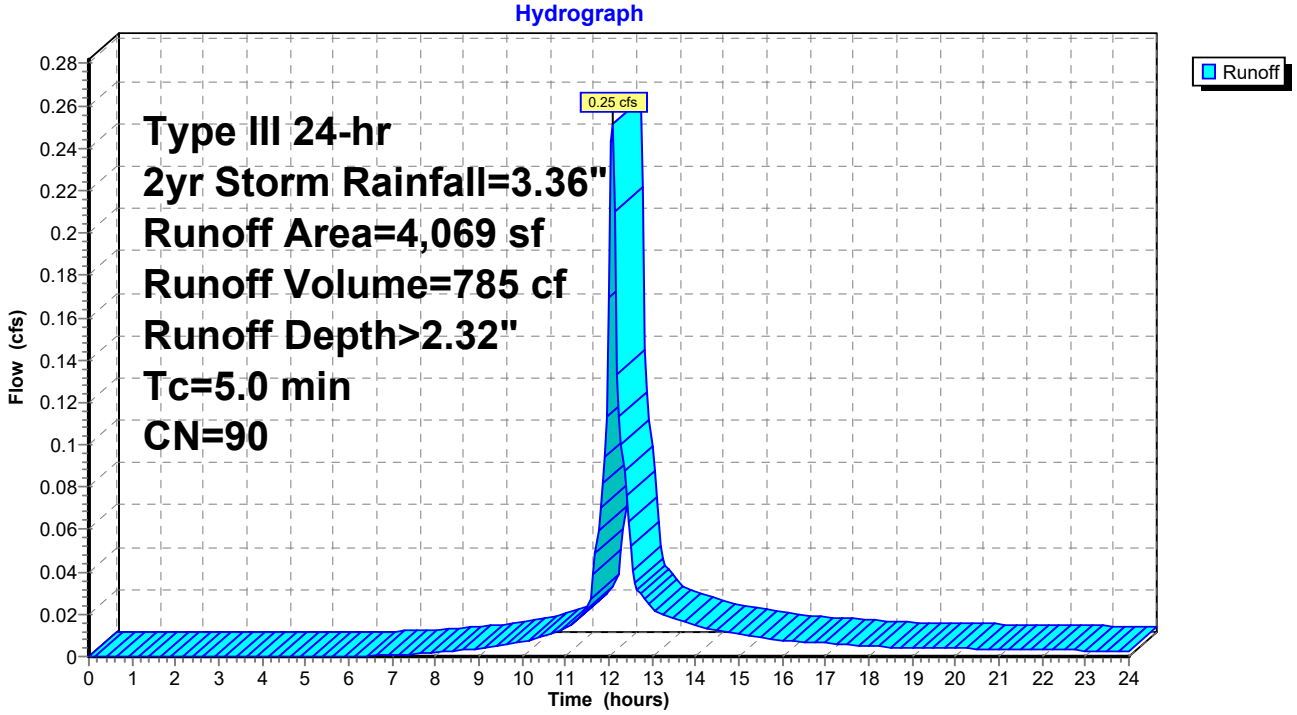
Runoff = 0.25 cfs @ 12.07 hrs, Volume= 785 cf, Depth> 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2yr Storm Rainfall=3.36"

	Area (sf)	CN	Description
*	2,189	98	Roof / Hardscape Areas
	1,880	80	>75% Grass cover, Good, HSG D
	4,069	90	Weighted Average
	1,880		46.20% Pervious Area
	2,189		53.80% Impervious Area

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

Subcatchment EX-2: Ex Drainage Area 2



Summary for Subcatchment EX-3: Ex Drainage Area 3

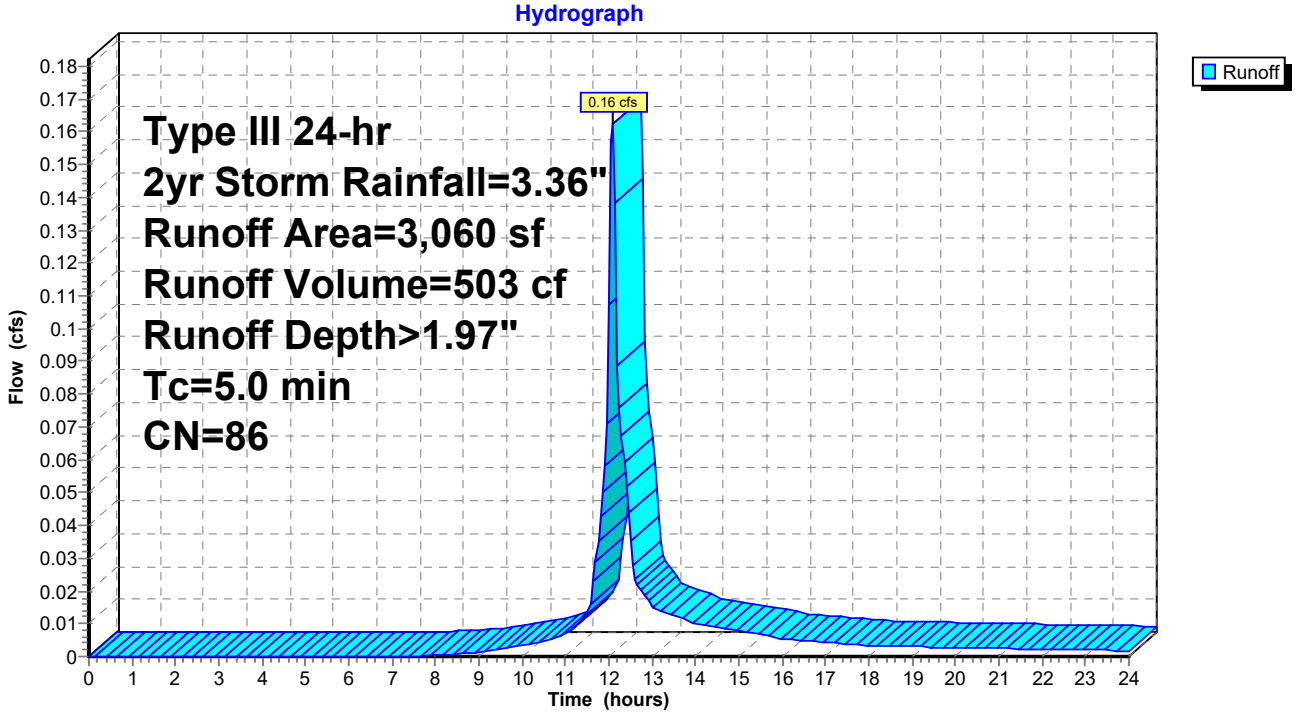
Runoff = 0.16 cfs @ 12.08 hrs, Volume= 503 cf, Depth> 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2yr Storm Rainfall=3.36"

	Area (sf)	CN	Description
*	952	98	Roof / Hardscape Areas
	2,108	80	>75% Grass cover, Good, HSG D
	3,060	86	Weighted Average
	2,108		68.89% Pervious Area
	952		31.11% Impervious Area

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

Subcatchment EX-3: Ex Drainage Area 3

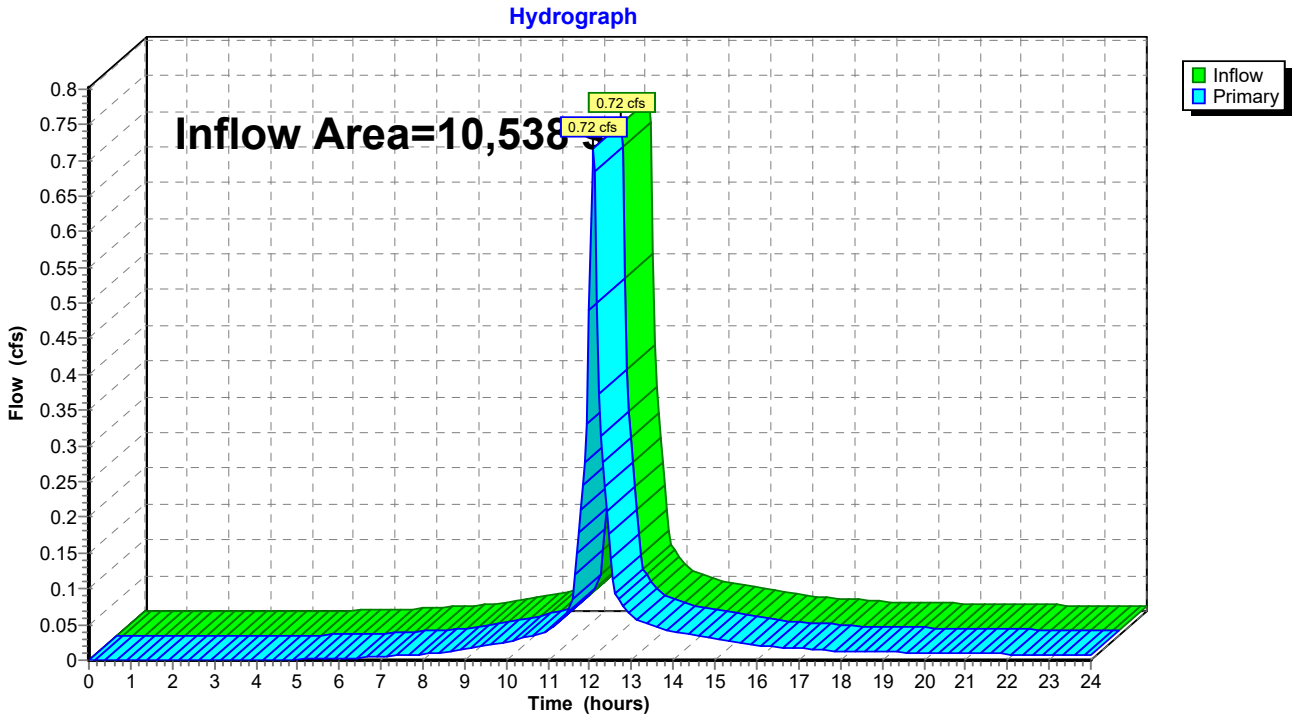


Summary for Link EX POC 1: EX CB 6

Inflow Area = 10,538 sf, 70.55% Impervious, Inflow Depth > 2.60" for 2yr Storm event
Inflow = 0.72 cfs @ 12.07 hrs, Volume= 2,282 cf
Primary = 0.72 cfs @ 12.07 hrs, Volume= 2,282 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC 1: EX CB 6

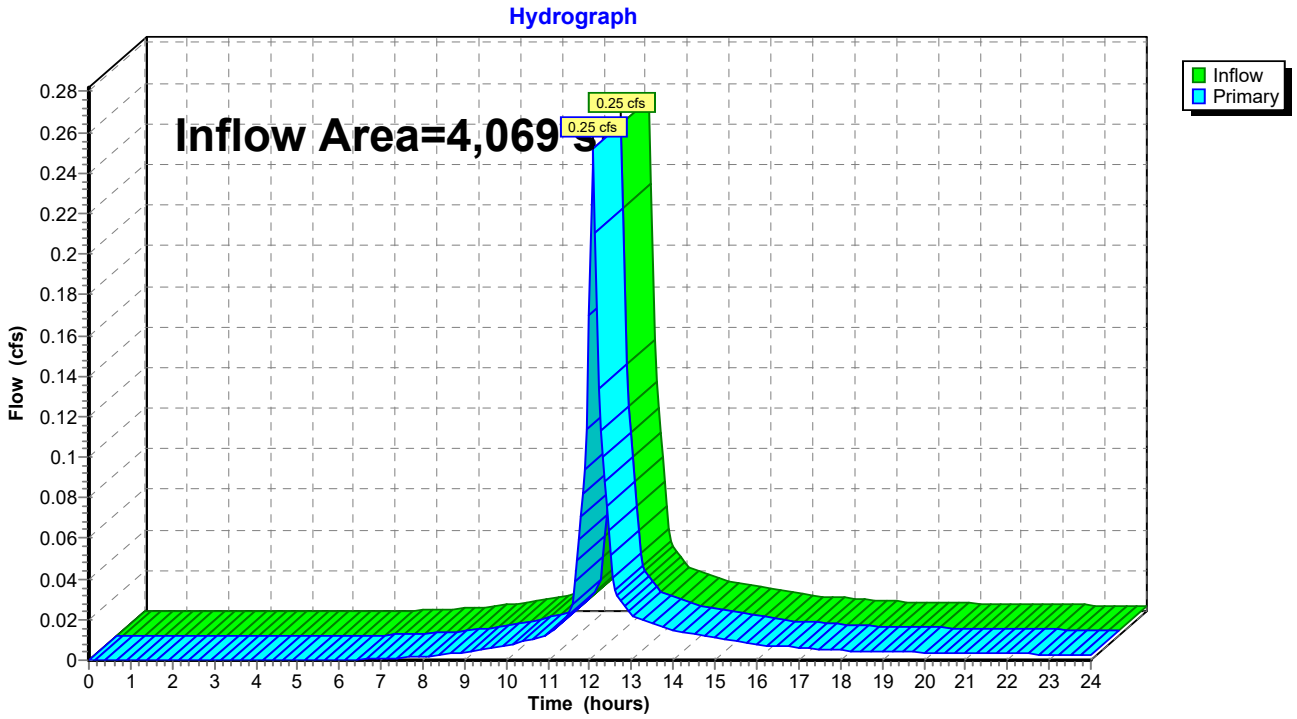


Summary for Link EX POC 2: EX CB 39

Inflow Area = 4,069 sf, 53.80% Impervious, Inflow Depth > 2.32" for 2yr Storm event
Inflow = 0.25 cfs @ 12.07 hrs, Volume= 785 cf
Primary = 0.25 cfs @ 12.07 hrs, Volume= 785 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC 2: EX CB 39

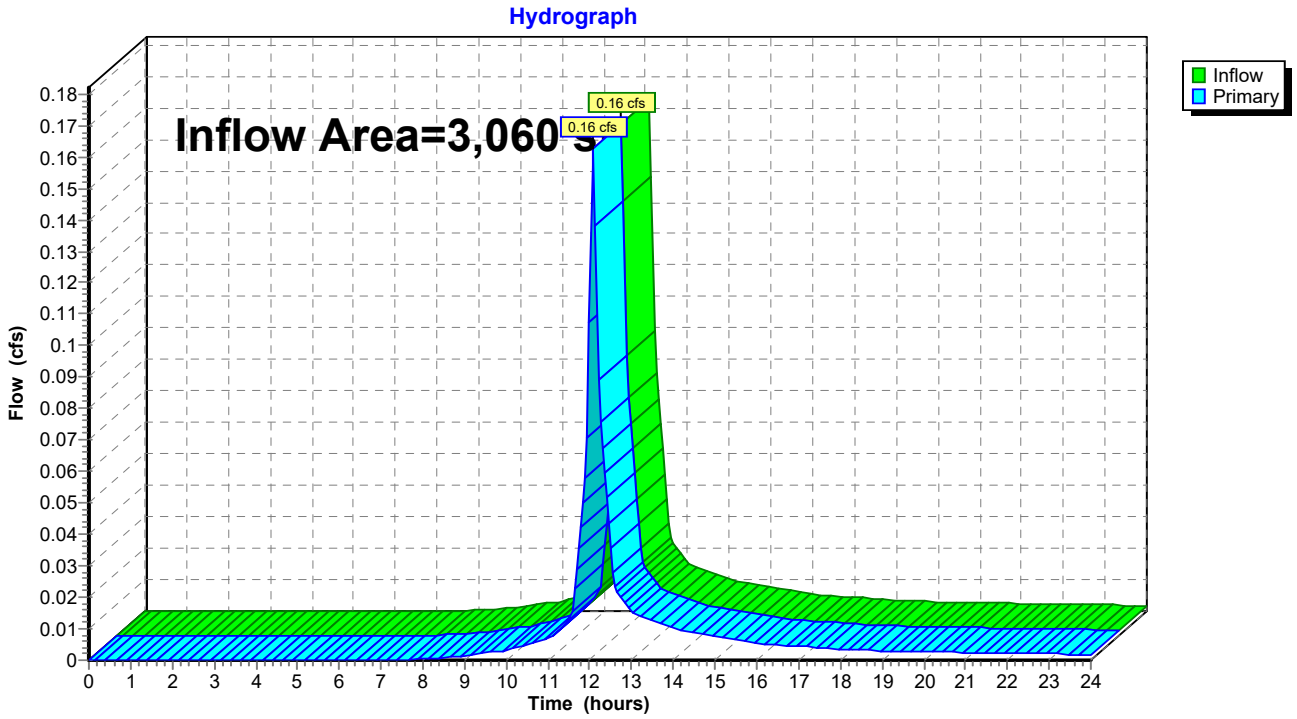


Summary for Link EX POC-3: EX CB 37

Inflow Area = 3,060 sf, 31.11% Impervious, Inflow Depth > 1.97" for 2yr Storm event
Inflow = 0.16 cfs @ 12.08 hrs, Volume= 503 cf
Primary = 0.16 cfs @ 12.08 hrs, Volume= 503 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC-3: EX CB 37

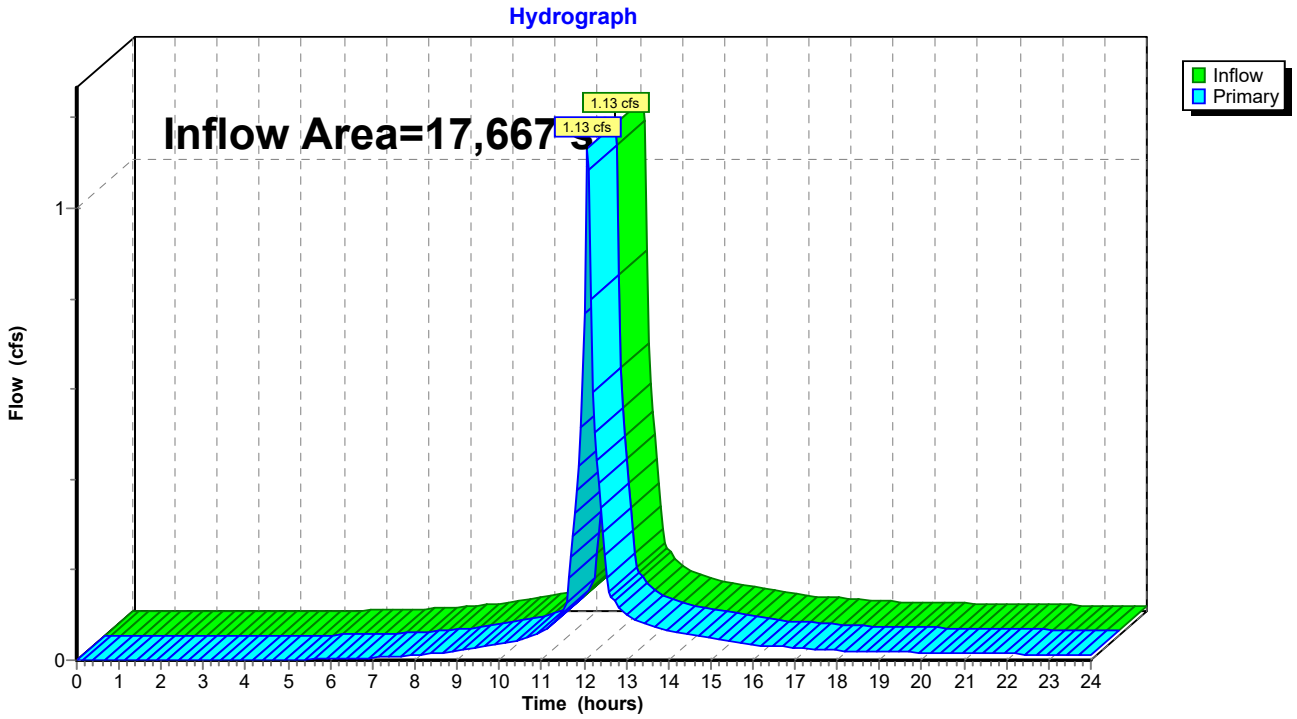


Summary for Link T-EX: Existing Conditions Overall Discharge

Inflow Area = 17,667 sf, 59.86% Impervious, Inflow Depth > 2.43" for 2yr Storm event
Inflow = 1.13 cfs @ 12.07 hrs, Volume= 3,570 cf
Primary = 1.13 cfs @ 12.07 hrs, Volume= 3,570 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link T-EX: Existing Conditions Overall Discharge



Summary for Subcatchment EX-1: Ex Drainage Area 1

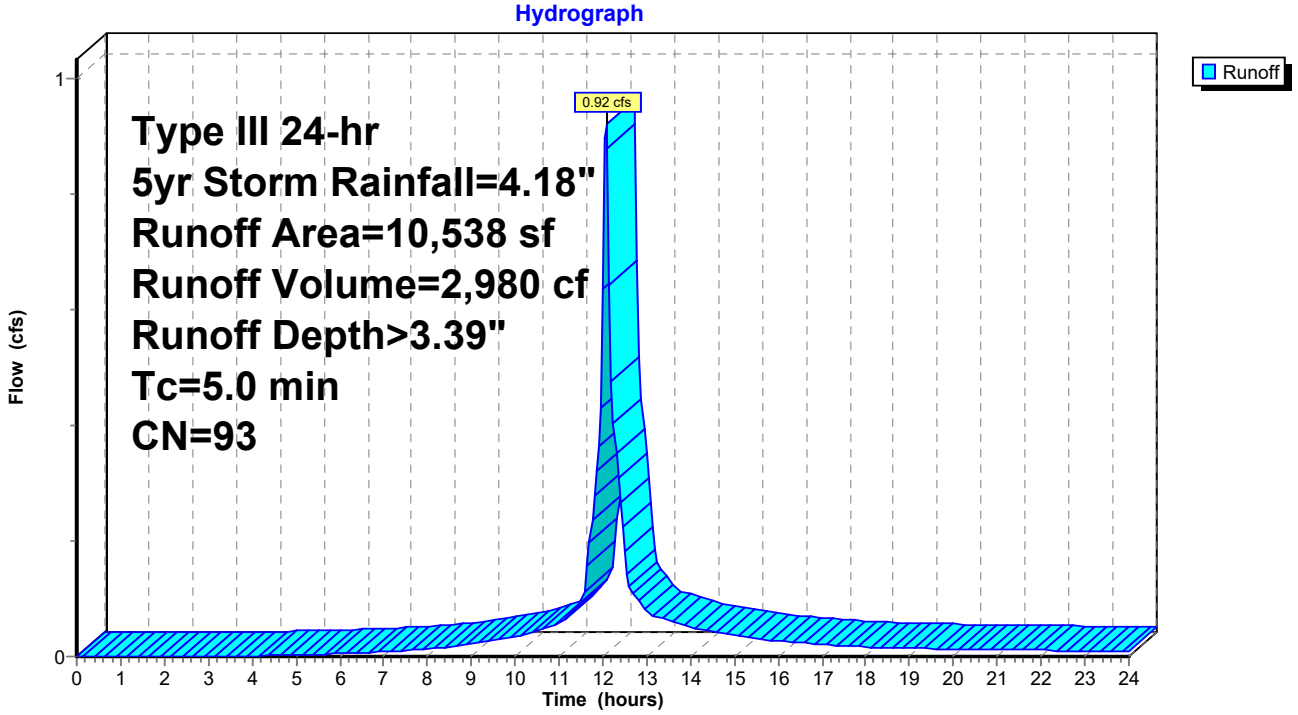
Runoff = 0.92 cfs @ 12.07 hrs, Volume= 2,980 cf, Depth> 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 5yr Storm Rainfall=4.18"

	Area (sf)	CN	Description
*	7,435	98	Roof / Hardscape Areas
	3,103	80	>75% Grass cover, Good, HSG D
	10,538	93	Weighted Average
	3,103		29.45% Pervious Area
	7,435		70.55% Impervious Area

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

Subcatchment EX-1: Ex Drainage Area 1



Summary for Subcatchment EX-2: Ex Drainage Area 2

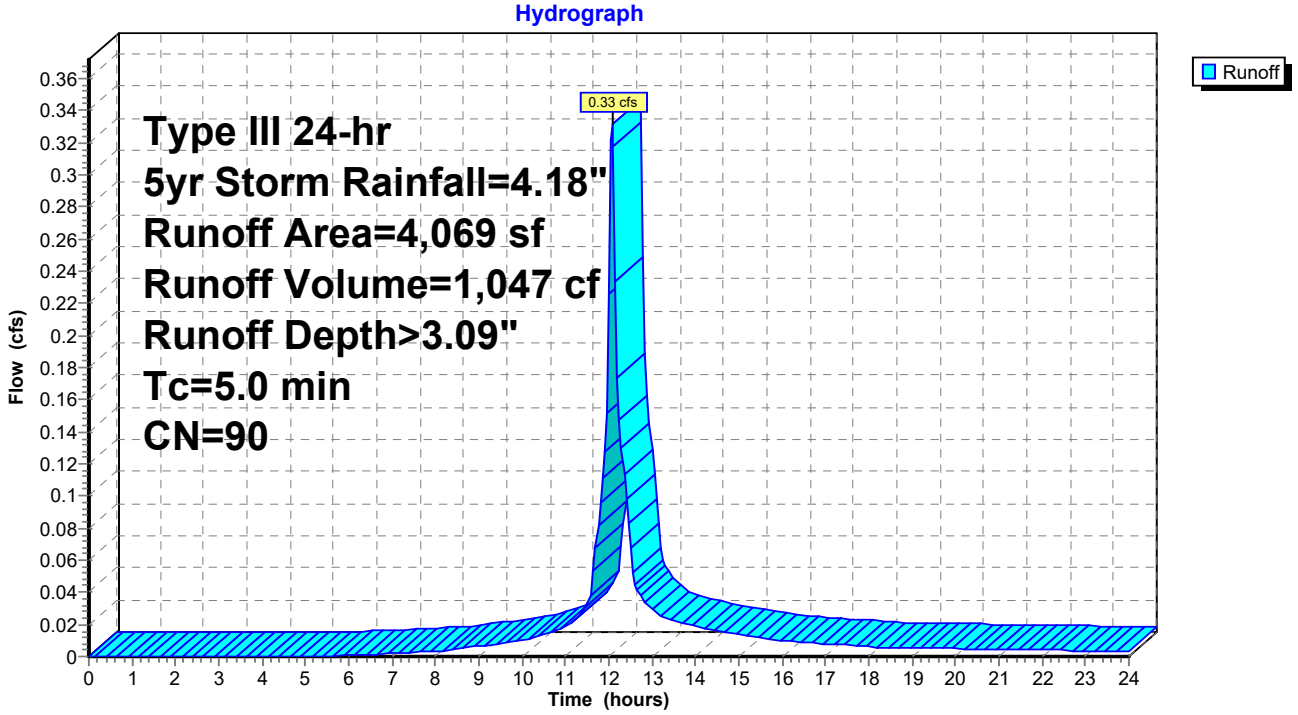
Runoff = 0.33 cfs @ 12.07 hrs, Volume= 1,047 cf, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 5yr Storm Rainfall=4.18"

	Area (sf)	CN	Description
*	2,189	98	Roof / Hardscape Areas
	1,880	80	>75% Grass cover, Good, HSG D
	4,069	90	Weighted Average
	1,880		46.20% Pervious Area
	2,189		53.80% Impervious Area

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

Subcatchment EX-2: Ex Drainage Area 2



Summary for Subcatchment EX-3: Ex Drainage Area 3

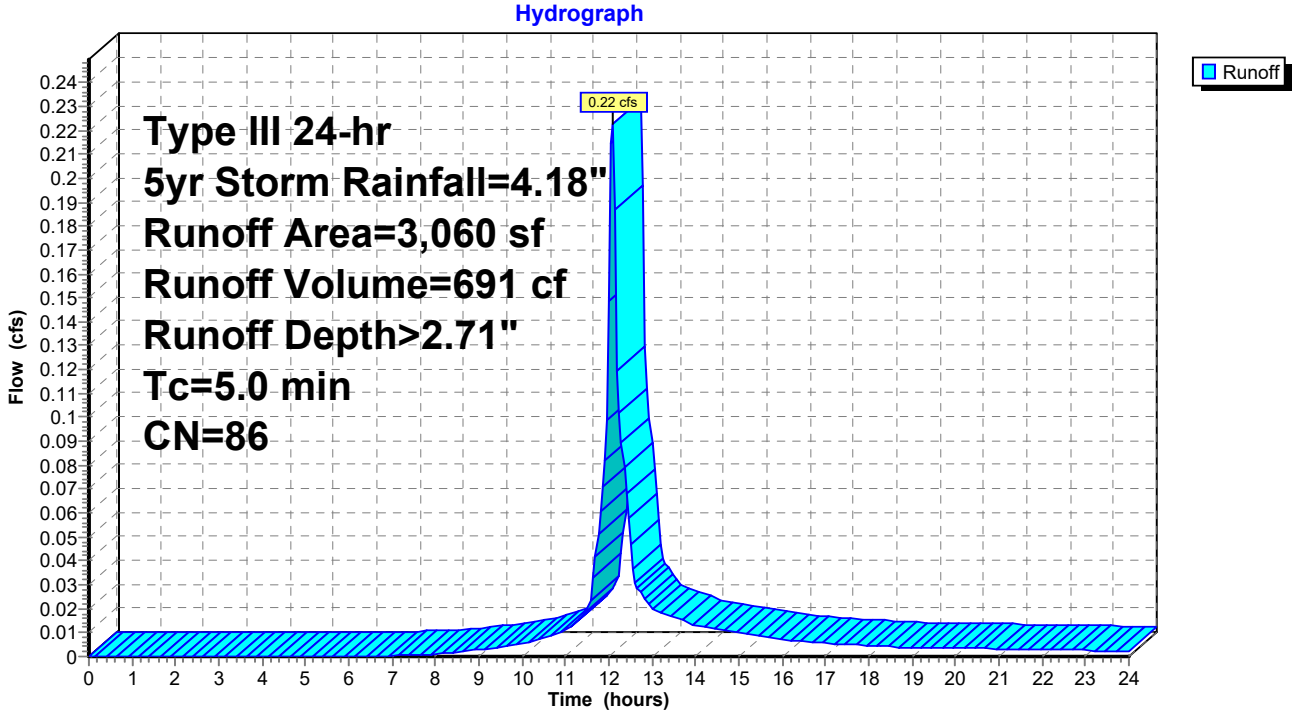
Runoff = 0.22 cfs @ 12.07 hrs, Volume= 691 cf, Depth> 2.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 5yr Storm Rainfall=4.18"

	Area (sf)	CN	Description
*	952	98	Roof / Hardscape Areas
	2,108	80	>75% Grass cover, Good, HSG D
	3,060	86	Weighted Average
	2,108		68.89% Pervious Area
	952		31.11% Impervious Area

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

Subcatchment EX-3: Ex Drainage Area 3

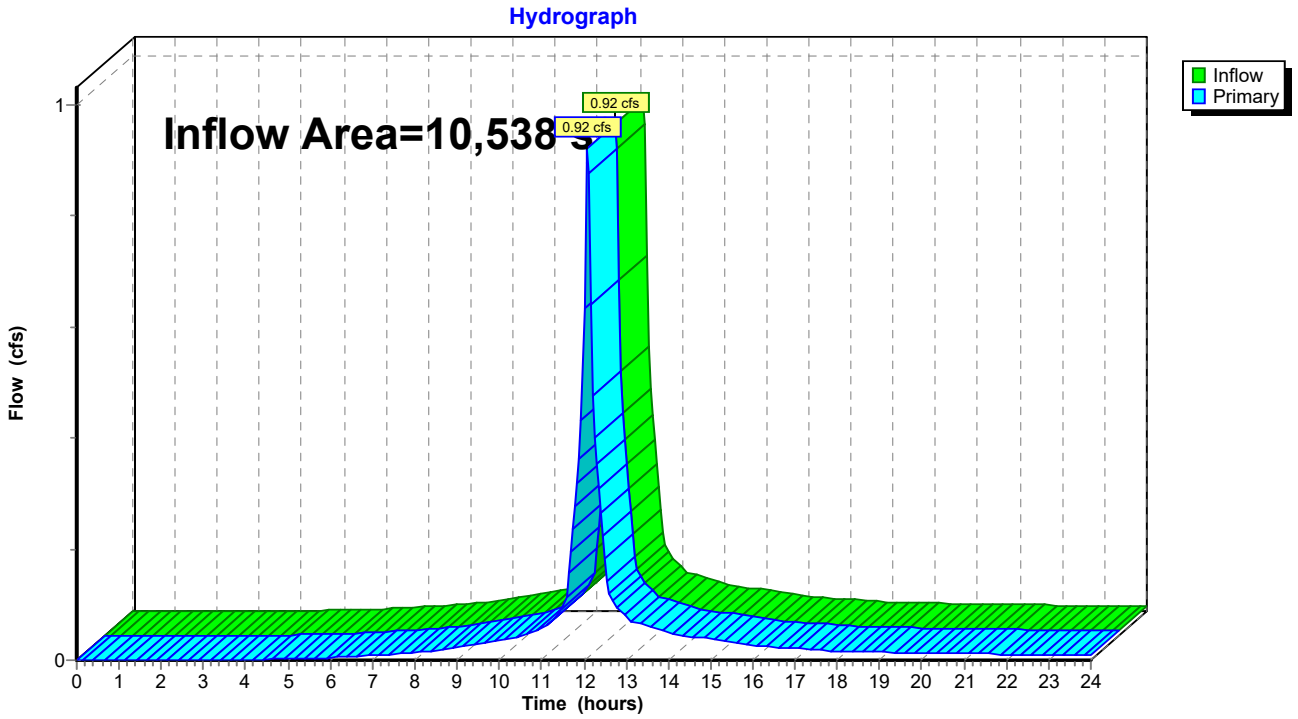


Summary for Link EX POC 1: EX CB 6

Inflow Area = 10,538 sf, 70.55% Impervious, Inflow Depth > 3.39" for 5yr Storm event
Inflow = 0.92 cfs @ 12.07 hrs, Volume= 2,980 cf
Primary = 0.92 cfs @ 12.07 hrs, Volume= 2,980 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC 1: EX CB 6

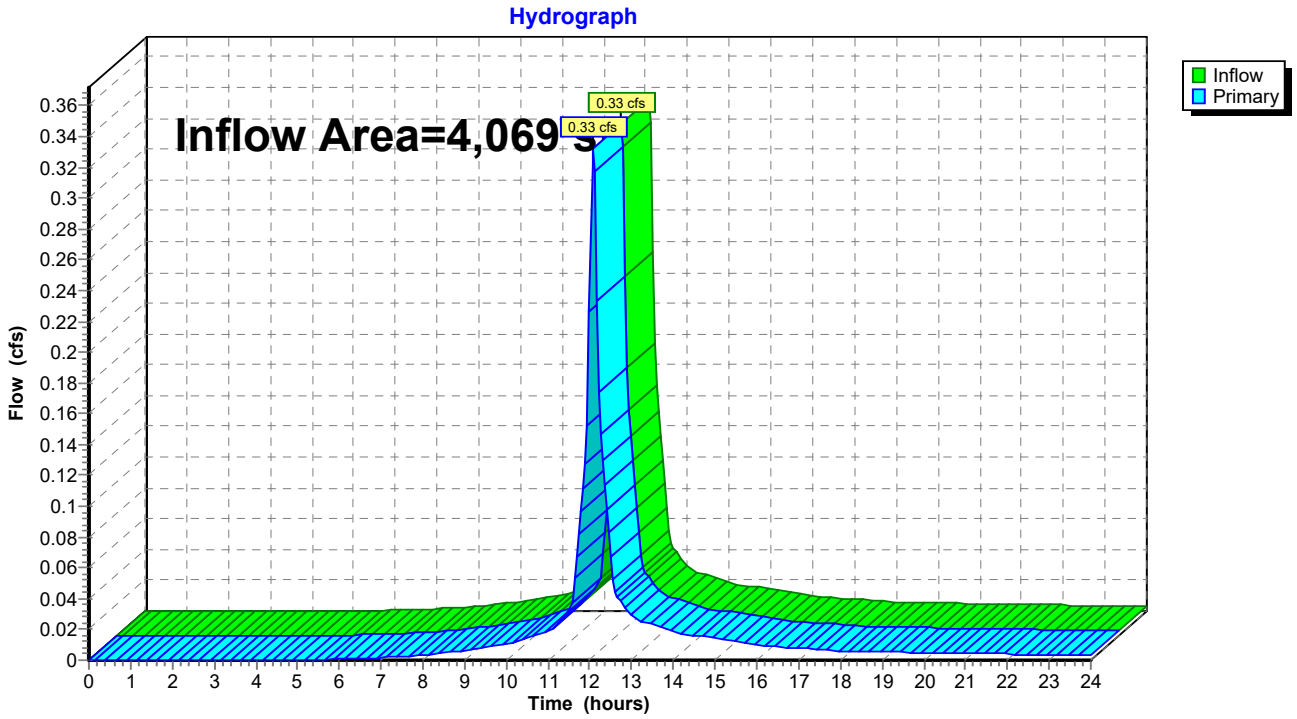


Summary for Link EX POC 2: EX CB 39

Inflow Area = 4,069 sf, 53.80% Impervious, Inflow Depth > 3.09" for 5yr Storm event
Inflow = 0.33 cfs @ 12.07 hrs, Volume= 1,047 cf
Primary = 0.33 cfs @ 12.07 hrs, Volume= 1,047 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC 2: EX CB 39

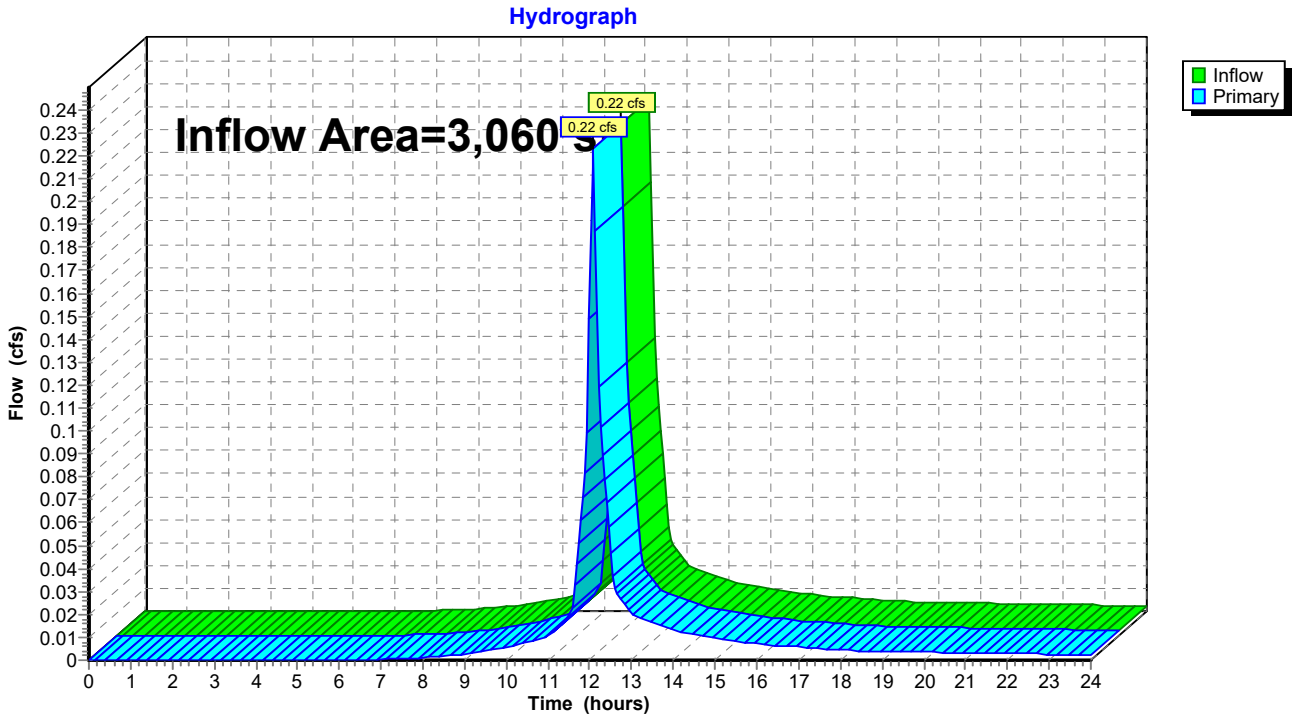


Summary for Link EX POC-3: EX CB 37

Inflow Area = 3,060 sf, 31.11% Impervious, Inflow Depth > 2.71" for 5yr Storm event
Inflow = 0.22 cfs @ 12.07 hrs, Volume= 691 cf
Primary = 0.22 cfs @ 12.07 hrs, Volume= 691 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC-3: EX CB 37

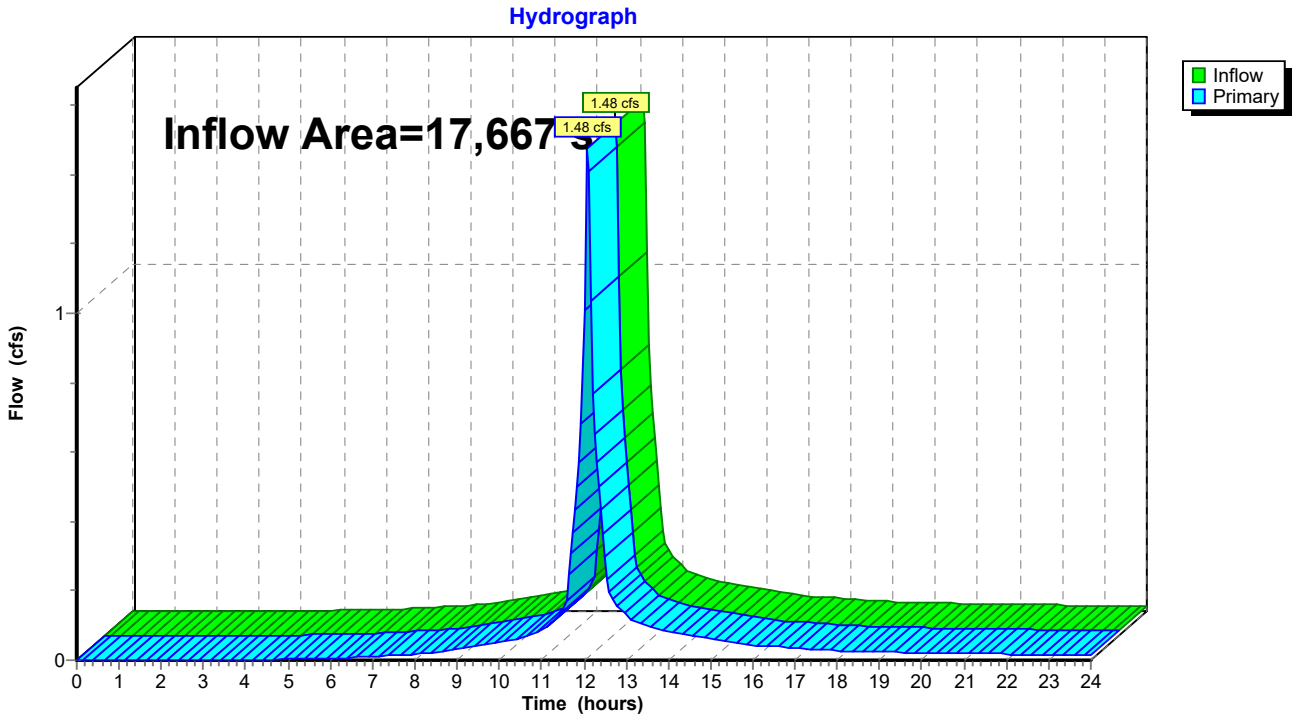


Summary for Link T-EX: Existing Conditions Overall Discharge

Inflow Area = 17,667 sf, 59.86% Impervious, Inflow Depth > 3.20" for 5yr Storm event
Inflow = 1.48 cfs @ 12.07 hrs, Volume= 4,718 cf
Primary = 1.48 cfs @ 12.07 hrs, Volume= 4,718 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link T-EX: Existing Conditions Overall Discharge



Summary for Subcatchment EX-1: Ex Drainage Area 1

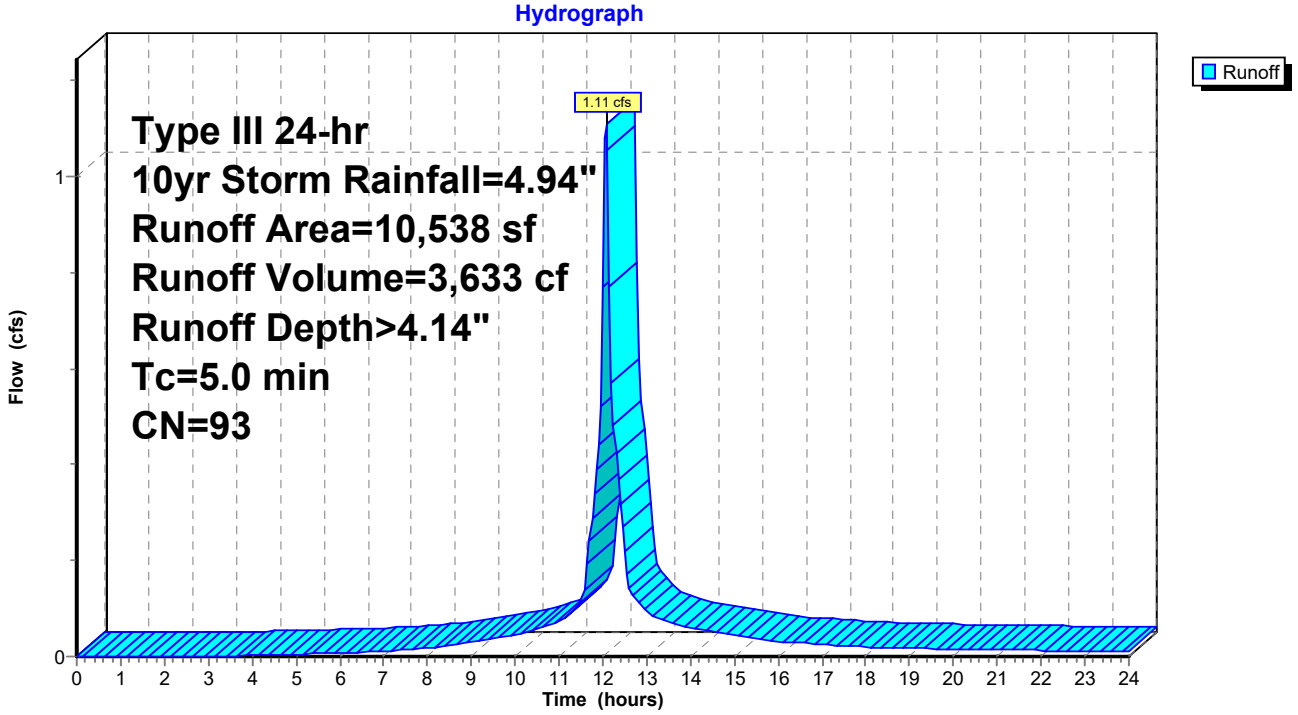
Runoff = 1.11 cfs @ 12.07 hrs, Volume= 3,633 cf, Depth> 4.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10yr Storm Rainfall=4.94"

	Area (sf)	CN	Description
*	7,435	98	Roof / Hardscape Areas
	3,103	80	>75% Grass cover, Good, HSG D
	10,538	93	Weighted Average
	3,103		29.45% Pervious Area
	7,435		70.55% Impervious Area

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

Subcatchment EX-1: Ex Drainage Area 1



Summary for Subcatchment EX-2: Ex Drainage Area 2

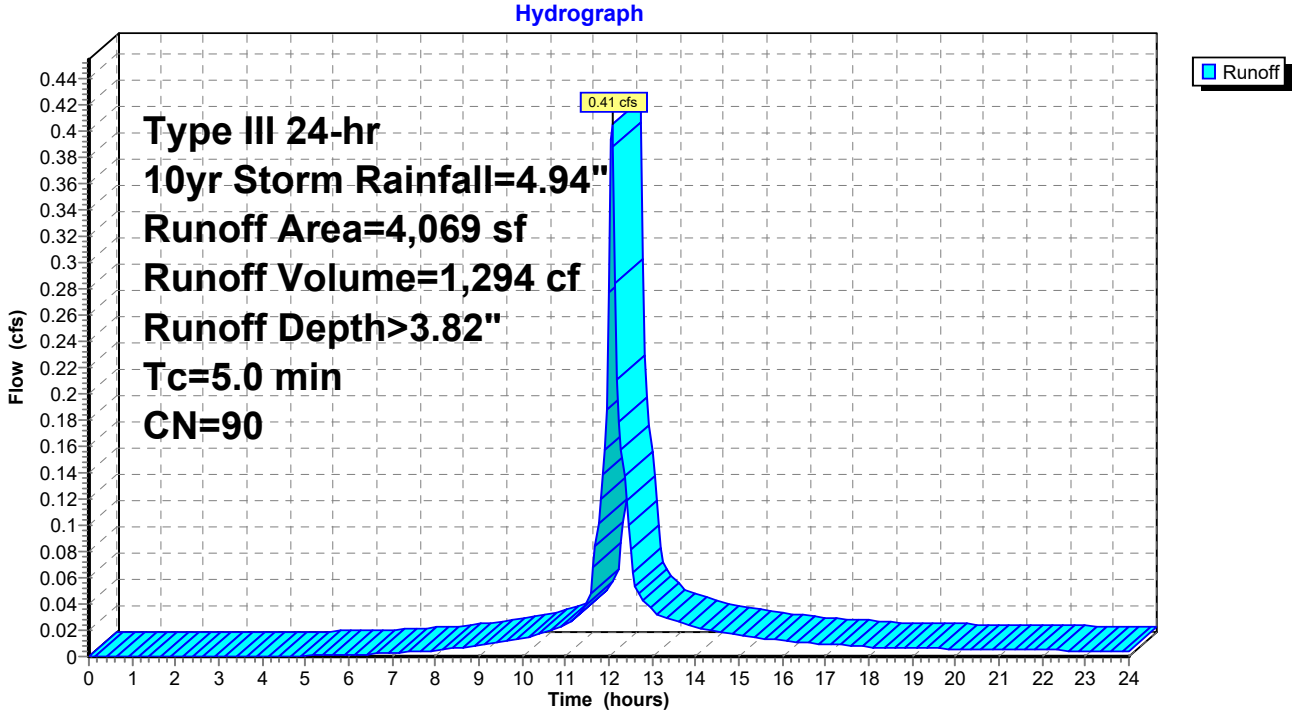
Runoff = 0.41 cfs @ 12.07 hrs, Volume= 1,294 cf, Depth> 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10yr Storm Rainfall=4.94"

	Area (sf)	CN	Description
*	2,189	98	Roof / Hardscape Areas
	1,880	80	>75% Grass cover, Good, HSG D
	4,069	90	Weighted Average
	1,880		46.20% Pervious Area
	2,189		53.80% Impervious Area

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

Subcatchment EX-2: Ex Drainage Area 2



Summary for Subcatchment EX-3: Ex Drainage Area 3

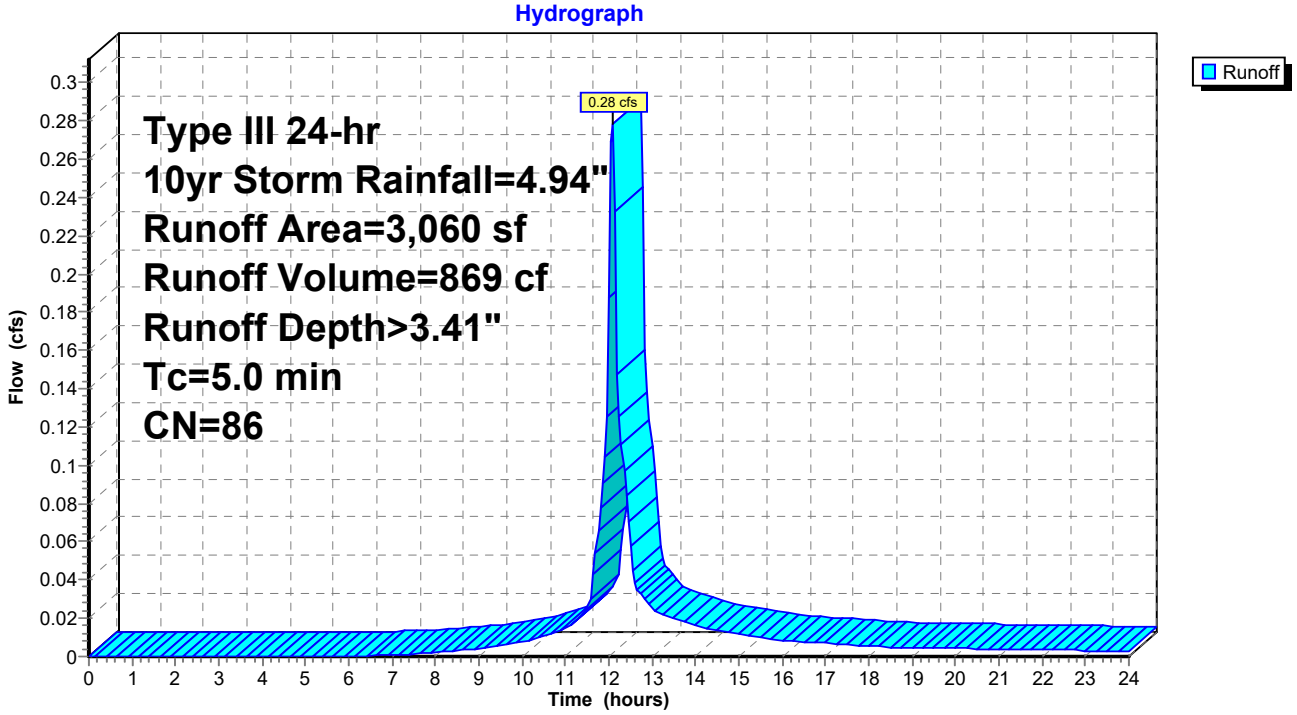
Runoff = 0.28 cfs @ 12.07 hrs, Volume= 869 cf, Depth> 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10yr Storm Rainfall=4.94"

	Area (sf)	CN	Description
*	952	98	Roof / Hardscape Areas
	2,108	80	>75% Grass cover, Good, HSG D
	3,060	86	Weighted Average
	2,108		68.89% Pervious Area
	952		31.11% Impervious Area

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

Subcatchment EX-3: Ex Drainage Area 3

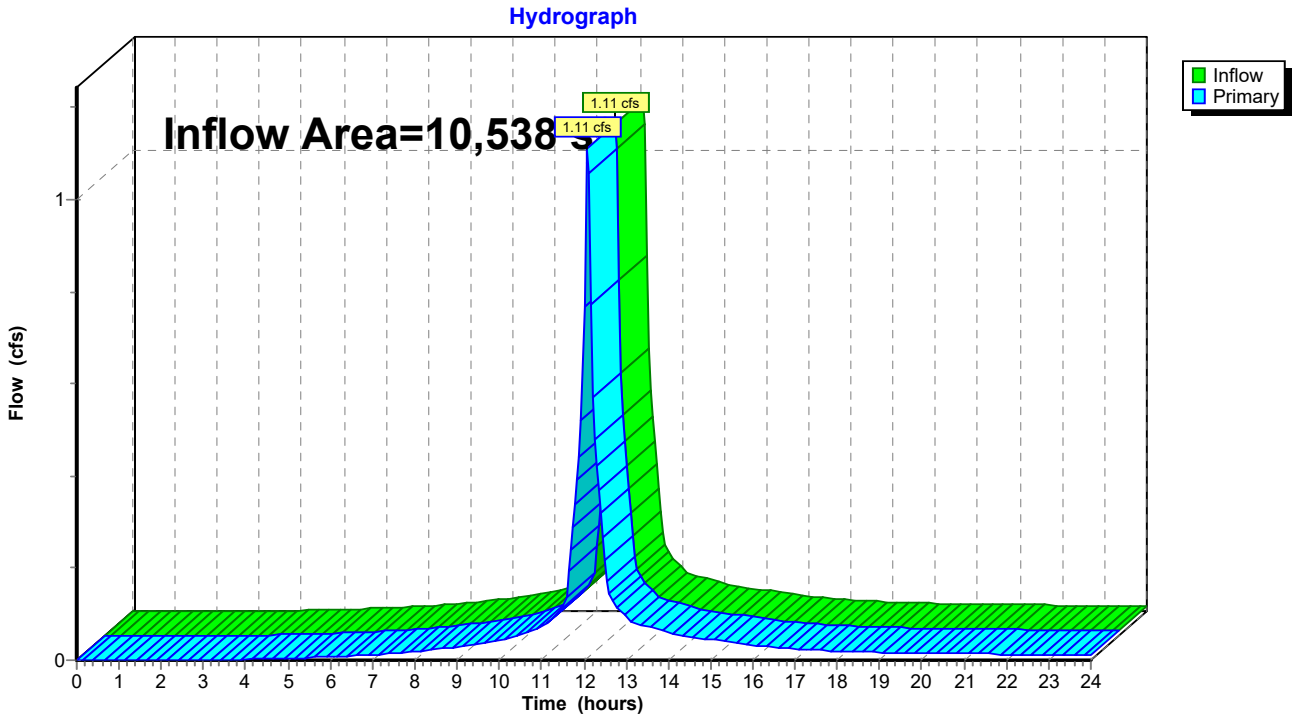


Summary for Link EX POC 1: EX CB 6

Inflow Area = 10,538 sf, 70.55% Impervious, Inflow Depth > 4.14" for 10yr Storm event
Inflow = 1.11 cfs @ 12.07 hrs, Volume= 3,633 cf
Primary = 1.11 cfs @ 12.07 hrs, Volume= 3,633 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC 1: EX CB 6

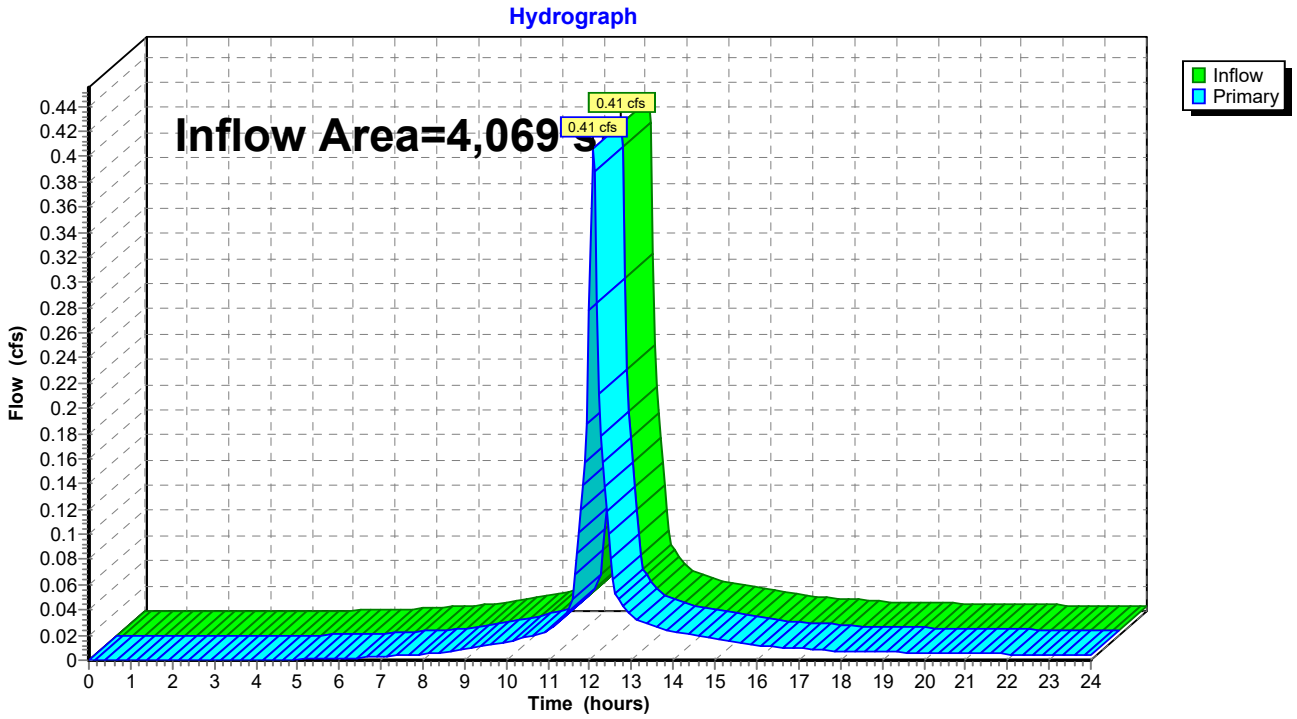


Summary for Link EX POC 2: EX CB 39

Inflow Area = 4,069 sf, 53.80% Impervious, Inflow Depth > 3.82" for 10yr Storm event
Inflow = 0.41 cfs @ 12.07 hrs, Volume= 1,294 cf
Primary = 0.41 cfs @ 12.07 hrs, Volume= 1,294 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC 2: EX CB 39

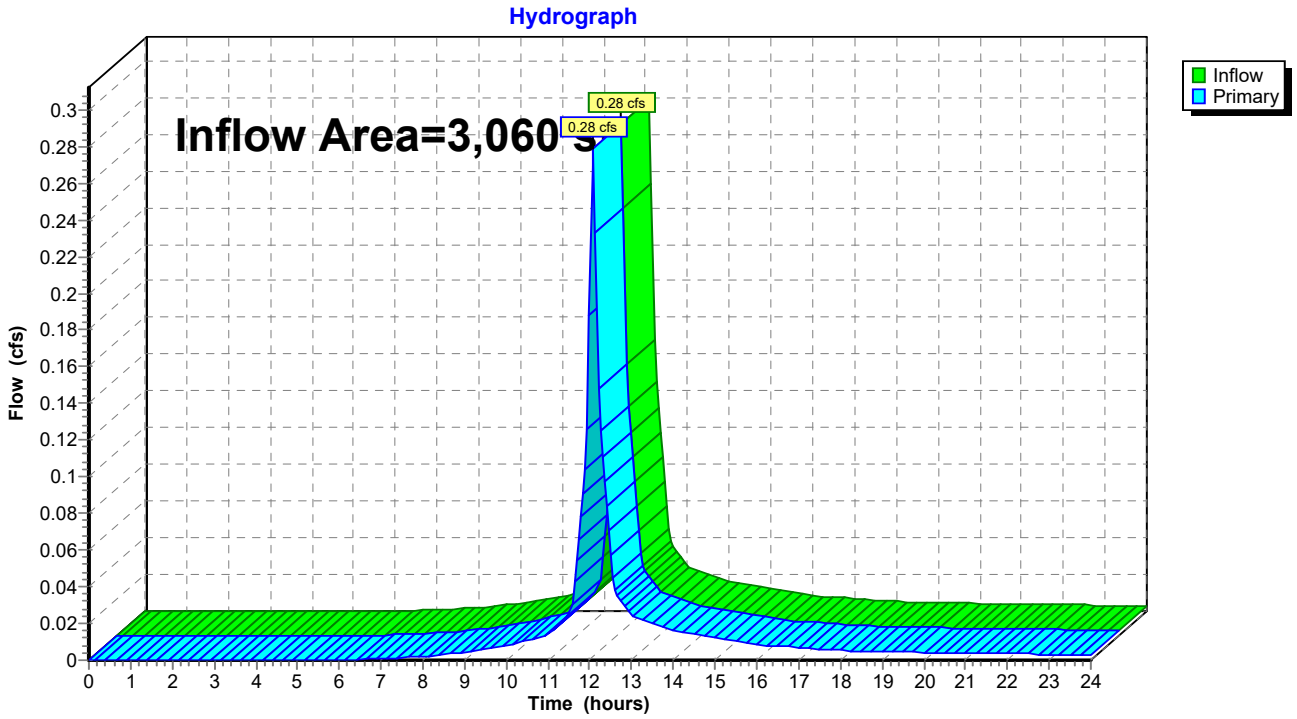


Summary for Link EX POC-3: EX CB 37

Inflow Area = 3,060 sf, 31.11% Impervious, Inflow Depth > 3.41" for 10yr Storm event
Inflow = 0.28 cfs @ 12.07 hrs, Volume= 869 cf
Primary = 0.28 cfs @ 12.07 hrs, Volume= 869 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC-3: EX CB 37

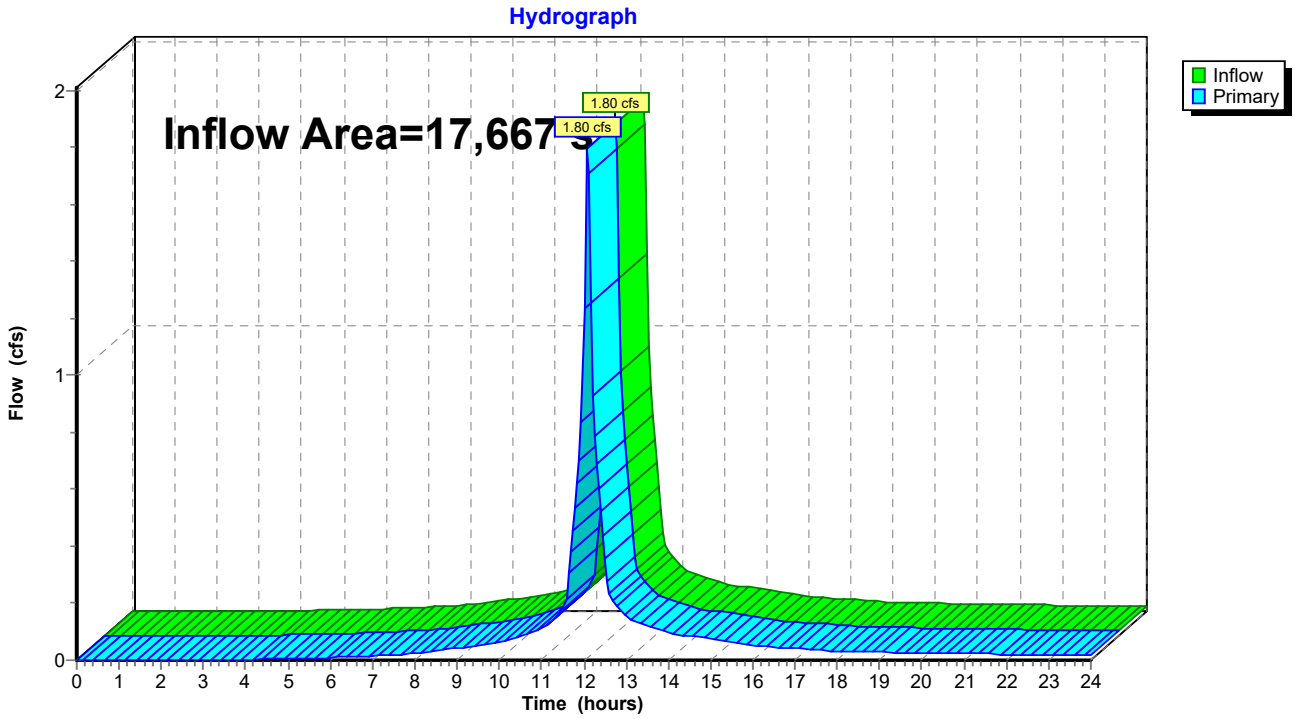


Summary for Link T-EX: Existing Conditions Overall Discharge

Inflow Area = 17,667 sf, 59.86% Impervious, Inflow Depth > 3.94" for 10yr Storm event
Inflow = 1.80 cfs @ 12.07 hrs, Volume= 5,796 cf
Primary = 1.80 cfs @ 12.07 hrs, Volume= 5,796 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link T-EX: Existing Conditions Overall Discharge



Summary for Subcatchment EX-1: Ex Drainage Area 1

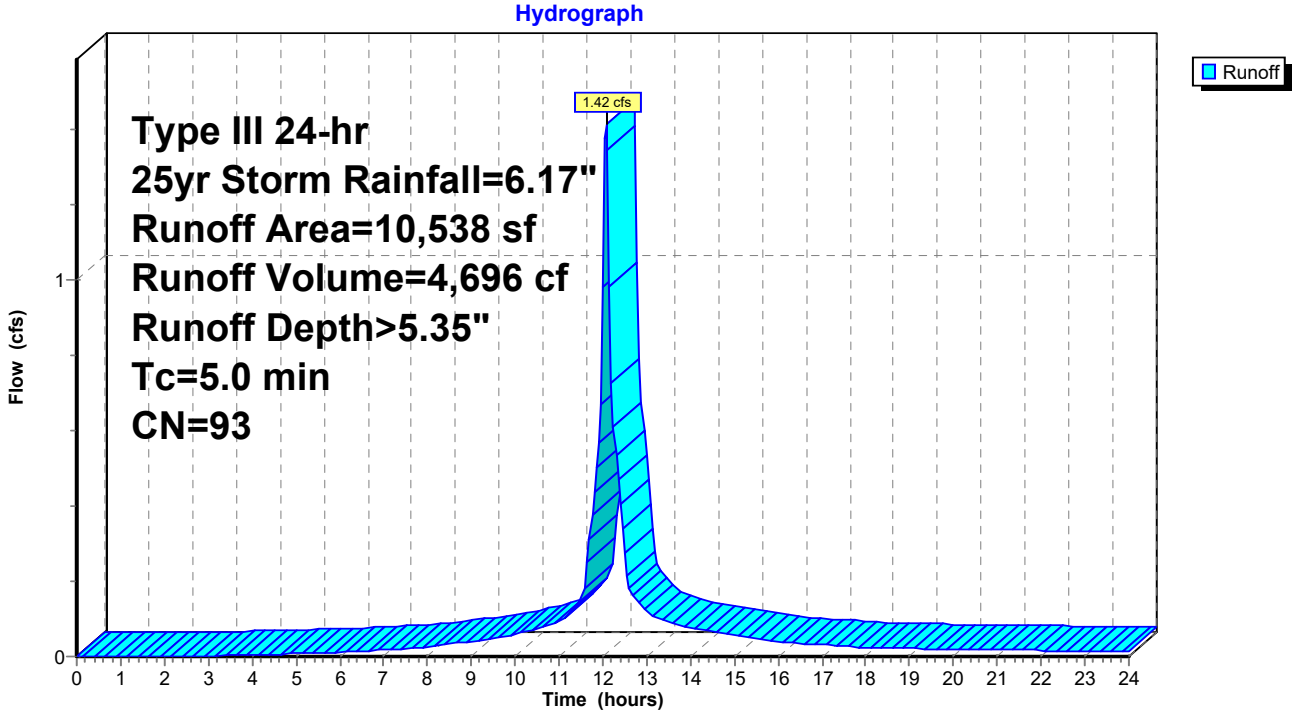
Runoff = 1.42 cfs @ 12.07 hrs, Volume= 4,696 cf, Depth> 5.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25yr Storm Rainfall=6.17"

	Area (sf)	CN	Description
*	7,435	98	Roof / Hardscape Areas
	3,103	80	>75% Grass cover, Good, HSG D
	10,538	93	Weighted Average
	3,103		29.45% Pervious Area
	7,435		70.55% Impervious Area

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

Subcatchment EX-1: Ex Drainage Area 1



Summary for Subcatchment EX-2: Ex Drainage Area 2

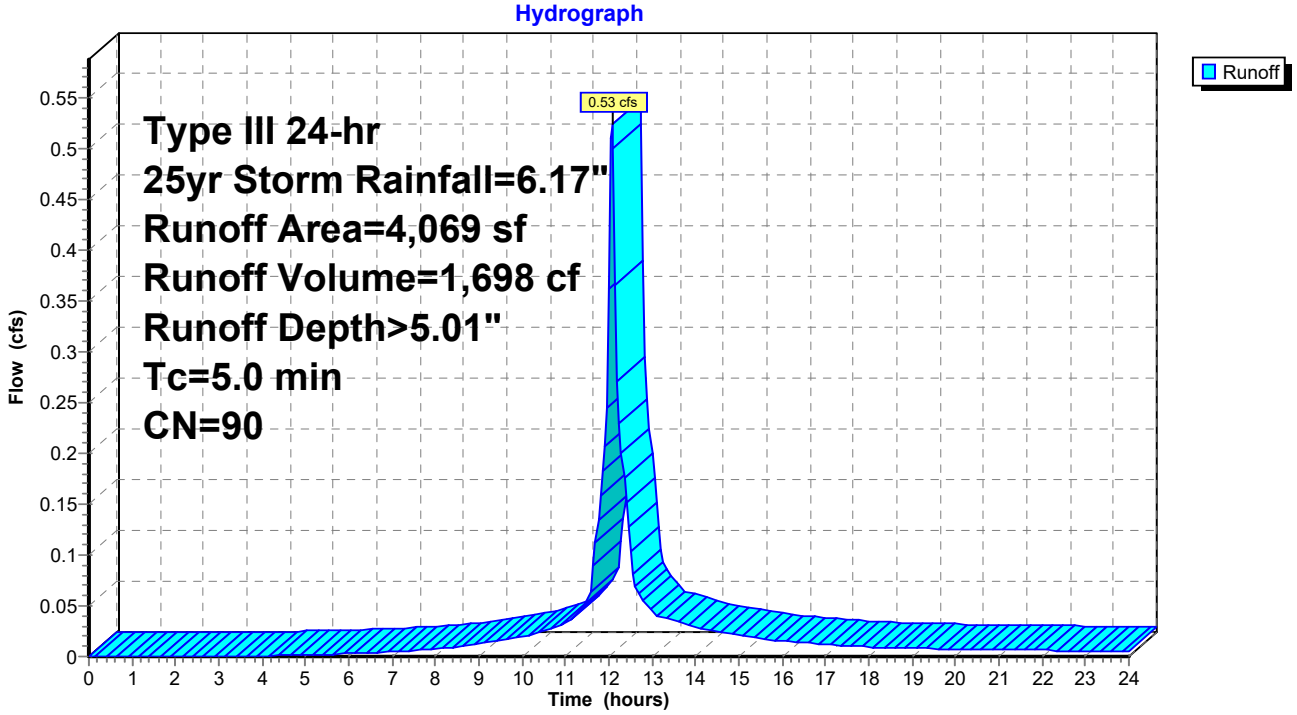
Runoff = 0.53 cfs @ 12.07 hrs, Volume= 1,698 cf, Depth> 5.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25yr Storm Rainfall=6.17"

	Area (sf)	CN	Description
*	2,189	98	Roof / Hardscape Areas
	1,880	80	>75% Grass cover, Good, HSG D
	4,069	90	Weighted Average
	1,880		46.20% Pervious Area
	2,189		53.80% Impervious Area

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

Subcatchment EX-2: Ex Drainage Area 2



Summary for Subcatchment EX-3: Ex Drainage Area 3

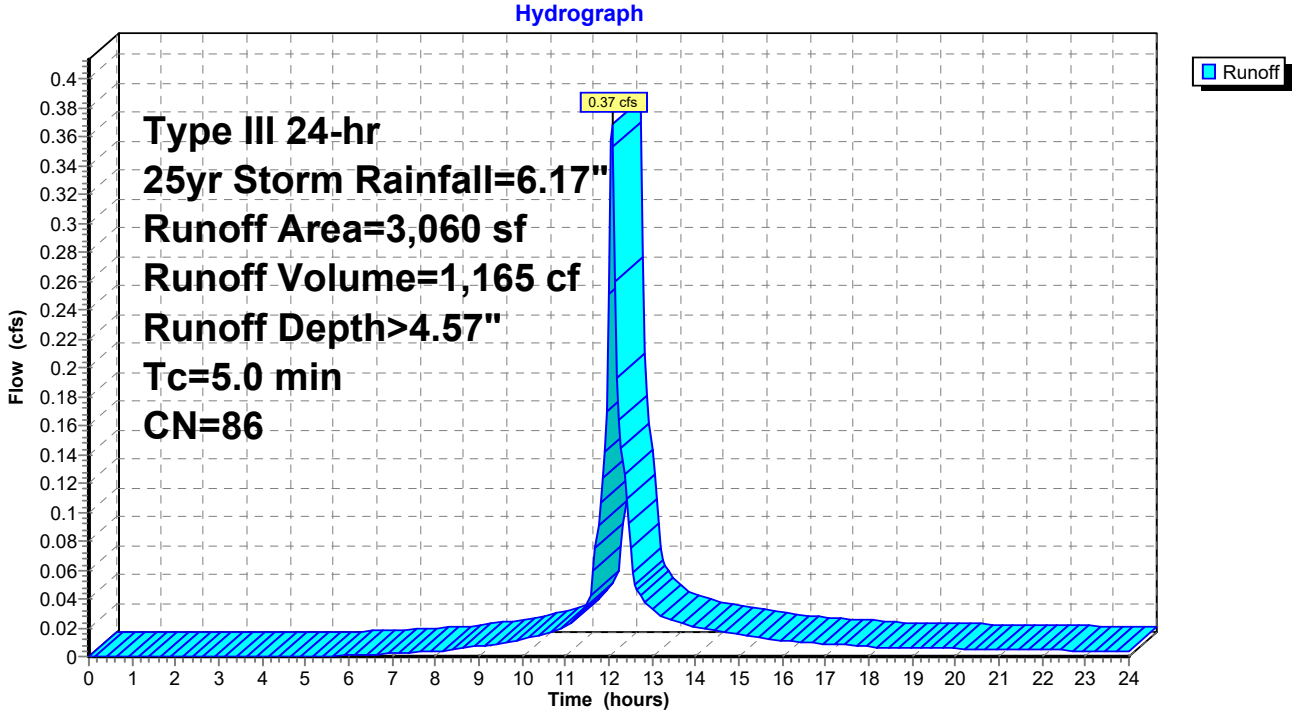
Runoff = 0.37 cfs @ 12.07 hrs, Volume= 1,165 cf, Depth> 4.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25yr Storm Rainfall=6.17"

	Area (sf)	CN	Description
*	952	98	Roof / Hardscape Areas
	2,108	80	>75% Grass cover, Good, HSG D
	3,060	86	Weighted Average
	2,108		68.89% Pervious Area
	952		31.11% Impervious Area

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

Subcatchment EX-3: Ex Drainage Area 3

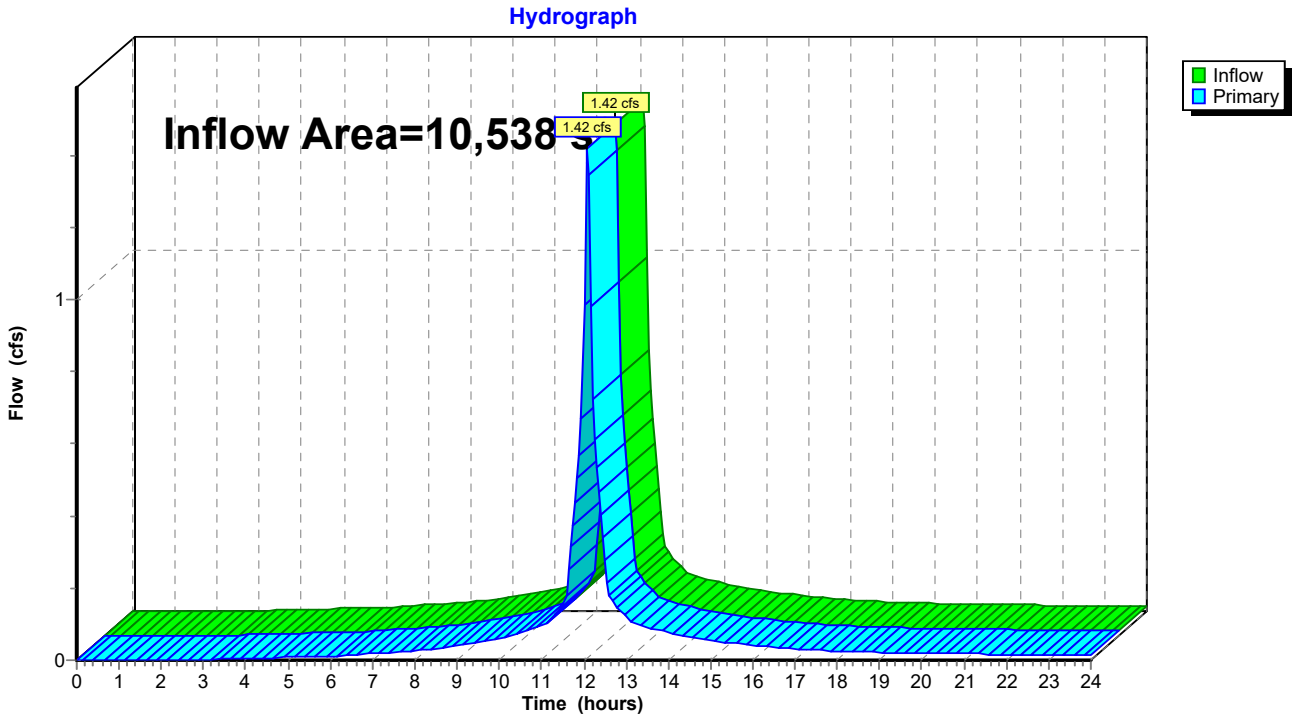


Summary for Link EX POC 1: EX CB 6

Inflow Area = 10,538 sf, 70.55% Impervious, Inflow Depth > 5.35" for 25yr Storm event
Inflow = 1.42 cfs @ 12.07 hrs, Volume= 4,696 cf
Primary = 1.42 cfs @ 12.07 hrs, Volume= 4,696 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC 1: EX CB 6

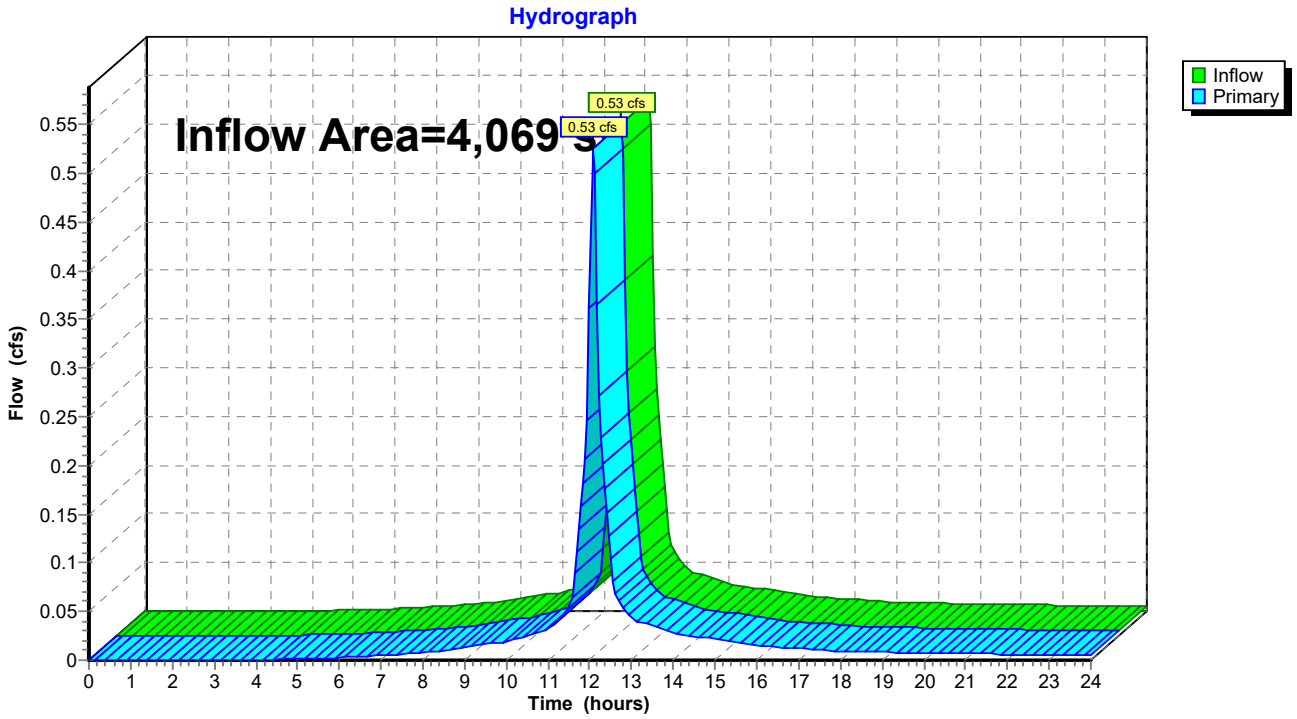


Summary for Link EX POC 2: EX CB 39

Inflow Area = 4,069 sf, 53.80% Impervious, Inflow Depth > 5.01" for 25yr Storm event
Inflow = 0.53 cfs @ 12.07 hrs, Volume= 1,698 cf
Primary = 0.53 cfs @ 12.07 hrs, Volume= 1,698 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC 2: EX CB 39

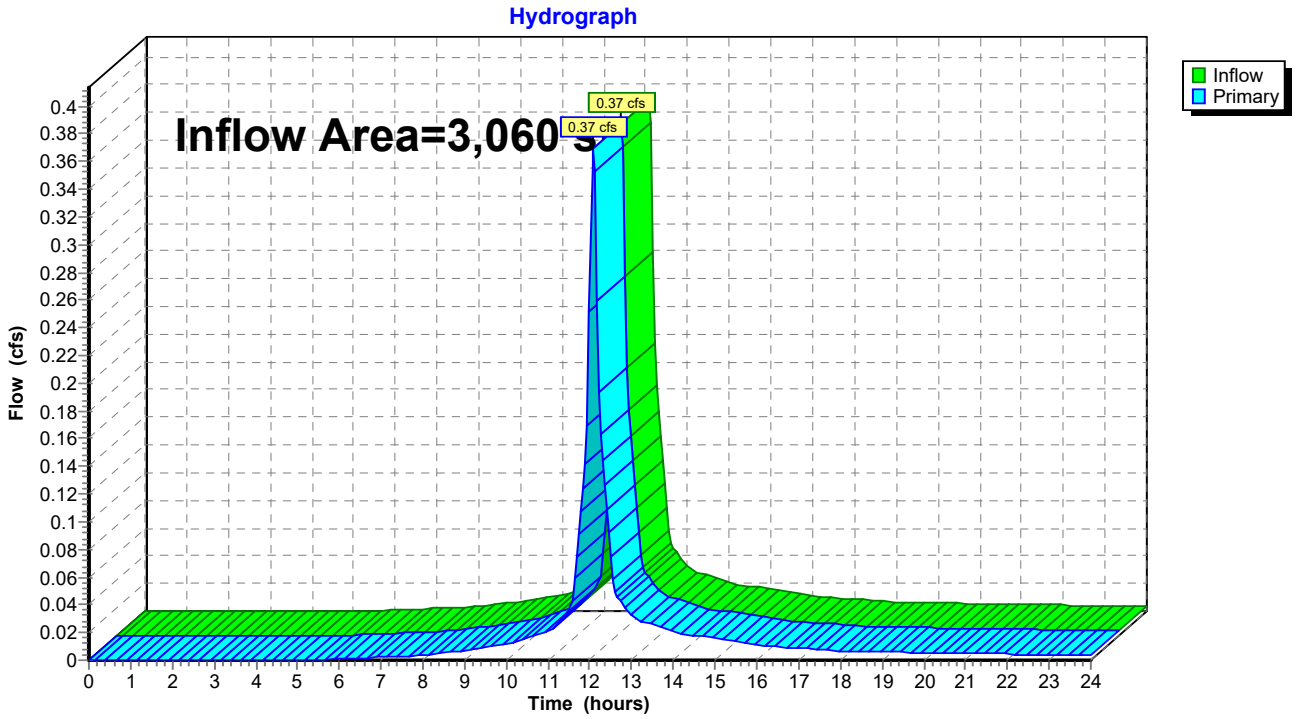


Summary for Link EX POC-3: EX CB 37

Inflow Area = 3,060 sf, 31.11% Impervious, Inflow Depth > 4.57" for 25yr Storm event
Inflow = 0.37 cfs @ 12.07 hrs, Volume= 1,165 cf
Primary = 0.37 cfs @ 12.07 hrs, Volume= 1,165 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC-3: EX CB 37

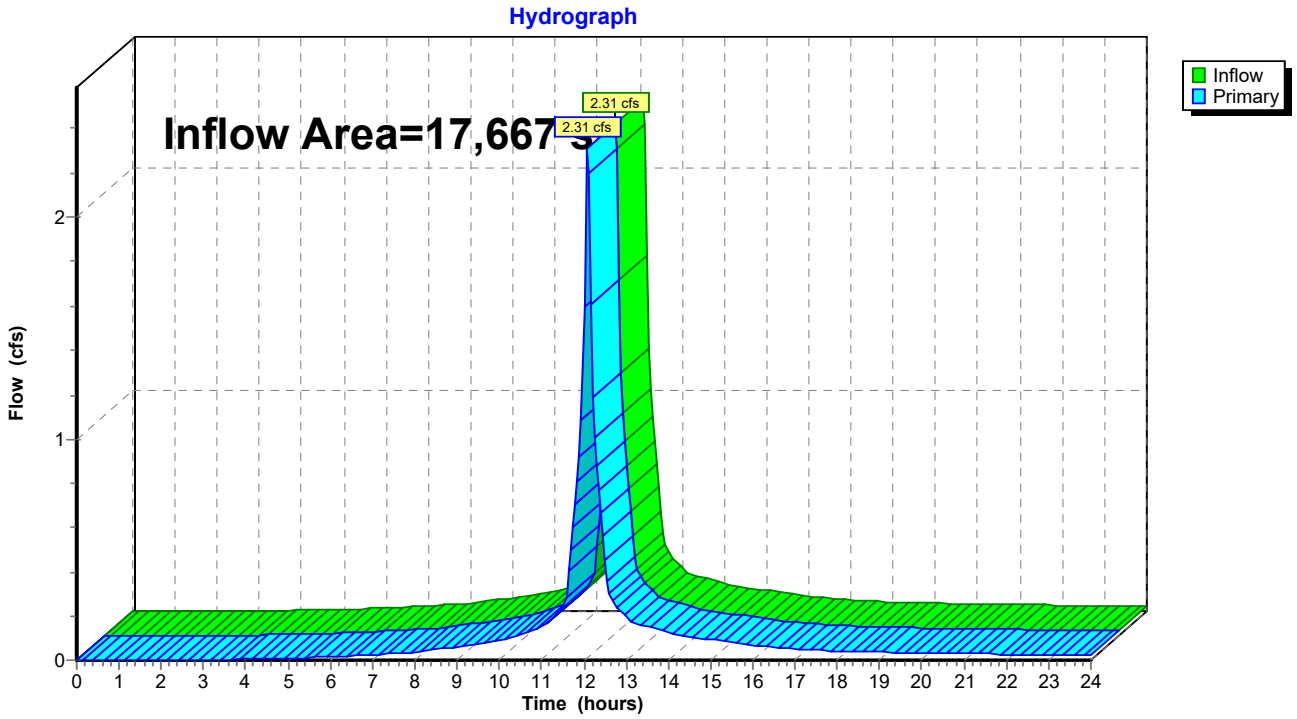


Summary for Link T-EX: Existing Conditions Overall Discharge

Inflow Area = 17,667 sf, 59.86% Impervious, Inflow Depth > 5.13" for 25yr Storm event
Inflow = 2.31 cfs @ 12.07 hrs, Volume= 7,560 cf
Primary = 2.31 cfs @ 12.07 hrs, Volume= 7,560 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link T-EX: Existing Conditions Overall Discharge



Summary for Subcatchment EX-1: Ex Drainage Area 1

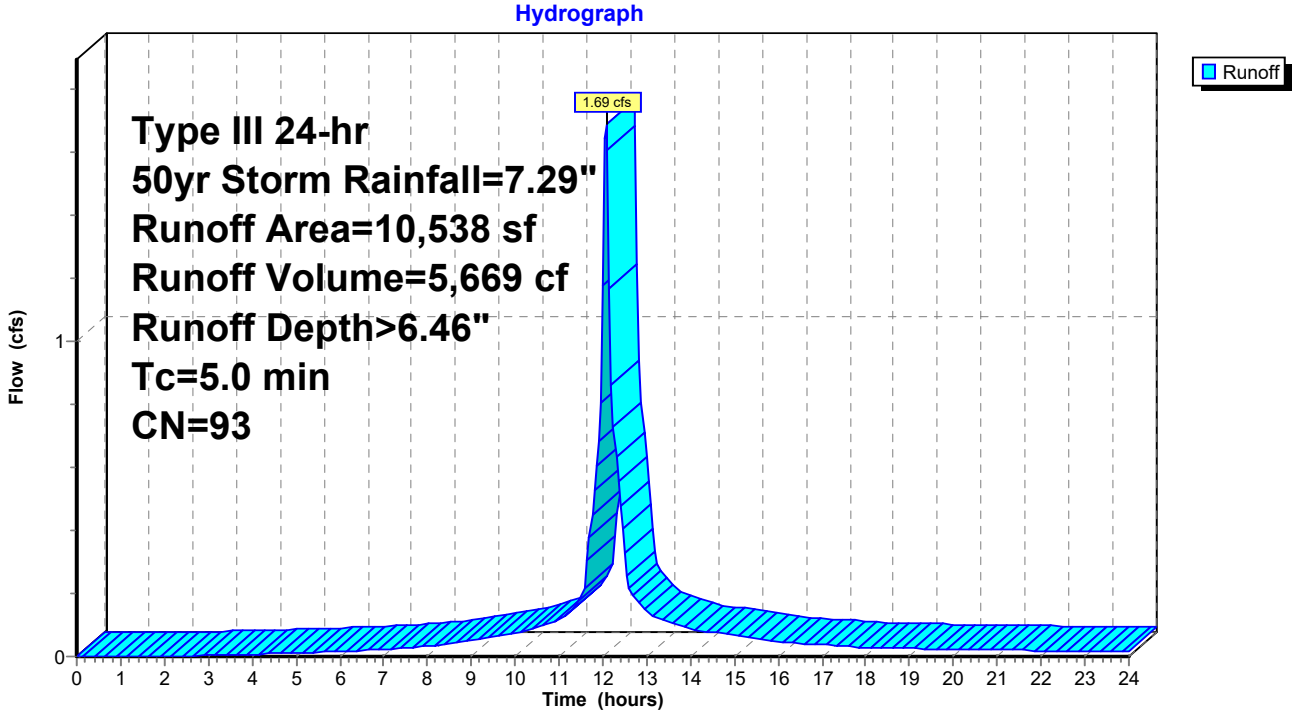
Runoff = 1.69 cfs @ 12.07 hrs, Volume= 5,669 cf, Depth> 6.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50yr Storm Rainfall=7.29"

	Area (sf)	CN	Description
*	7,435	98	Roof / Hardscape Areas
	3,103	80	>75% Grass cover, Good, HSG D
	10,538	93	Weighted Average
	3,103		29.45% Pervious Area
	7,435		70.55% Impervious Area

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

Subcatchment EX-1: Ex Drainage Area 1



Summary for Subcatchment EX-2: Ex Drainage Area 2

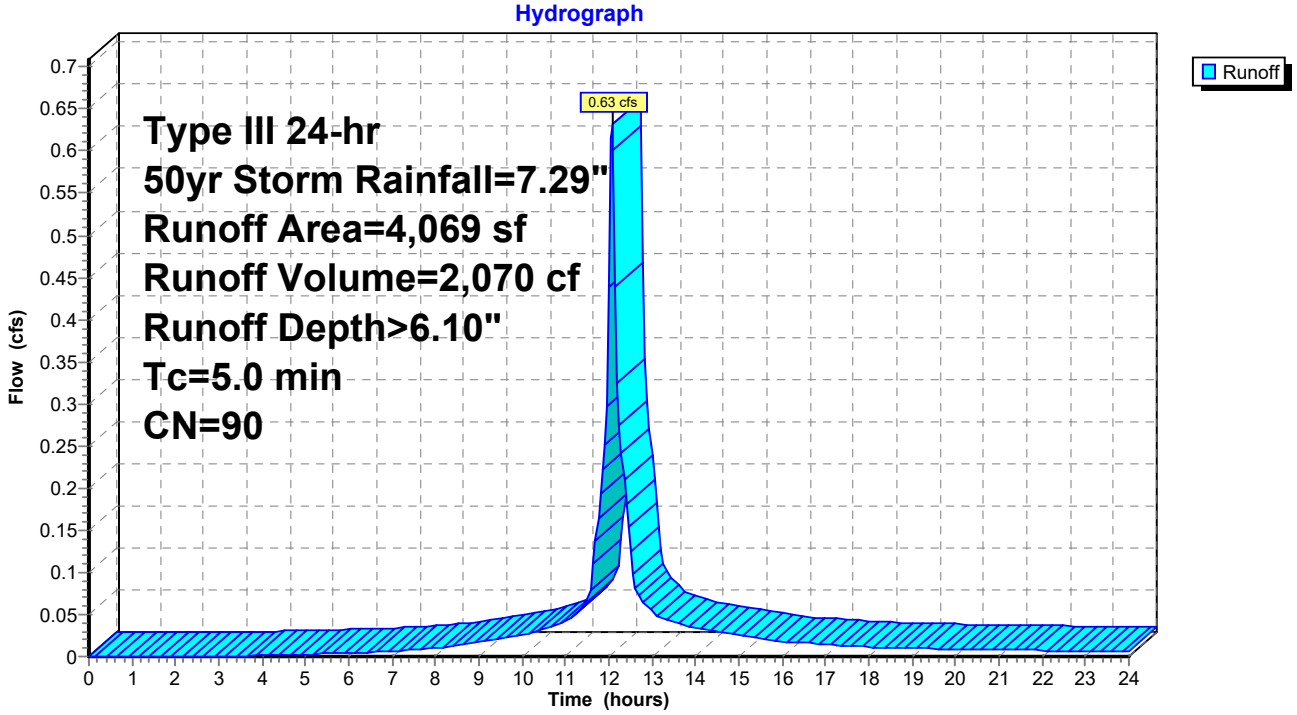
Runoff = 0.63 cfs @ 12.07 hrs, Volume= 2,070 cf, Depth> 6.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50yr Storm Rainfall=7.29"

	Area (sf)	CN	Description
*	2,189	98	Roof / Hardscape Areas
	1,880	80	>75% Grass cover, Good, HSG D
	4,069	90	Weighted Average
	1,880		46.20% Pervious Area
	2,189		53.80% Impervious Area

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

Subcatchment EX-2: Ex Drainage Area 2



Summary for Subcatchment EX-3: Ex Drainage Area 3

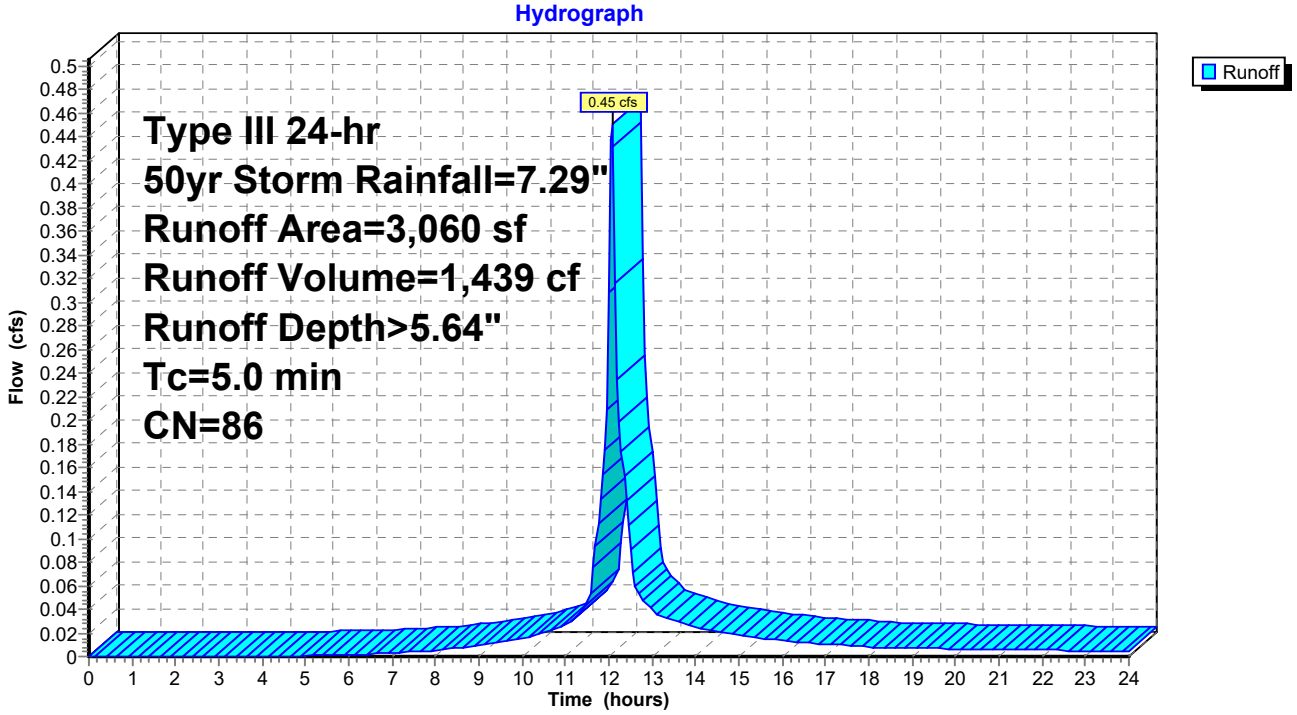
Runoff = 0.45 cfs @ 12.07 hrs, Volume= 1,439 cf, Depth> 5.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50yr Storm Rainfall=7.29"

	Area (sf)	CN	Description
*	952	98	Roof / Hardscape Areas
	2,108	80	>75% Grass cover, Good, HSG D
	3,060	86	Weighted Average
	2,108		68.89% Pervious Area
	952		31.11% Impervious Area

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

Subcatchment EX-3: Ex Drainage Area 3

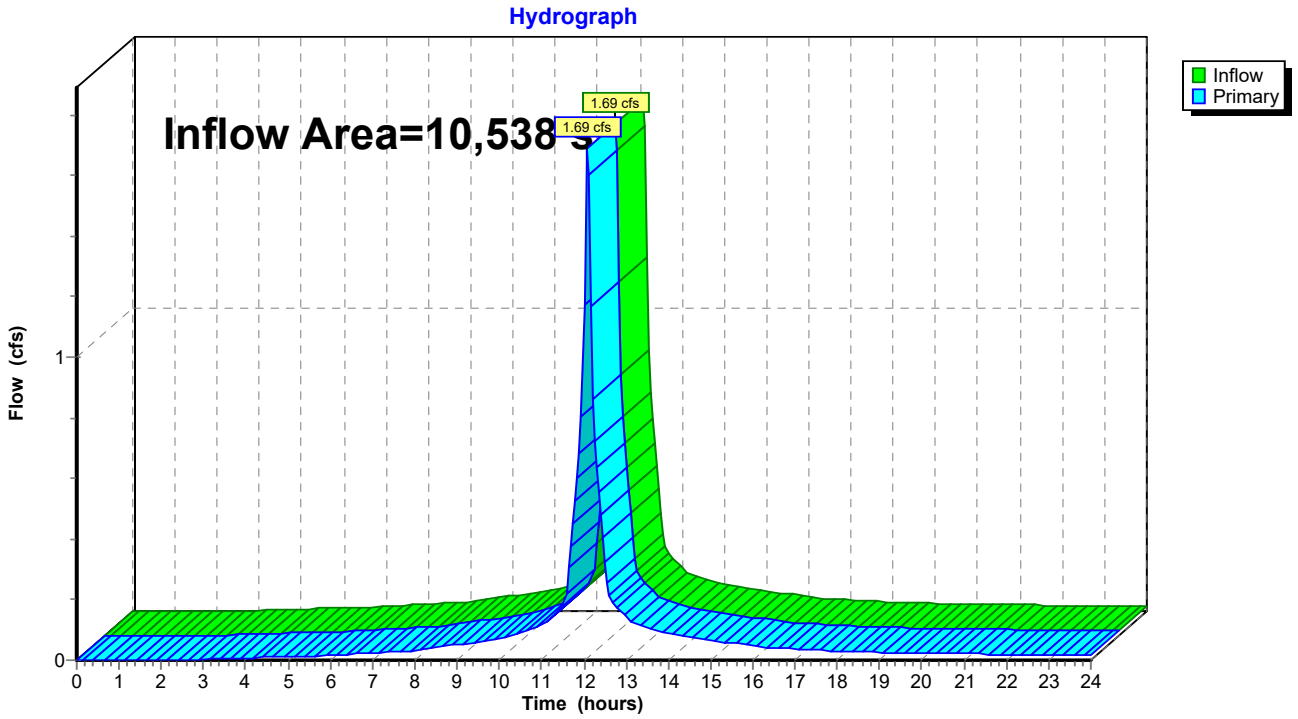


Summary for Link EX POC 1: EX CB 6

Inflow Area = 10,538 sf, 70.55% Impervious, Inflow Depth > 6.46" for 50yr Storm event
Inflow = 1.69 cfs @ 12.07 hrs, Volume= 5,669 cf
Primary = 1.69 cfs @ 12.07 hrs, Volume= 5,669 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC 1: EX CB 6

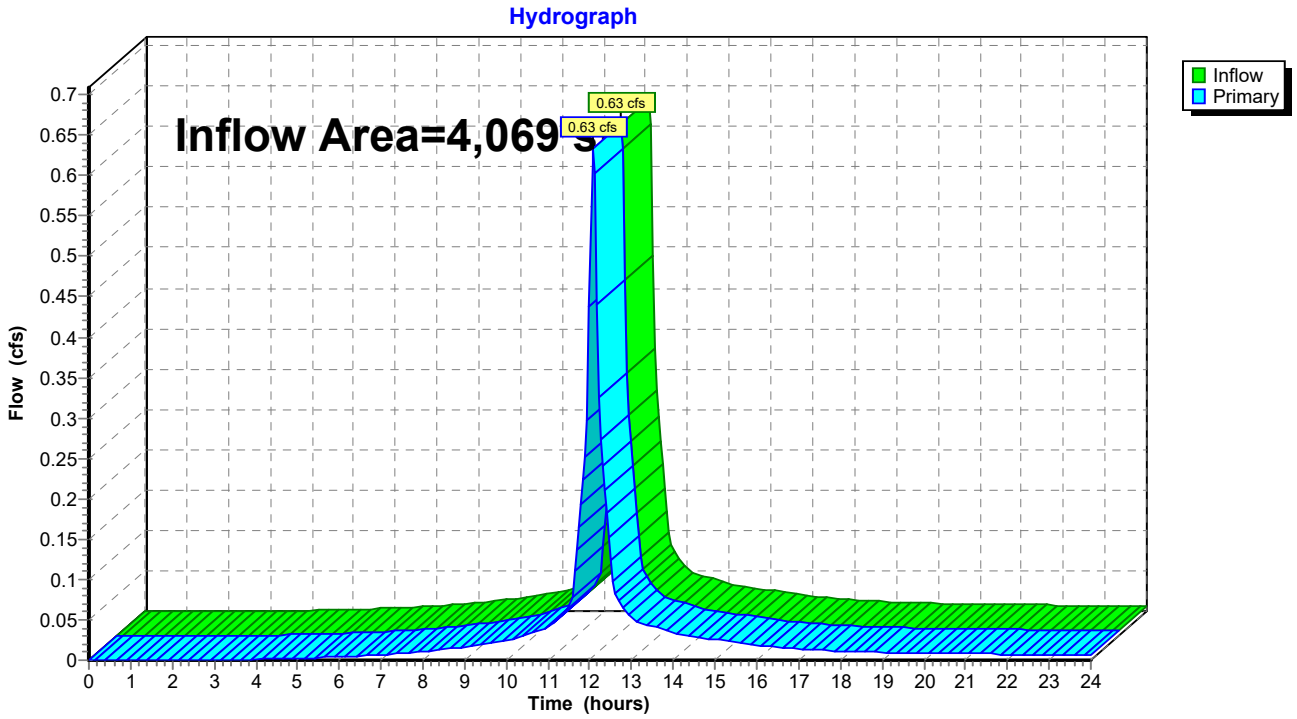


Summary for Link EX POC 2: EX CB 39

Inflow Area = 4,069 sf, 53.80% Impervious, Inflow Depth > 6.10" for 50yr Storm event
Inflow = 0.63 cfs @ 12.07 hrs, Volume= 2,070 cf
Primary = 0.63 cfs @ 12.07 hrs, Volume= 2,070 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC 2: EX CB 39

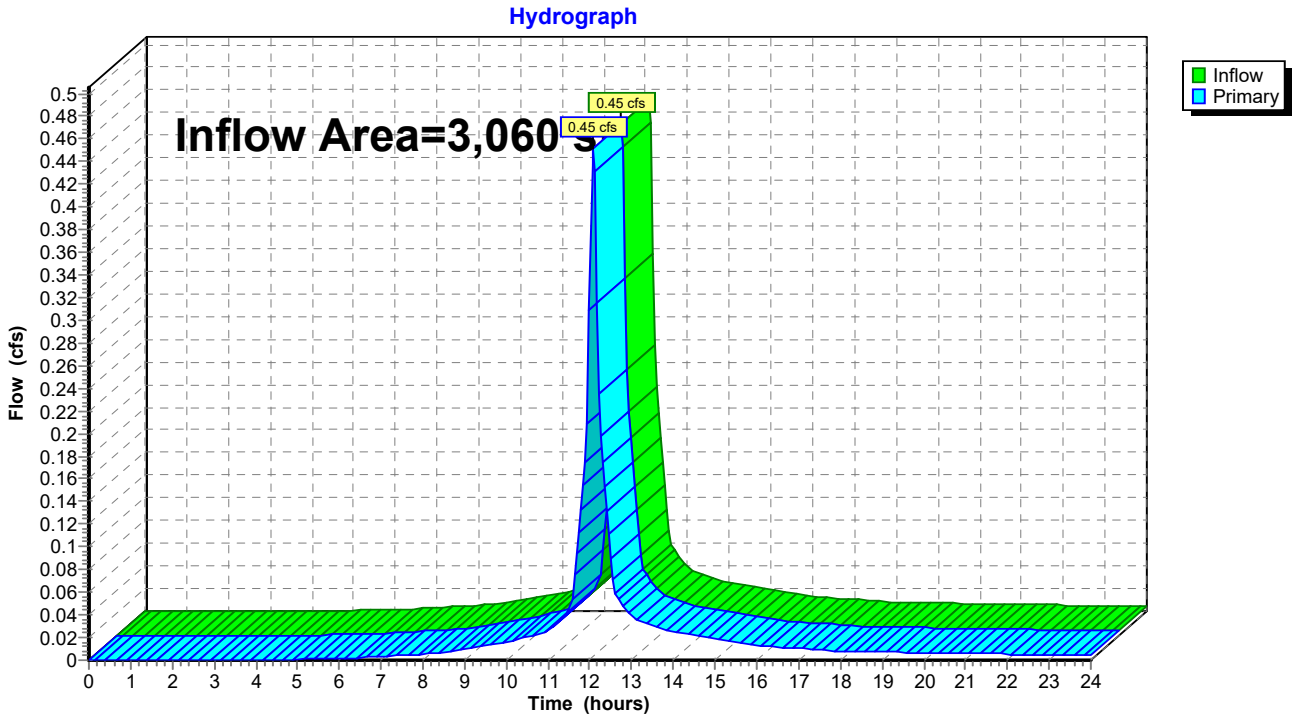


Summary for Link EX POC-3: EX CB 37

Inflow Area = 3,060 sf, 31.11% Impervious, Inflow Depth > 5.64" for 50yr Storm event
Inflow = 0.45 cfs @ 12.07 hrs, Volume= 1,439 cf
Primary = 0.45 cfs @ 12.07 hrs, Volume= 1,439 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC-3: EX CB 37

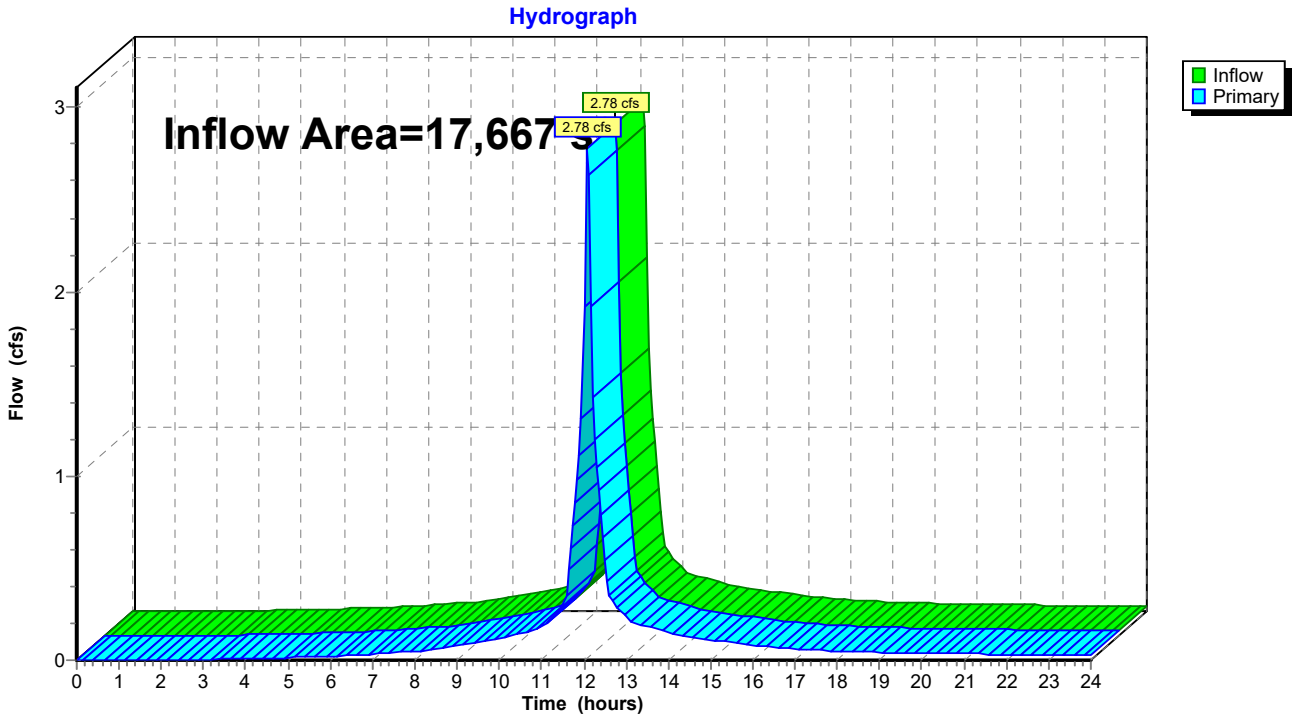


Summary for Link T-EX: Existing Conditions Overall Discharge

Inflow Area = 17,667 sf, 59.86% Impervious, Inflow Depth > 6.23" for 50yr Storm event
Inflow = 2.78 cfs @ 12.07 hrs, Volume= 9,177 cf
Primary = 2.78 cfs @ 12.07 hrs, Volume= 9,177 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link T-EX: Existing Conditions Overall Discharge



Summary for Subcatchment EX-1: Ex Drainage Area 1

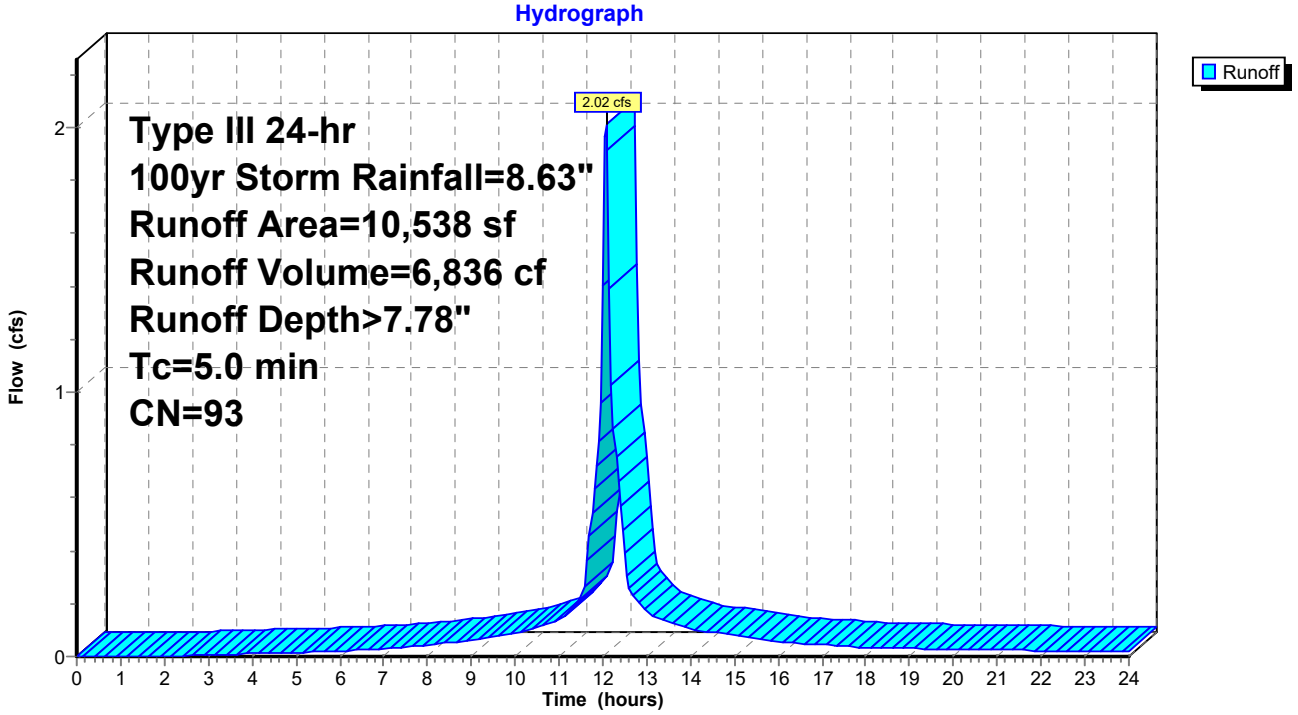
Runoff = 2.02 cfs @ 12.07 hrs, Volume= 6,836 cf, Depth> 7.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100yr Storm Rainfall=8.63"

	Area (sf)	CN	Description
*	7,435	98	Roof / Hardscape Areas
	3,103	80	>75% Grass cover, Good, HSG D
	10,538	93	Weighted Average
	3,103		29.45% Pervious Area
	7,435		70.55% Impervious Area

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

Subcatchment EX-1: Ex Drainage Area 1



Summary for Subcatchment EX-2: Ex Drainage Area 2

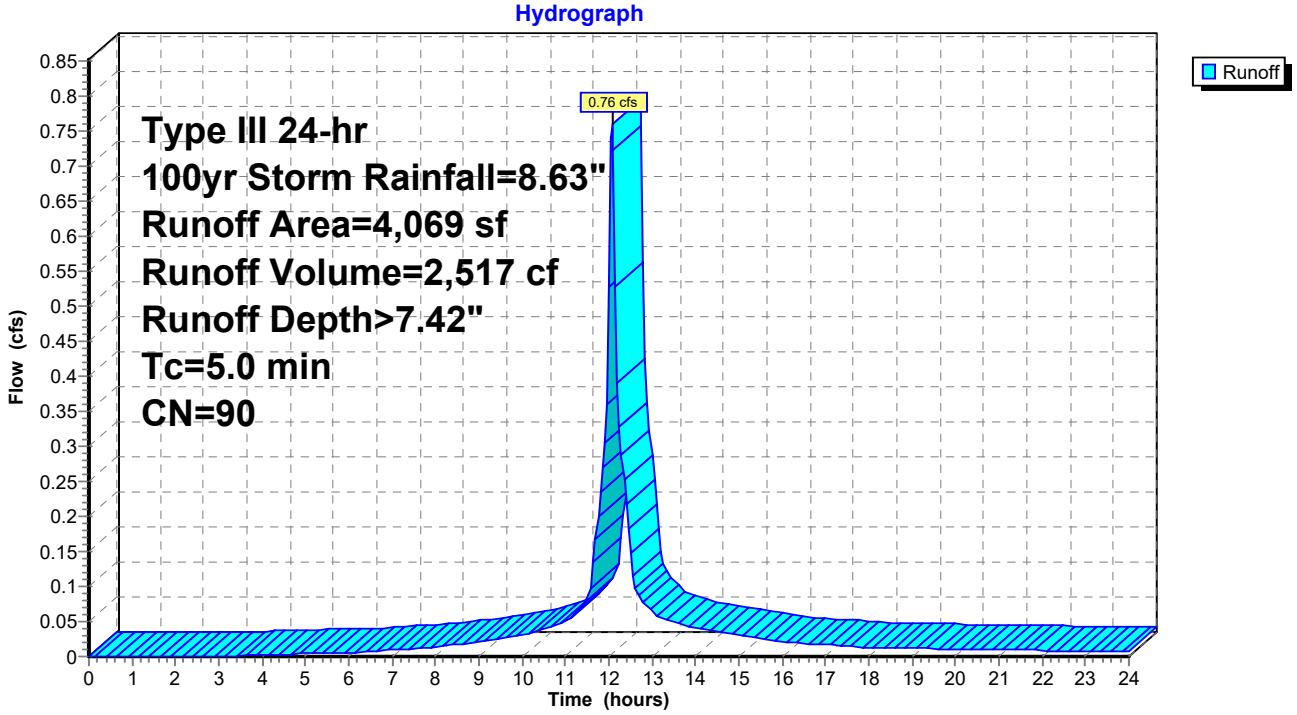
Runoff = 0.76 cfs @ 12.07 hrs, Volume= 2,517 cf, Depth> 7.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100yr Storm Rainfall=8.63"

	Area (sf)	CN	Description
*	2,189	98	Roof / Hardscape Areas
	1,880	80	>75% Grass cover, Good, HSG D
	4,069	90	Weighted Average
	1,880		46.20% Pervious Area
	2,189		53.80% Impervious Area

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

Subcatchment EX-2: Ex Drainage Area 2



Summary for Subcatchment EX-3: Ex Drainage Area 3

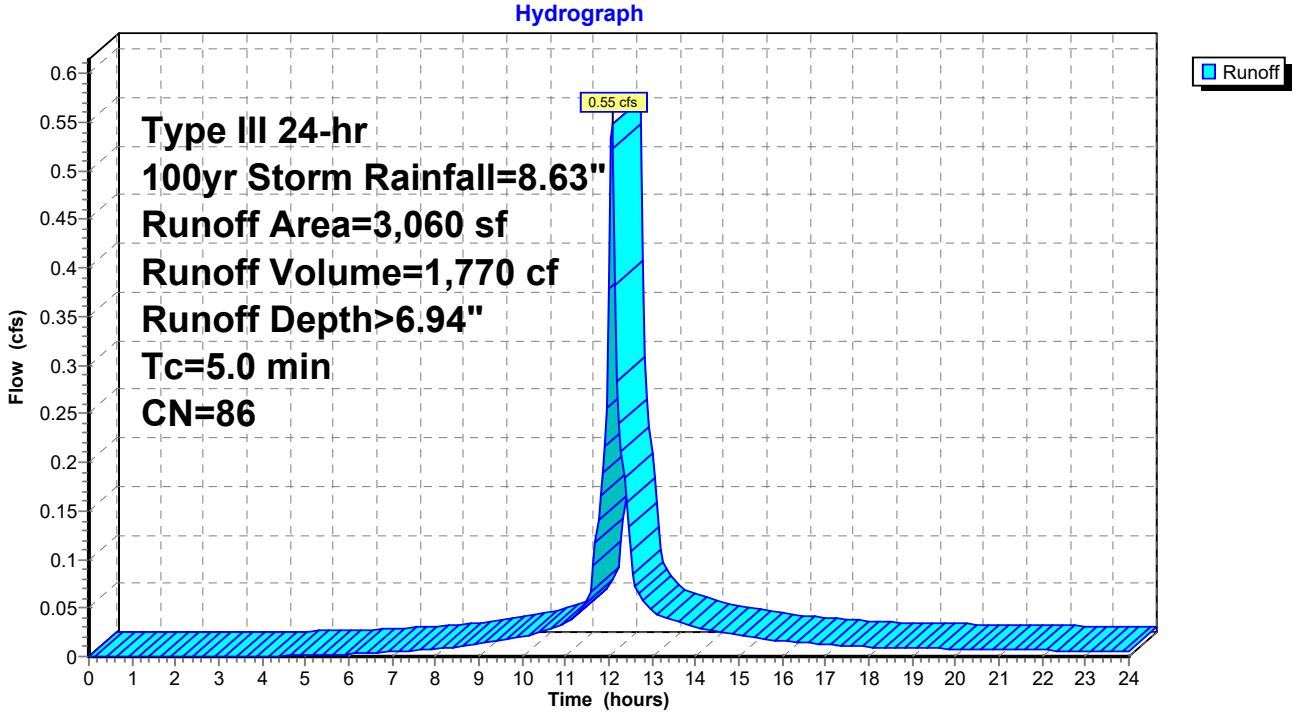
Runoff = 0.55 cfs @ 12.07 hrs, Volume= 1,770 cf, Depth> 6.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100yr Storm Rainfall=8.63"

	Area (sf)	CN	Description
*	952	98	Roof / Hardscape Areas
	2,108	80	>75% Grass cover, Good, HSG D
	3,060	86	Weighted Average
	2,108		68.89% Pervious Area
	952		31.11% Impervious Area

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

Subcatchment EX-3: Ex Drainage Area 3

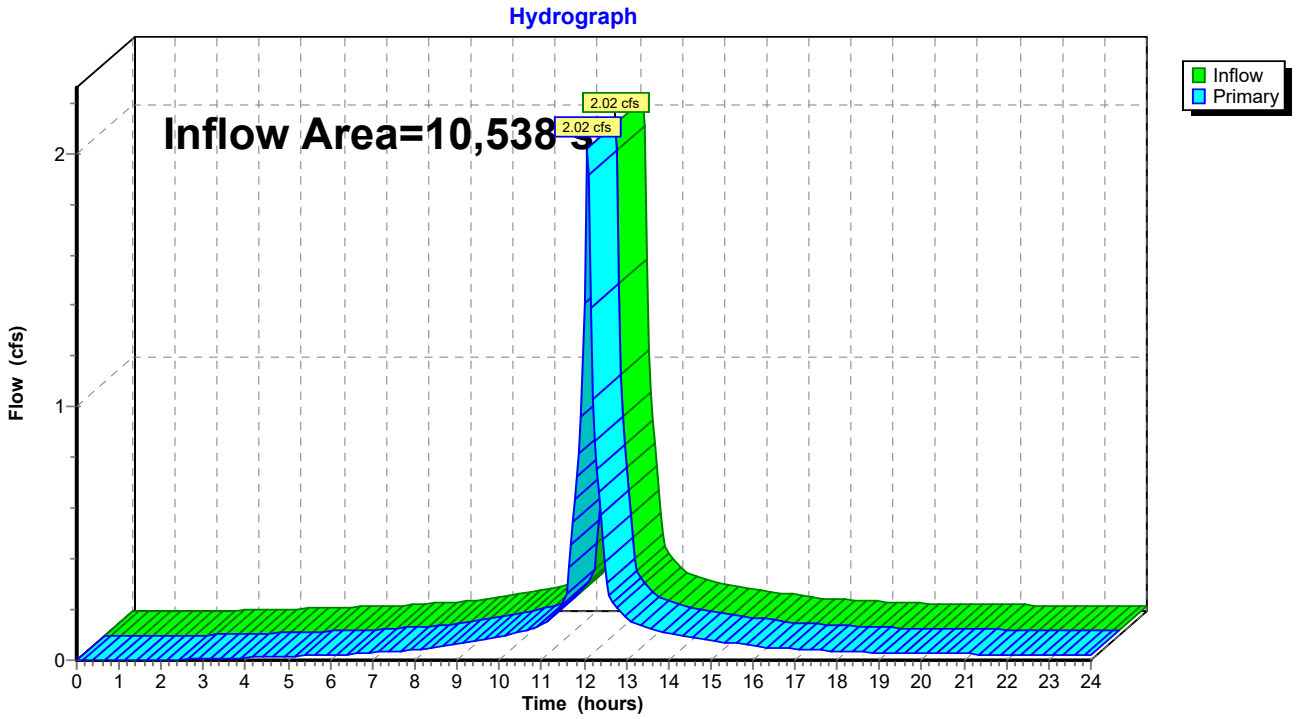


Summary for Link EX POC 1: EX CB 6

Inflow Area = 10,538 sf, 70.55% Impervious, Inflow Depth > 7.78" for 100yr Storm event
Inflow = 2.02 cfs @ 12.07 hrs, Volume= 6,836 cf
Primary = 2.02 cfs @ 12.07 hrs, Volume= 6,836 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC 1: EX CB 6

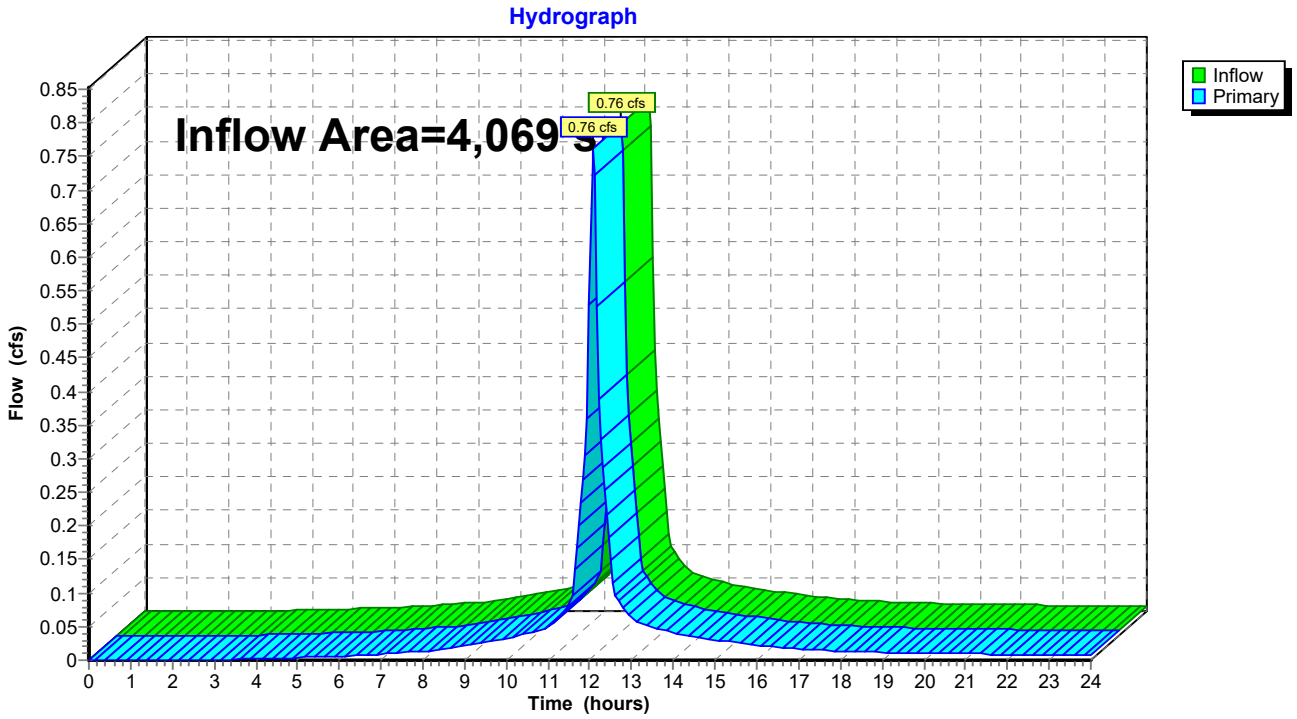


Summary for Link EX POC 2: EX CB 39

Inflow Area = 4,069 sf, 53.80% Impervious, Inflow Depth > 7.42" for 100yr Storm event
Inflow = 0.76 cfs @ 12.07 hrs, Volume= 2,517 cf
Primary = 0.76 cfs @ 12.07 hrs, Volume= 2,517 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC 2: EX CB 39

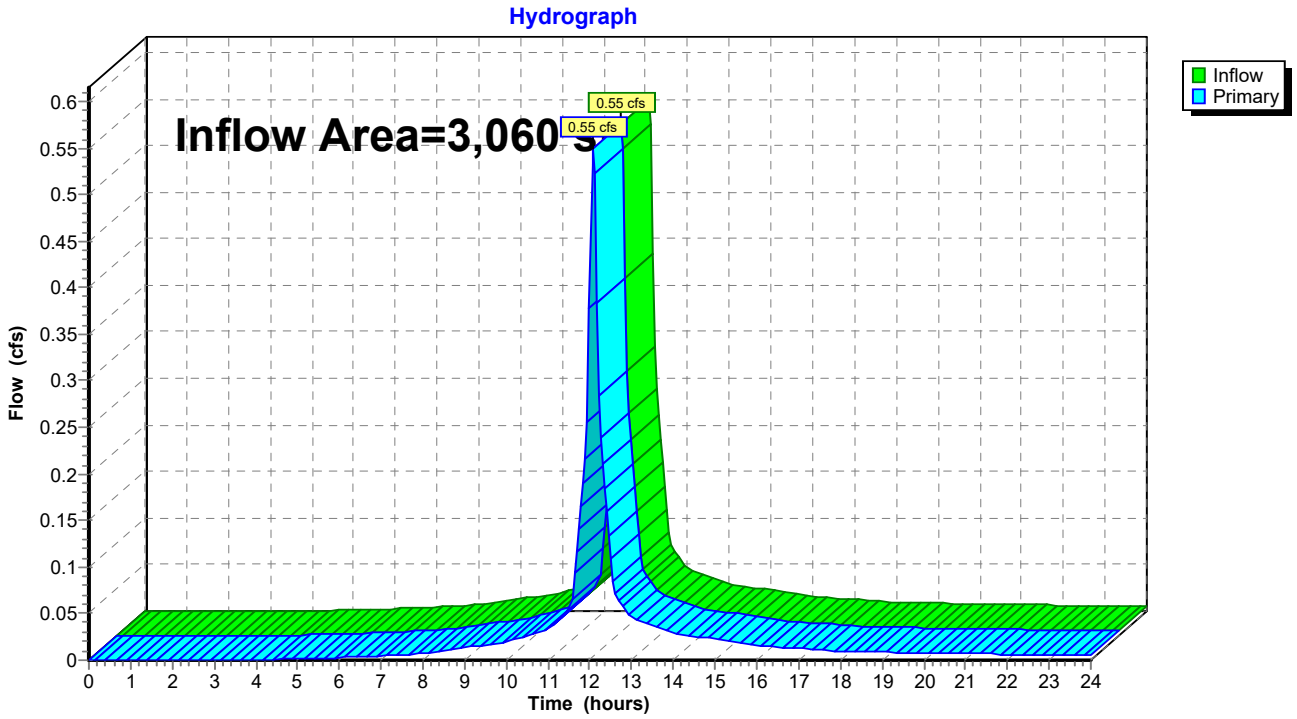


Summary for Link EX POC-3: EX CB 37

Inflow Area = 3,060 sf, 31.11% Impervious, Inflow Depth > 6.94" for 100yr Storm event
Inflow = 0.55 cfs @ 12.07 hrs, Volume= 1,770 cf
Primary = 0.55 cfs @ 12.07 hrs, Volume= 1,770 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link EX POC-3: EX CB 37

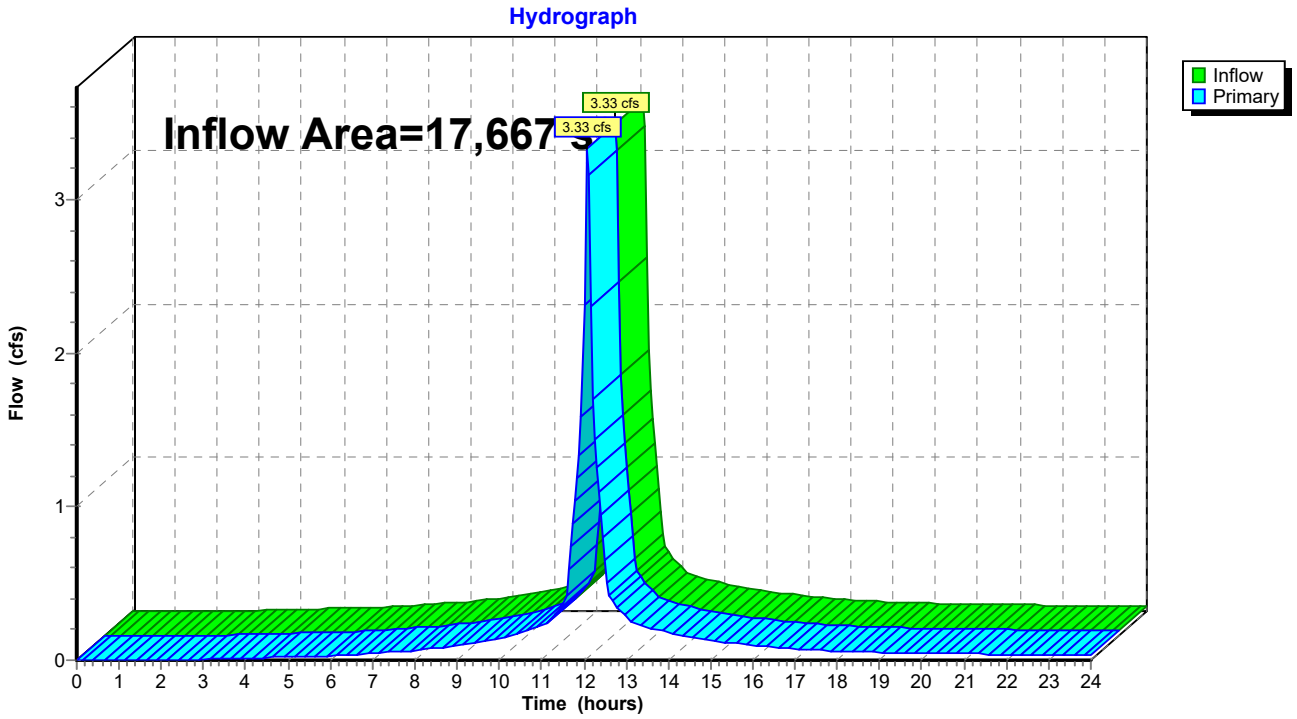


Summary for Link T-EX: Existing Conditions Overall Discharge

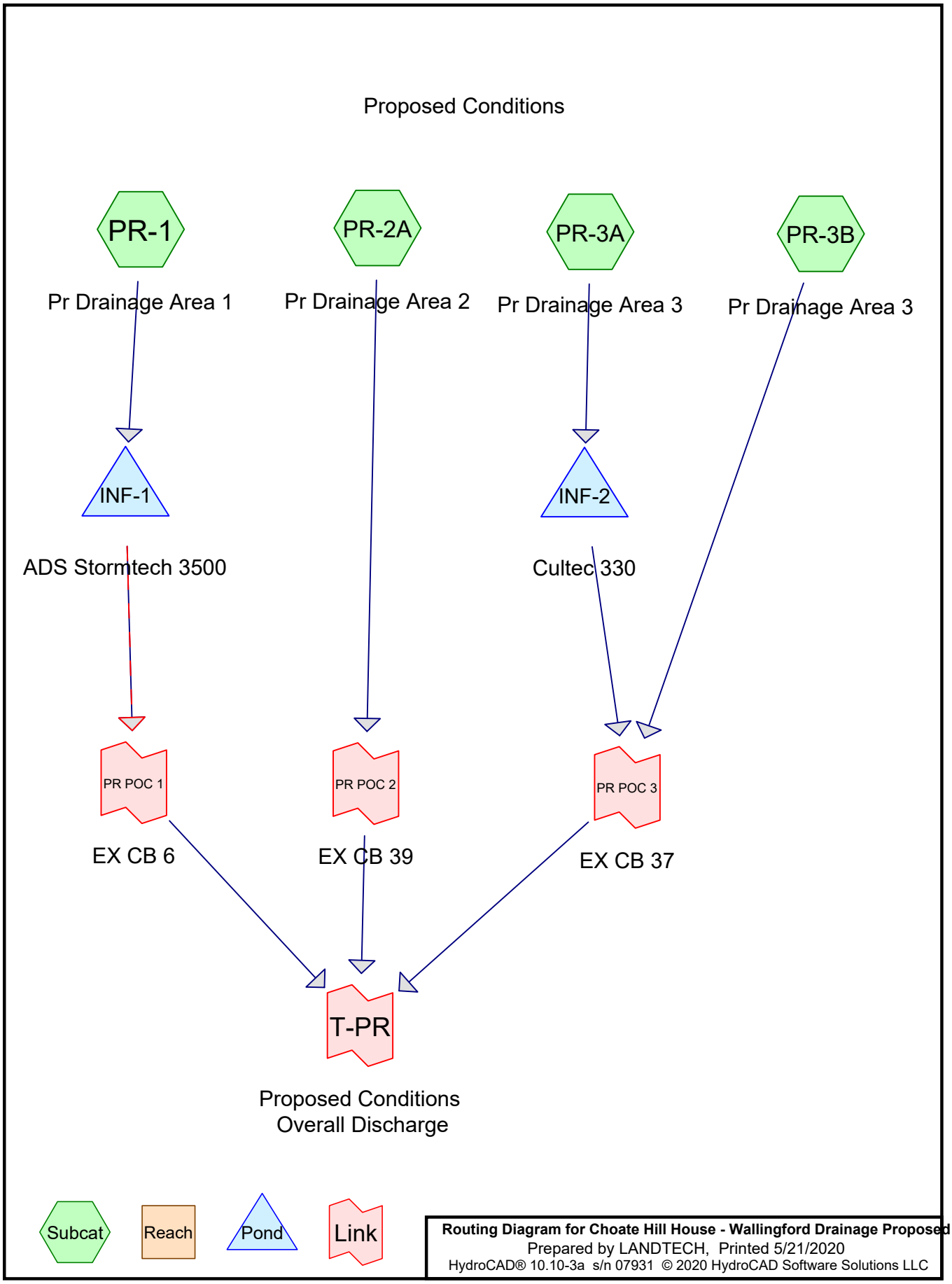
Inflow Area = 17,667 sf, 59.86% Impervious, Inflow Depth > 7.55" for 100yr Storm event
Inflow = 3.33 cfs @ 12.07 hrs, Volume= 11,122 cf
Primary = 3.33 cfs @ 12.07 hrs, Volume= 11,122 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link T-EX: Existing Conditions Overall Discharge



Proposed Conditions Summary



Routing Diagram for Choate Hill House - Wallingford Drainage Proposed
Prepared by LANDTECH, Printed 5/21/2020
HydroCAD® 10.10-3a s/n 07931 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
6,017	80	>75% Grass cover, Good, HSG D (PR-1, PR-2A, PR-3B)
1,724	98	Hardscape Area (PR-2A, PR-3B)
2,743	98	Hardscape Areas (PR-1)
6,551	98	Roof Area (PR-1, PR-3A)

Summary for Subcatchment PR-1: Pr Drainage Area 1

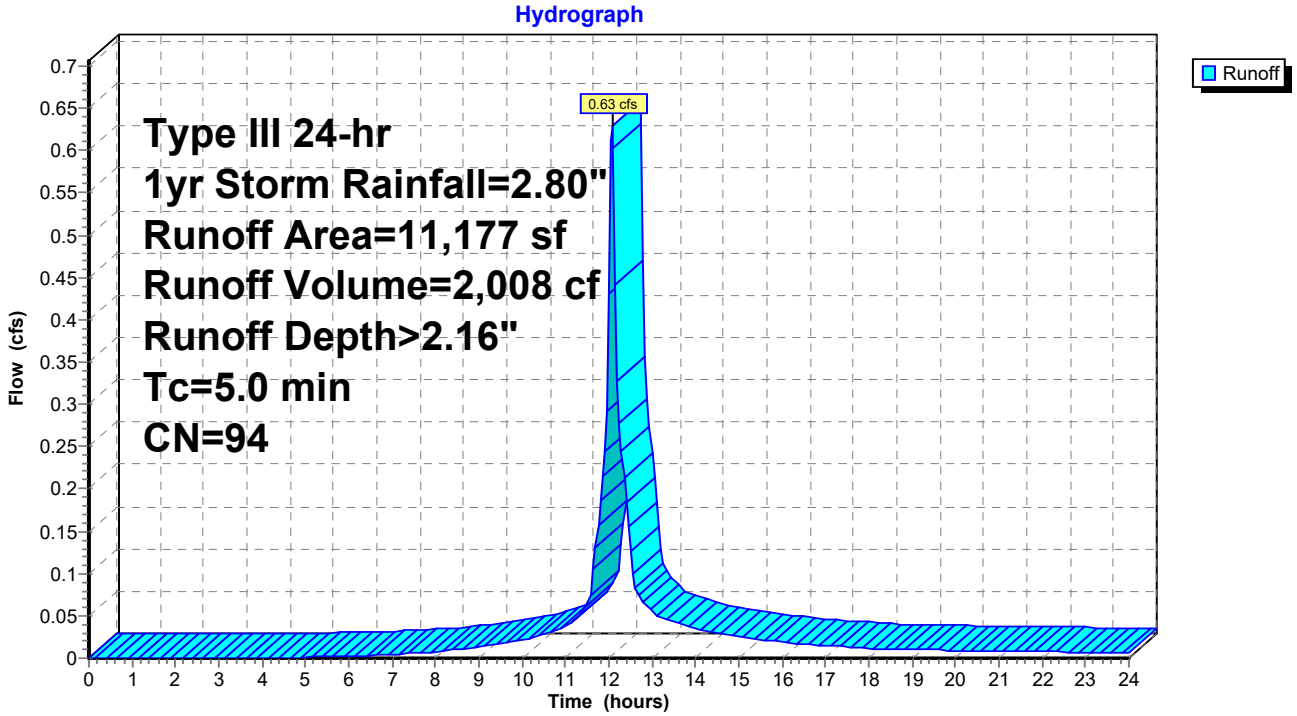
Runoff = 0.63 cfs @ 12.07 hrs, Volume= 2,008 cf, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1yr Storm Rainfall=2.80"

	Area (sf)	CN	Description
*	5,809	98	Roof Area
*	2,743	98	Hardscape Areas
	2,625	80	>75% Grass cover, Good, HSG D
	11,177	94	Weighted Average
	2,625		23.49% Pervious Area
	8,552		76.51% Impervious Area

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

Subcatchment PR-1: Pr Drainage Area 1



Summary for Subcatchment PR-2A: Pr Drainage Area 2

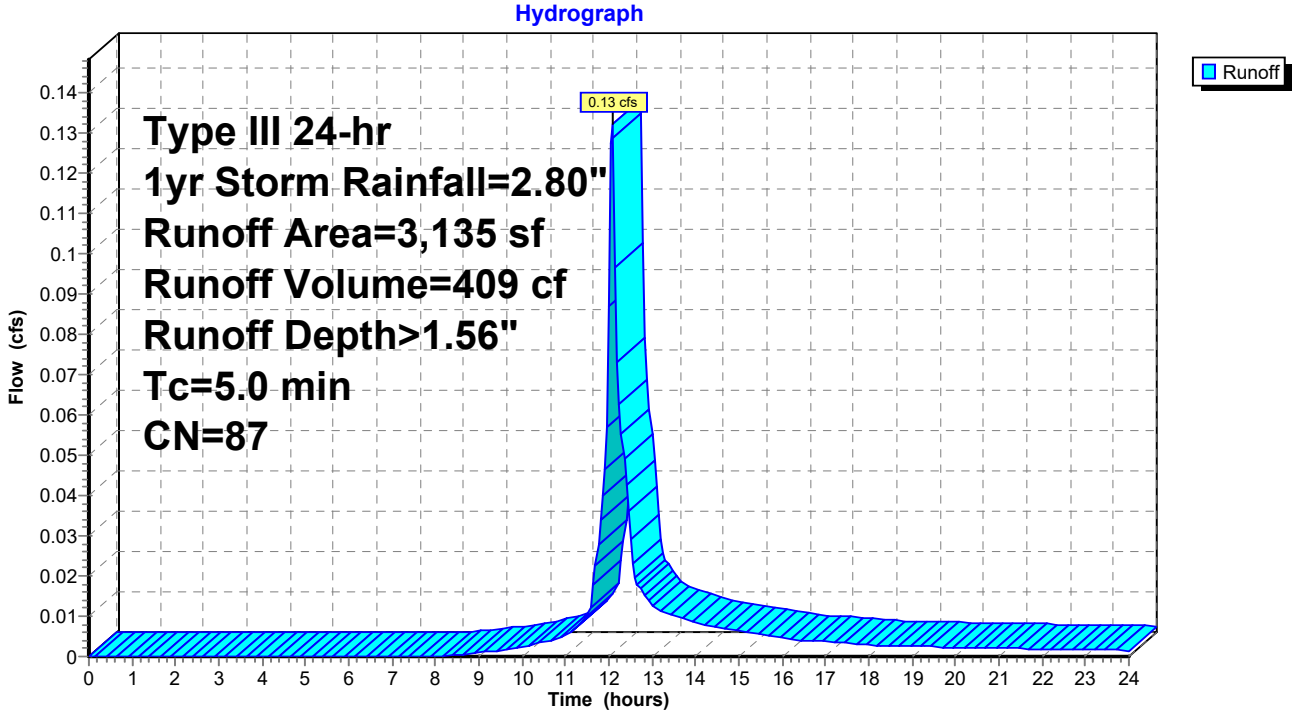
Runoff = 0.13 cfs @ 12.08 hrs, Volume= 409 cf, Depth> 1.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1yr Storm Rainfall=2.80"

	Area (sf)	CN	Description
*	1,142	98	Hardscape Area
	1,993	80	>75% Grass cover, Good, HSG D
	3,135	87	Weighted Average
	1,993		63.57% Pervious Area
	1,142		36.43% Impervious Area

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

Subcatchment PR-2A: Pr Drainage Area 2



Summary for Subcatchment PR-3A: Pr Drainage Area 3

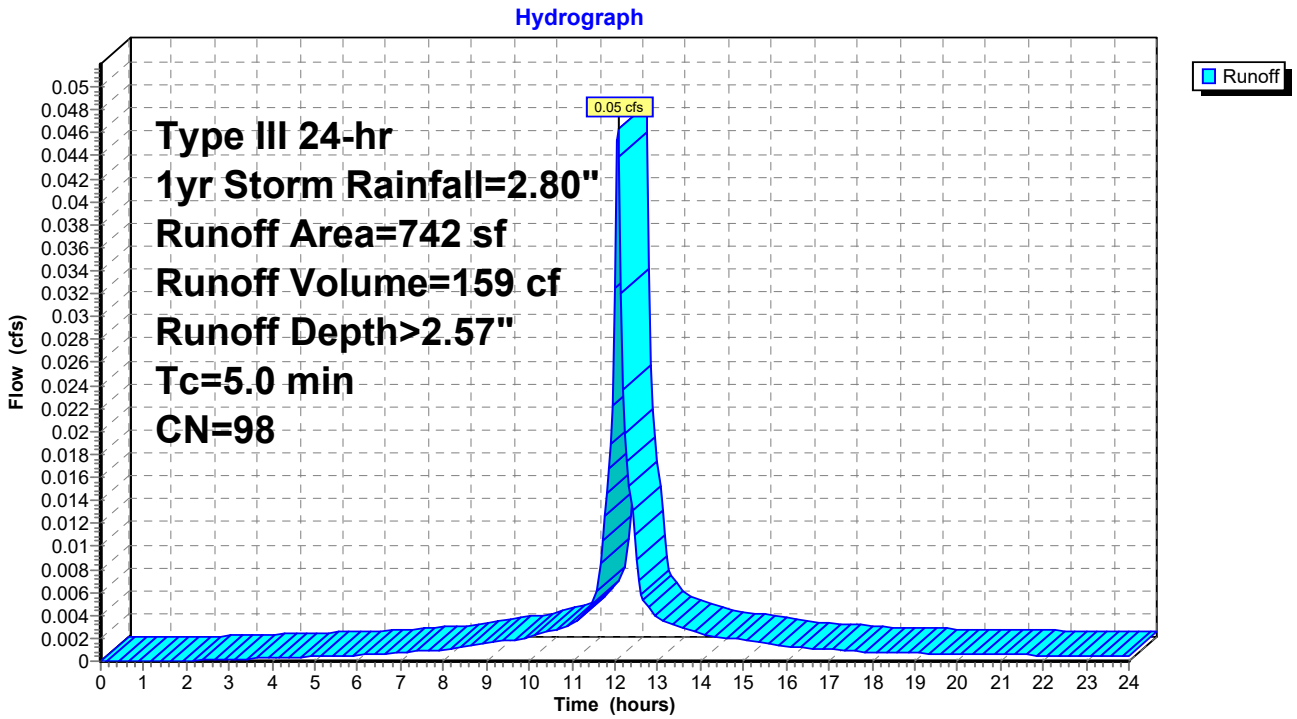
Runoff = 0.05 cfs @ 12.07 hrs, Volume= 159 cf, Depth> 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1yr Storm Rainfall=2.80"

	Area (sf)	CN	Description
*	742	98	Roof Area
	742		100.00% Impervious Area

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

Subcatchment PR-3A: Pr Drainage Area 3



Summary for Subcatchment PR-3B: Pr Drainage Area 3

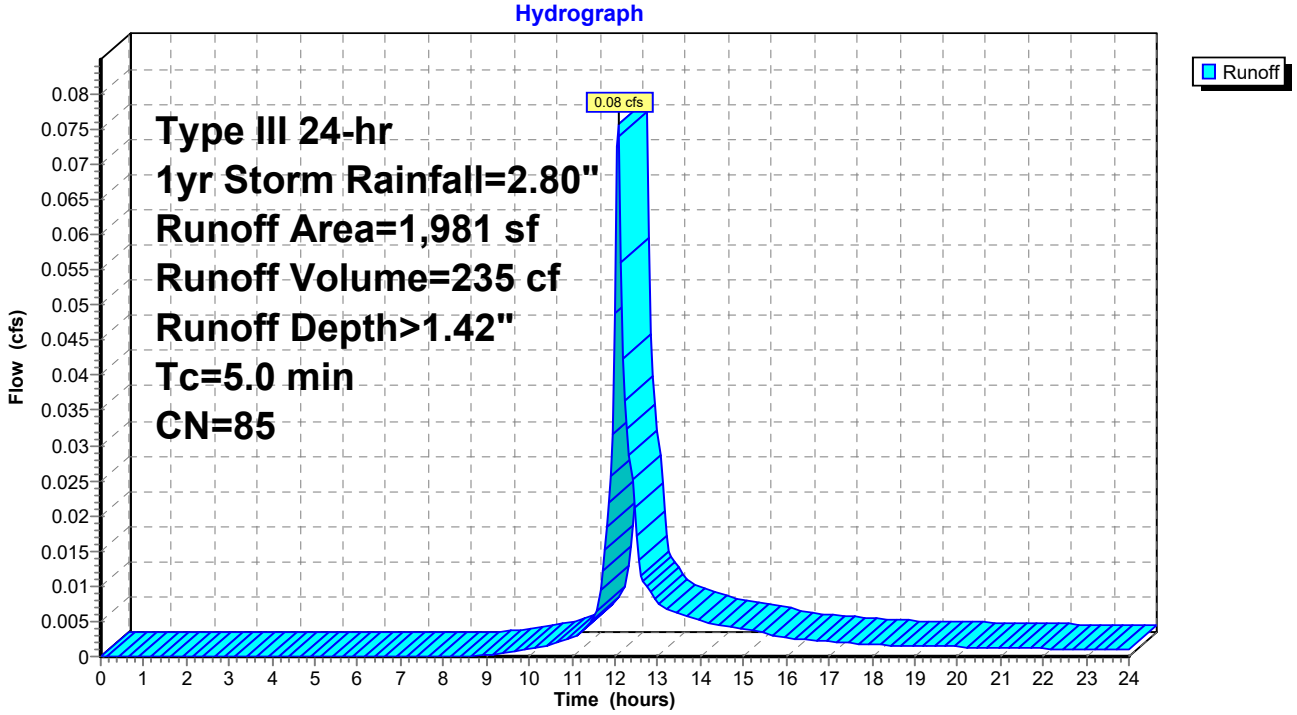
Runoff = 0.08 cfs @ 12.08 hrs, Volume= 235 cf, Depth> 1.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1yr Storm Rainfall=2.80"

	Area (sf)	CN	Description
*	582	98	Hardscape Area
	1,399	80	>75% Grass cover, Good, HSG D
	1,981	85	Weighted Average
	1,399		70.62% Pervious Area
	582		29.38% Impervious Area

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

Subcatchment PR-3B: Pr Drainage Area 3



Summary for Pond INF-1: ADS Stormtech 3500

Inflow Area =	11,177 sf, 76.51% Impervious, Inflow Depth > 2.16" for 1yr Storm event				
Inflow =	0.63 cfs @	12.07 hrs,	Volume=	2,008 cf	
Outflow =	0.03 cfs @	14.23 hrs,	Volume=	1,673 cf,	Atten= 95%, Lag= 129.2 min
Discarded =	0.03 cfs @	14.23 hrs,	Volume=	1,673 cf	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 6
Peak Elev= 160.96' @ 14.23 hrs Surf.Area= 782 sf Storage= 986 cf

Plug-Flow detention time= 264.9 min calculated for 1,673 cf (83% of inflow)
Center-of-Mass det. time= 197.2 min (987.5 - 790.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	159.00'	1,157 cf	**22.75'W x 34.38'L x 5.50'H Field A** 4,302 cf Overall - 1,409 cf Embedded = 2,893 cf x 40.0% Voids
#2A	159.75'	1,409 cf	**ADS_StormTech MC-3500 d +Cap**x 12 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 12 Chambers in 3 Rows Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf
		2,566 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	159.00'	**1.500 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 149.00'
#2	Secondary	165.75'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	162.00'	**12.0" Round Culvert to CB 6** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 161.80' / 162.00' S= -0.0143 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#4	Device 3	161.80'	**6.0" Vert. LFO** C= 0.600 Limited to weir flow at low heads
#5	Secondary	164.75'	**6.0" Vert. HLO** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 14.23 hrs HW=160.96' (Free Discharge)
└─**1=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=159.00' (Free Discharge)
└─**3=Culvert to CB 6** (Controls 0.00 cfs)
  └─**4=LFO** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=159.00' (Free Discharge)
├─**2=Orifice/Grate** (Controls 0.00 cfs)
└─**5=HLO** (Controls 0.00 cfs)

Pond INF-1: ADS Stormtech 3500 - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

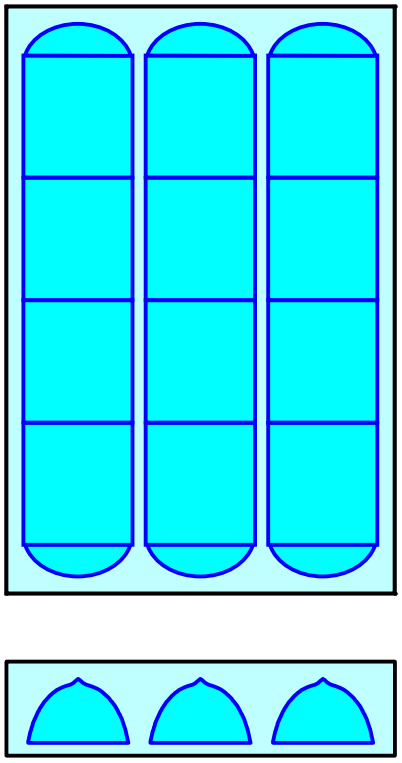
4 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 32.38' Row Length +12.0" End Stone x 2 = 34.38' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

12 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 1,408.8 cf Chamber Storage

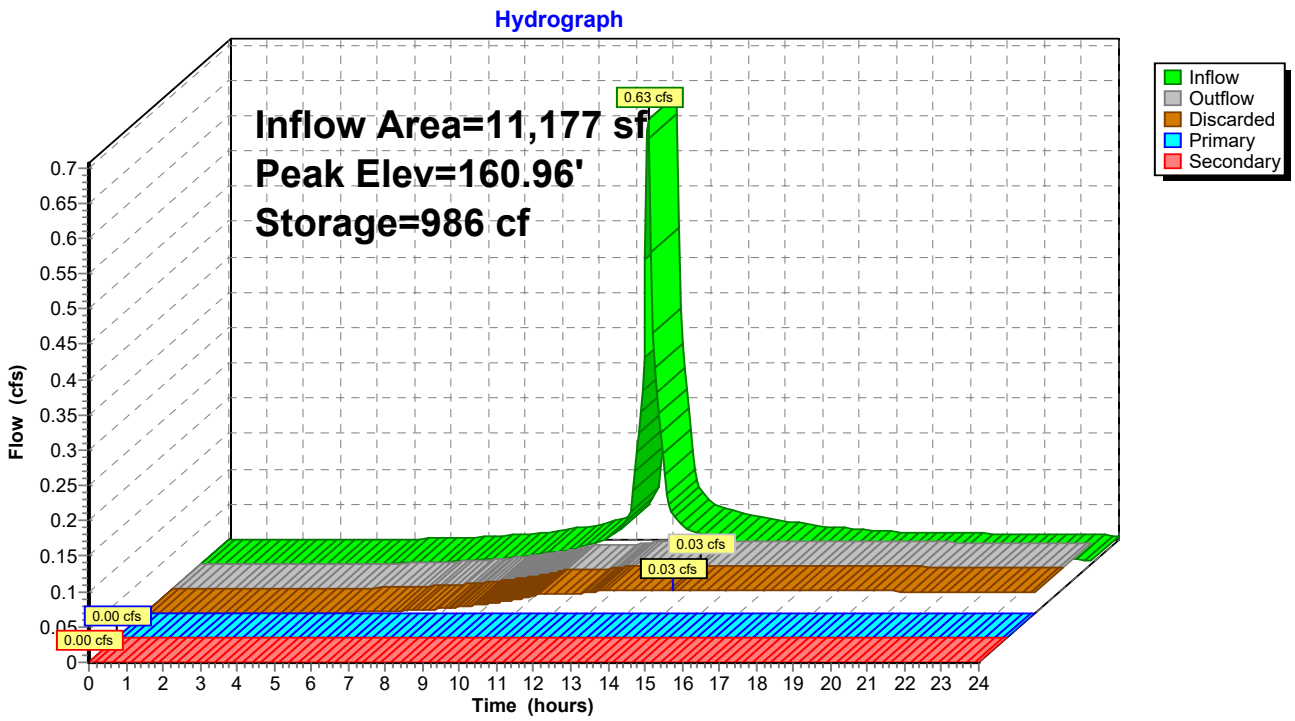
4,301.8 cf Field - 1,408.8 cf Chambers = 2,893.0 cf Stone x 40.0% Voids = 1,157.2 cf Stone Storage

Chamber Storage + Stone Storage = 2,566.0 cf = 0.059 af
Overall Storage Efficiency = 59.6%
Overall System Size = 34.38' x 22.75' x 5.50'

12 Chambers
159.3 cy Field
107.1 cy Stone



Pond INF-1: ADS Stormtech 3500



Stage-Area-Storage for Pond INF-1: ADS Stormtech 3500

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
159.00	**782**	0
159.10	782	31
159.20	782	63
159.30	782	94
159.40	782	125
159.50	782	156
159.60	782	188
159.70	782	219
159.80	782	266
159.90	782	330
160.00	782	393
160.10	782	456
160.20	782	519
160.30	782	581
160.40	782	643
160.50	782	705
160.60	782	767
160.70	782	828
160.80	782	889
160.90	782	950
161.00	782	1,010
161.10	782	1,070
161.20	782	1,129
161.30	782	1,188
161.40	782	1,247
161.50	782	1,304
161.60	782	1,362
161.70	782	1,418
161.80	782	1,474
161.90	782	1,530
162.00	782	1,585
162.10	782	1,638
162.20	782	1,692
162.30	782	1,744
162.40	782	1,795
162.50	782	1,845
162.60	782	1,894
162.70	782	1,942
162.80	782	1,988
162.90	782	2,033
163.00	782	2,076
163.10	782	2,116
163.20	782	2,153
163.30	782	2,188
163.40	782	2,221
163.50	782	2,253
163.60	782	2,284
163.70	782	2,316
163.80	782	2,347
163.90	782	2,378
164.00	782	2,410
164.10	782	2,441
164.20	782	2,472
164.30	782	2,503
164.40	782	2,535
164.50	782	**2,566**
164.60	782	2,566
164.70	782	2,566
164.80	782	2,566
164.90	782	2,566
165.00	782	2,566
165.10	782	2,566
165.20	782	2,566
165.30	782	2,566
165.40	782	2,566
165.50	782	2,566
165.60	782	2,566
165.70	782	2,566

Summary for Pond INF-2: Cultec 330

Inflow Area = 742 sf,100.00% Impervious, Inflow Depth > 2.57" for 1yr Storm event
Inflow = 0.05 cfs @ 12.07 hrs, Volume= 159 cf
Outflow = 0.03 cfs @ 12.10 hrs, Volume= 159 cf, Atten= 25%, Lag= 1.8 min
Discarded = 0.03 cfs @ 12.10 hrs, Volume= 159 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 152.43' @ 12.14 hrs Surf.Area= 288 sf Storage= 8 cf

Plug-Flow detention time= 2.9 min calculated for 159 cf (100% of inflow)
Center-of-Mass det. time= 2.6 min (760.7 - 758.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	152.36'	279 cf	**6.33'W x 45.50'L x 3.54'H Field A** 1,021 cf Overall - 324 cf Embedded = 696 cf x 40.0% Voids
#2A	152.86'	324 cf	**Cultec R-330XLHD** x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		603 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	152.36'	**5.220 in/hr Exfiltration over Surface area**
#2	Primary	157.50'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.10 hrs HW=152.43' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=152.36' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond INF-2: Cultec 330 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

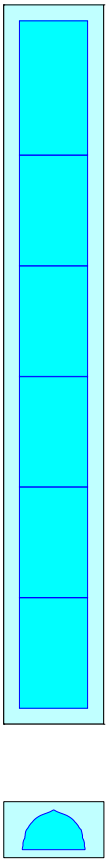
6 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 43.50' Row Length +12.0" End Stone x 2 = 45.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

6 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 324.1 cf Chamber Storage

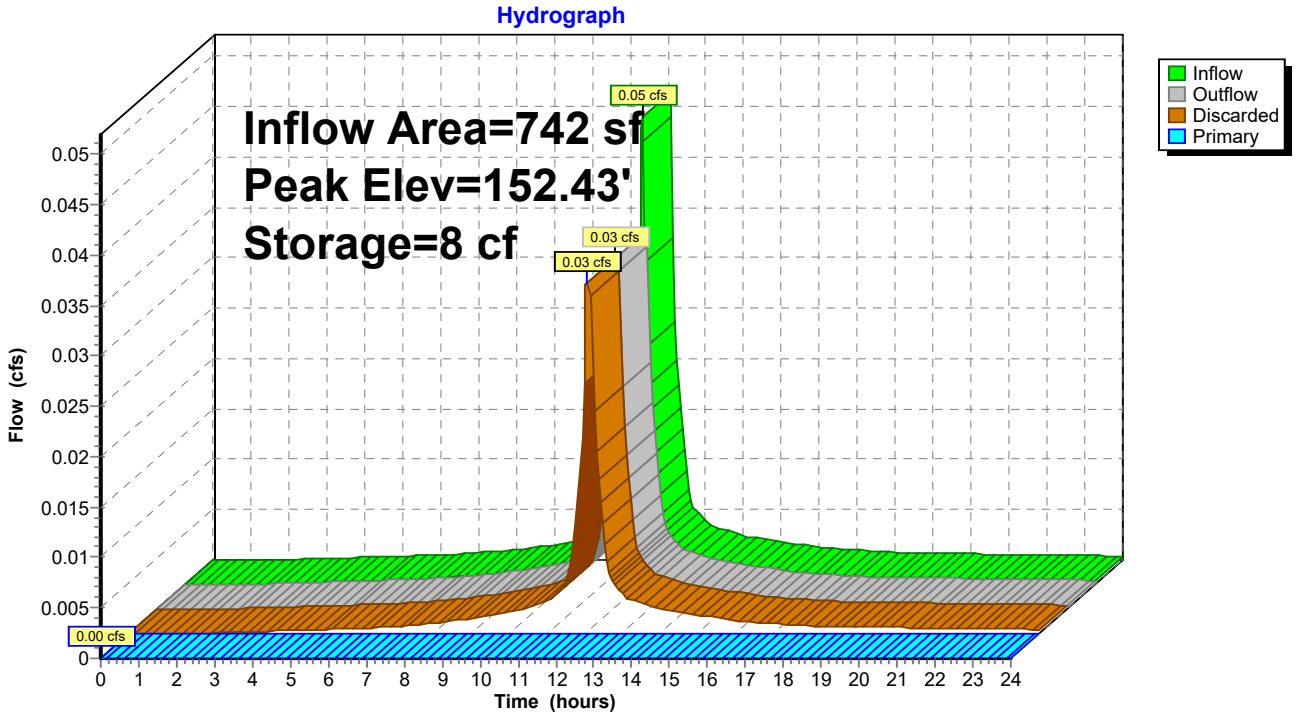
1,020.6 cf Field - 324.1 cf Chambers = 696.5 cf Stone x 40.0% Voids = 278.6 cf Stone Storage

Chamber Storage + Stone Storage = 602.7 cf = 0.014 af
Overall Storage Efficiency = 59.1%
Overall System Size = 45.50' x 6.33' x 3.54'

6 Chambers
37.8 cy Field
25.8 cy Stone



Pond INF-2: Cultec 330



Stage-Area-Storage for Pond INF-2: Cultec 330

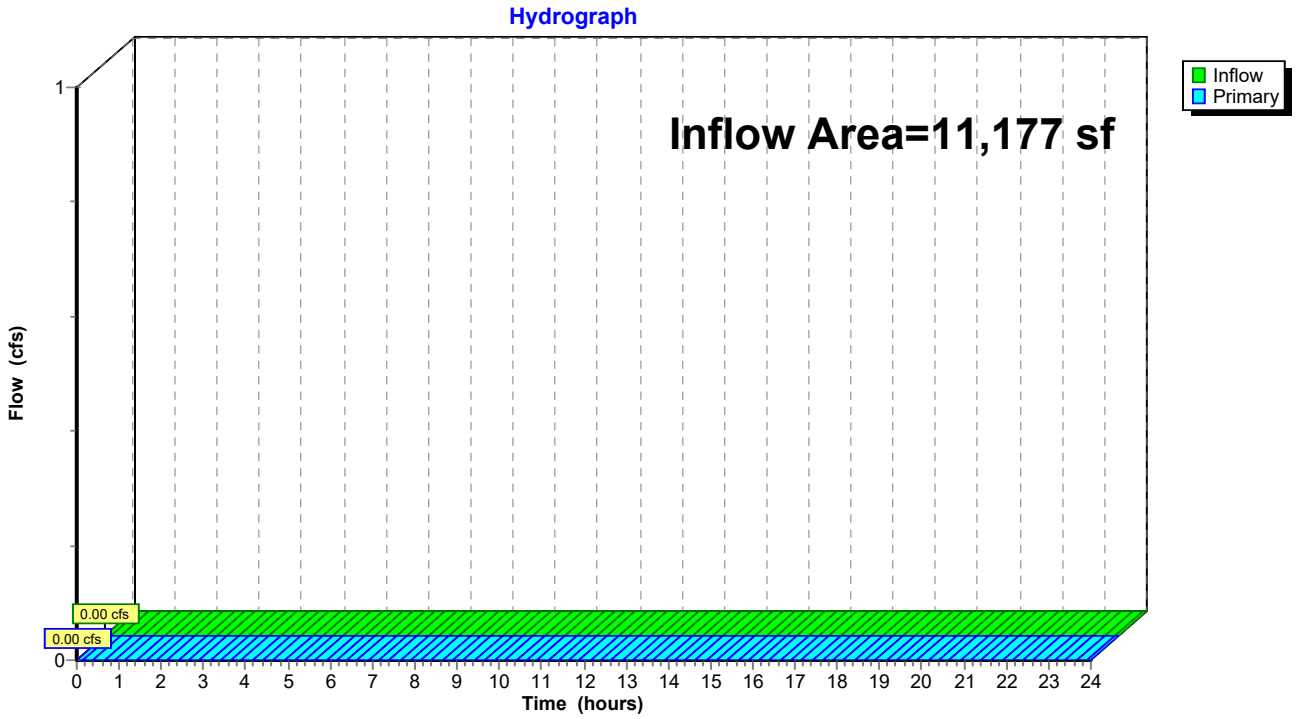
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
152.36	**288**	0
152.46	288	12
152.56	288	23
152.66	288	35
152.76	288	46
152.86	288	58
152.96	288	80
153.06	288	101
153.16	288	123
153.26	288	145
153.36	288	166
153.46	288	188
153.56	288	209
153.66	288	230
153.76	288	251
153.86	288	272
153.96	288	293
154.06	288	314
154.16	288	334
154.26	288	354
154.36	288	374
154.46	288	394
154.56	288	413
154.66	288	431
154.76	288	449
154.86	288	467
154.96	288	484
155.06	288	500
155.16	288	515
155.26	288	528
155.36	288	540
155.46	288	552
155.56	288	563
155.66	288	575
155.76	288	586
155.86	288	**598**
155.96	288	**603**
156.06	288	603
156.16	288	603
156.26	288	603
156.36	288	603
156.46	288	603
156.56	288	603
156.66	288	603
156.76	288	603
156.86	288	603
156.96	288	603
157.06	288	603
157.16	288	603
157.26	288	603
157.36	288	603
157.46	288	603

Summary for Link PR POC 1: EX CB 6

Inflow Area = 11,177 sf, 76.51% Impervious, Inflow Depth = 0.00" for 1yr Storm event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 1: EX CB 6

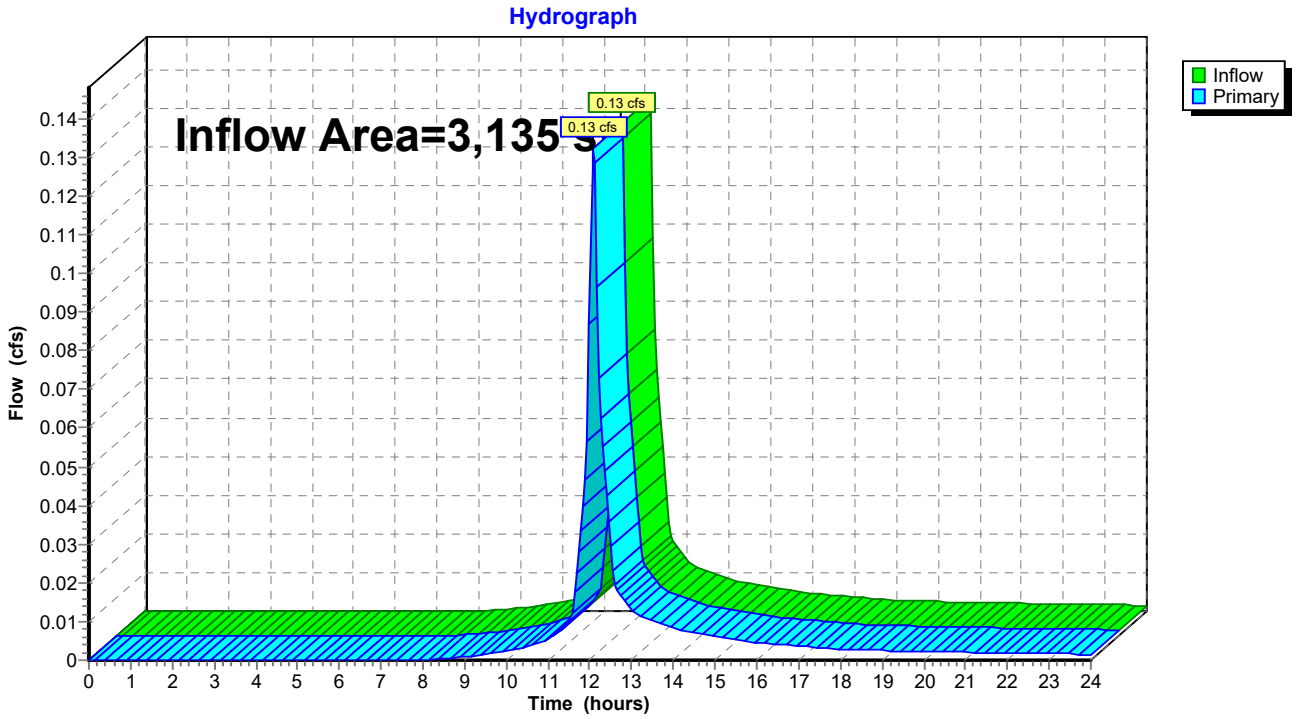


Summary for Link PR POC 2: EX CB 39

Inflow Area = 3,135 sf, 36.43% Impervious, Inflow Depth > 1.56" for 1yr Storm event
Inflow = 0.13 cfs @ 12.08 hrs, Volume= 409 cf
Primary = 0.13 cfs @ 12.08 hrs, Volume= 409 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 2: EX CB 39

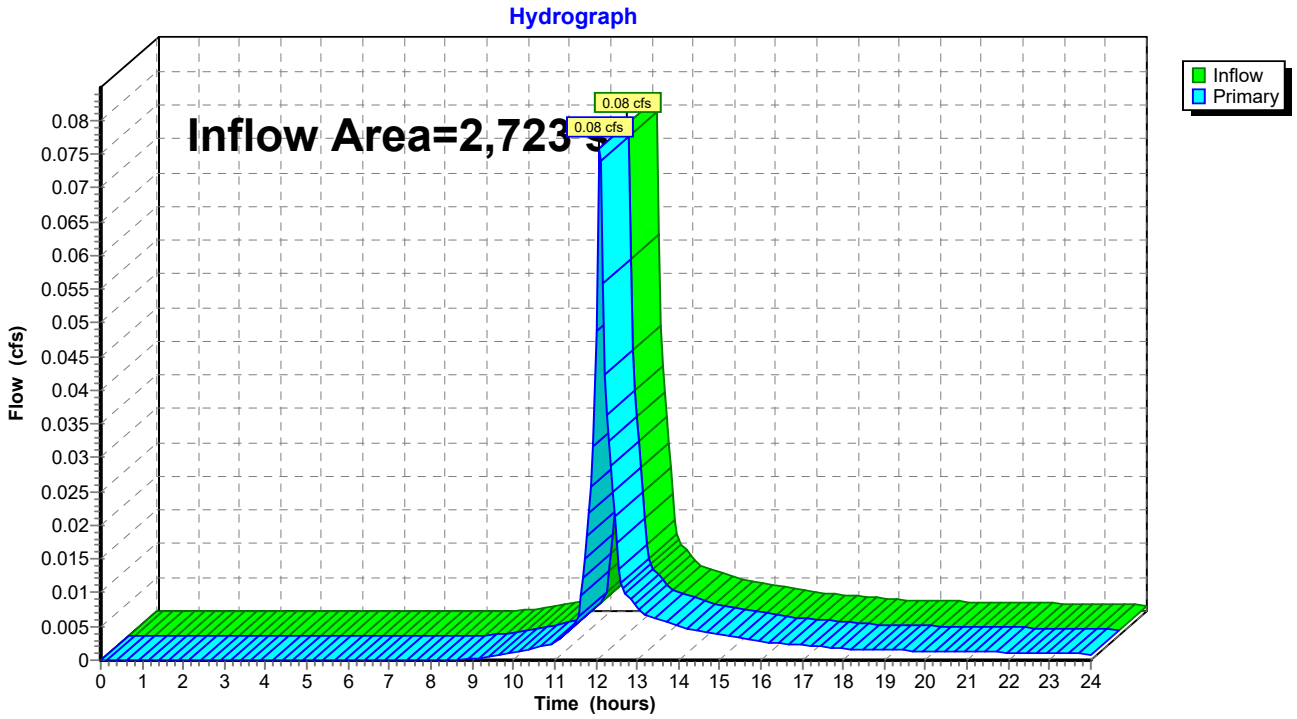


Summary for Link PR POC 3: EX CB 37

Inflow Area = 2,723 sf, 48.62% Impervious, Inflow Depth > 1.03" for 1yr Storm event
Inflow = 0.08 cfs @ 12.08 hrs, Volume= 235 cf
Primary = 0.08 cfs @ 12.08 hrs, Volume= 235 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 3: EX CB 37

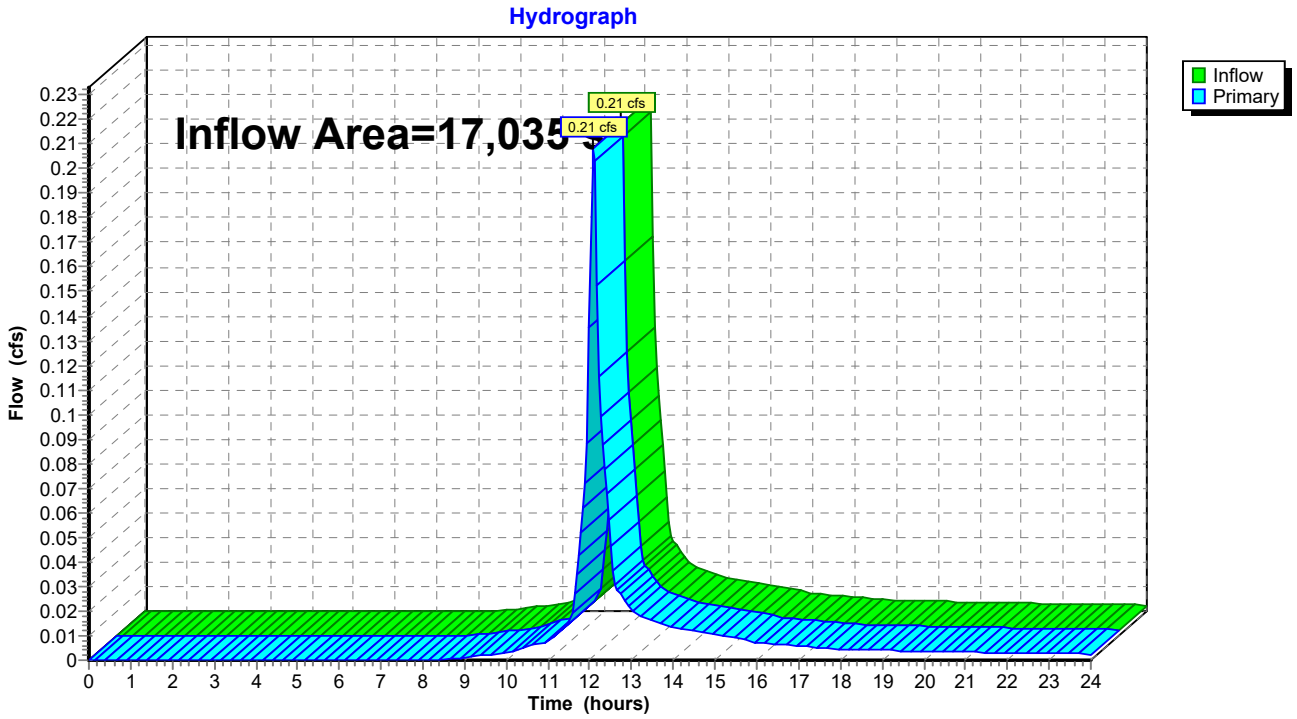


Summary for Link T-PR: Proposed Conditions Overall Discharge

Inflow Area = 17,035 sf, 64.68% Impervious, Inflow Depth > 0.45" for 1yr Storm event
Inflow = 0.21 cfs @ 12.08 hrs, Volume= 643 cf
Primary = 0.21 cfs @ 12.08 hrs, Volume= 643 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link T-PR: Proposed Conditions Overall Discharge



Summary for Subcatchment PR-1: Pr Drainage Area 1

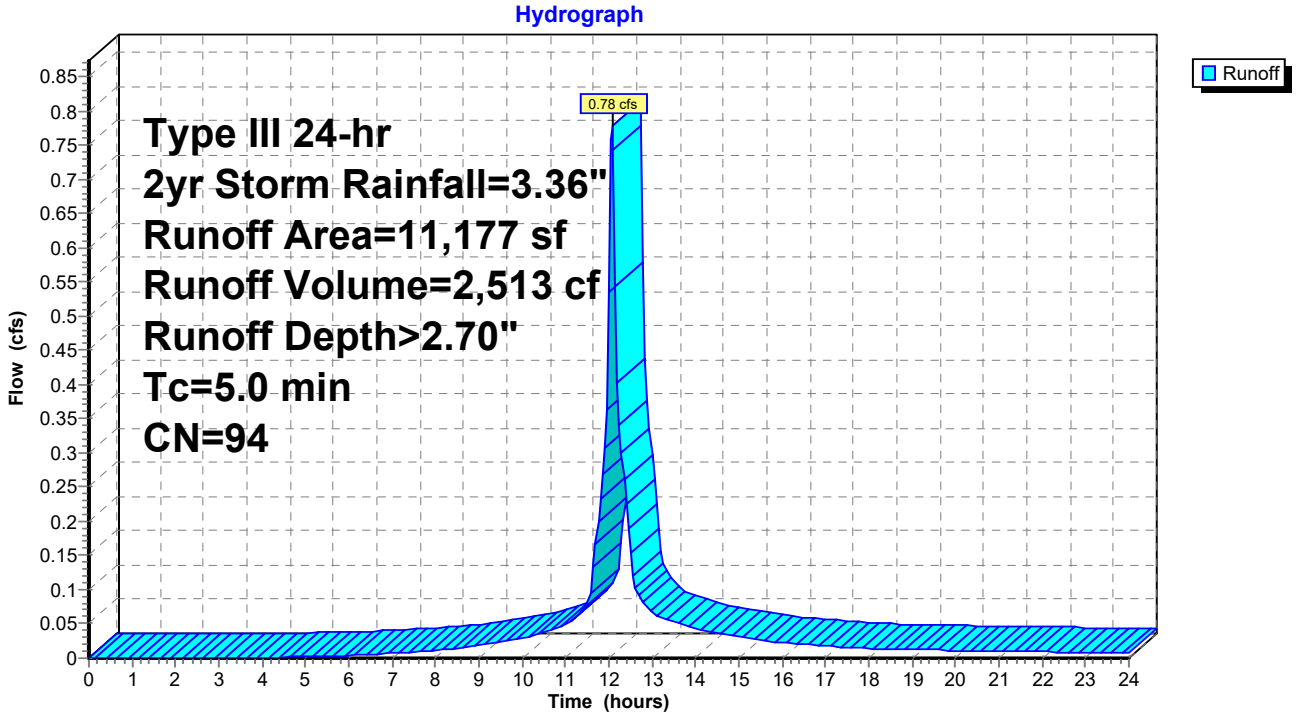
Runoff = 0.78 cfs @ 12.07 hrs, Volume= 2,513 cf, Depth> 2.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2yr Storm Rainfall=3.36"

	Area (sf)	CN	Description
*	5,809	98	Roof Area
*	2,743	98	Hardscape Areas
	2,625	80	>75% Grass cover, Good, HSG D
	11,177	94	Weighted Average
	2,625		23.49% Pervious Area
	8,552		76.51% Impervious Area

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

Subcatchment PR-1: Pr Drainage Area 1



Summary for Subcatchment PR-2A: Pr Drainage Area 2

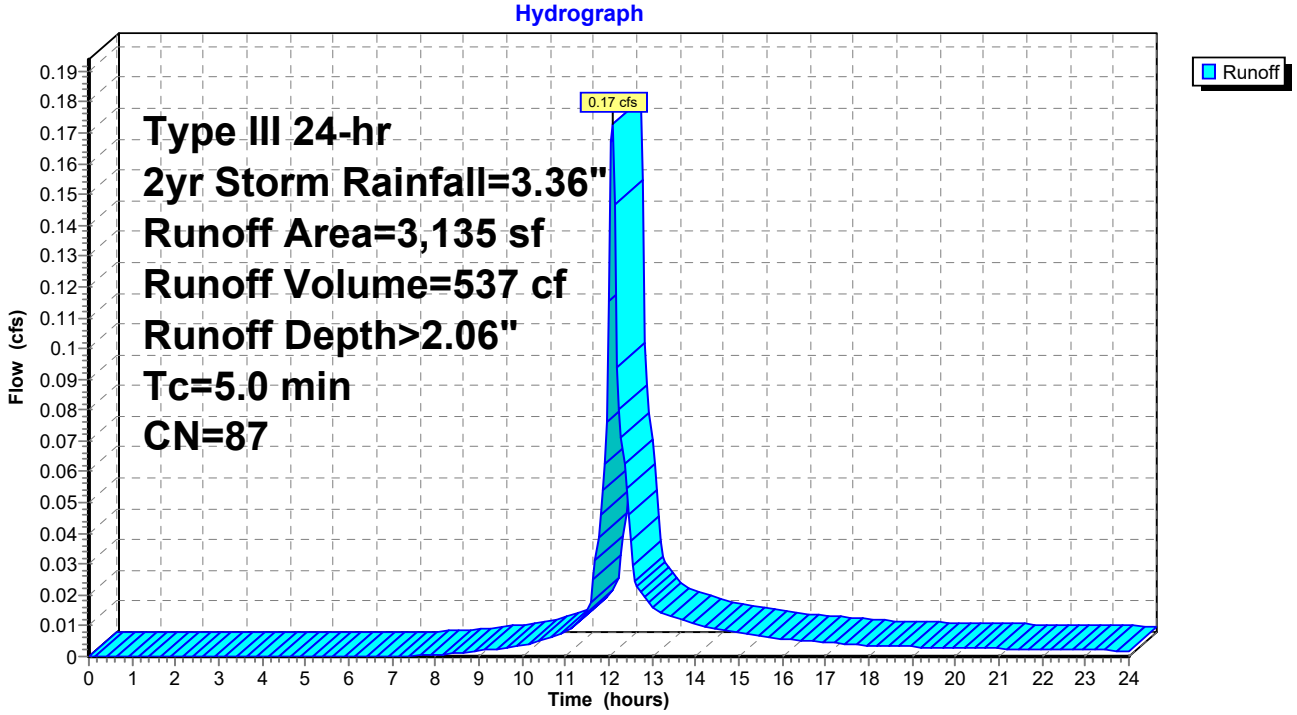
Runoff = 0.17 cfs @ 12.08 hrs, Volume= 537 cf, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2yr Storm Rainfall=3.36"

	Area (sf)	CN	Description
*	1,142	98	Hardscape Area
	1,993	80	>75% Grass cover, Good, HSG D
	3,135	87	Weighted Average
	1,993		63.57% Pervious Area
	1,142		36.43% Impervious Area

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

Subcatchment PR-2A: Pr Drainage Area 2



Summary for Subcatchment PR-3A: Pr Drainage Area 3

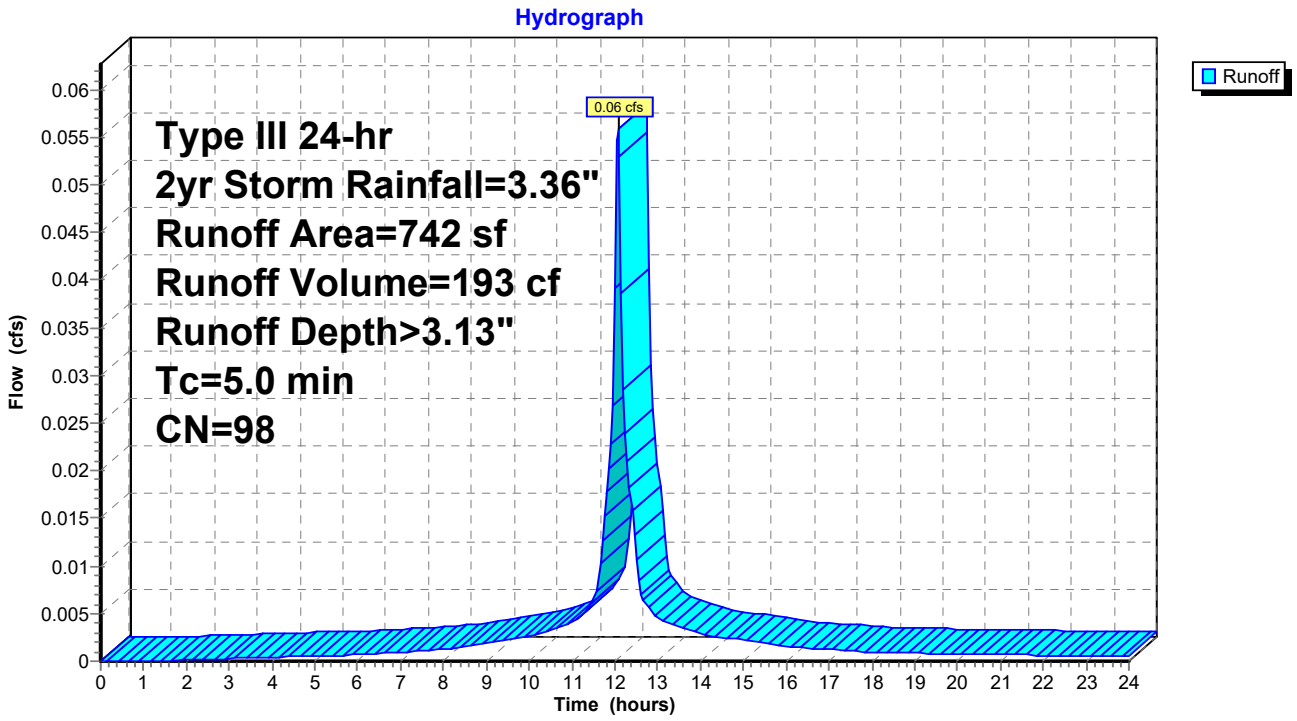
Runoff = 0.06 cfs @ 12.07 hrs, Volume= 193 cf, Depth> 3.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2yr Storm Rainfall=3.36"

	Area (sf)	CN	Description
*	742	98	Roof Area
	742		100.00% Impervious Area

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

Subcatchment PR-3A: Pr Drainage Area 3



Summary for Subcatchment PR-3B: Pr Drainage Area 3

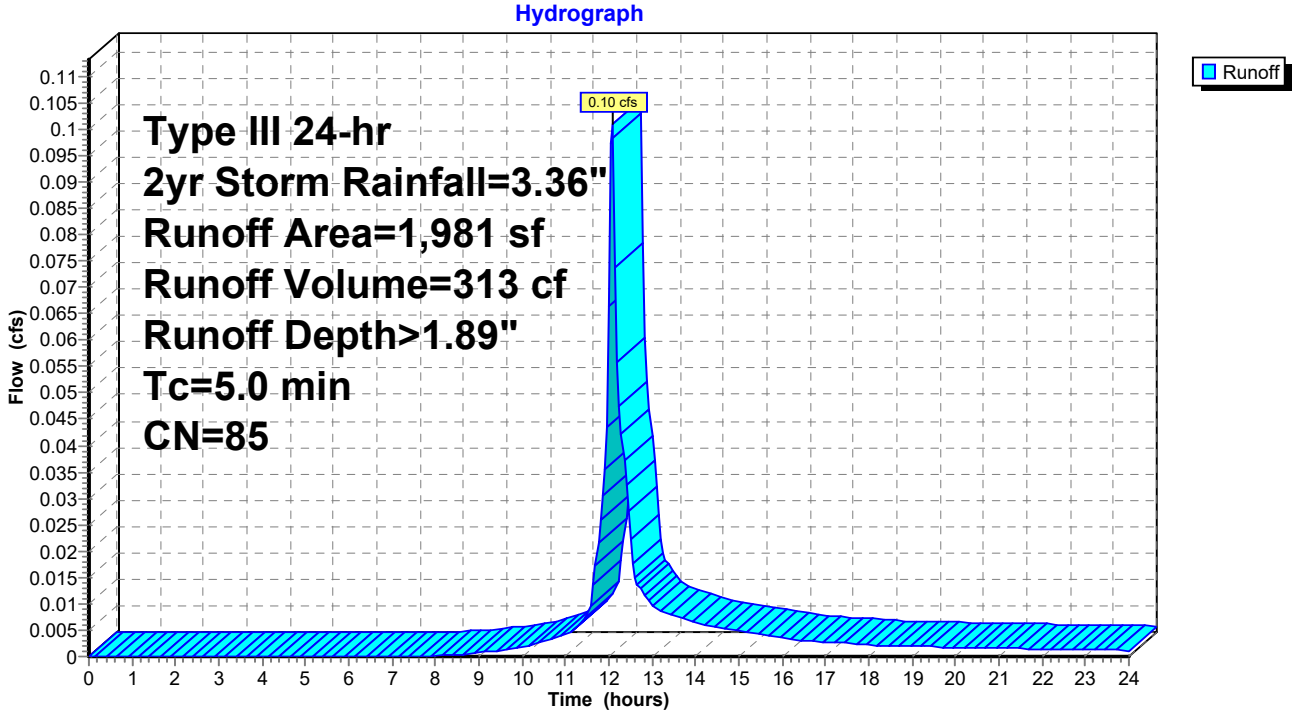
Runoff = 0.10 cfs @ 12.08 hrs, Volume= 313 cf, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2yr Storm Rainfall=3.36"

	Area (sf)	CN	Description
*	582	98	Hardscape Area
	1,399	80	>75% Grass cover, Good, HSG D
	1,981	85	Weighted Average
	1,399		70.62% Pervious Area
	582		29.38% Impervious Area

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

Subcatchment PR-3B: Pr Drainage Area 3



Summary for Pond INF-1: ADS Stormtech 3500

Inflow Area =	11,177 sf, 76.51% Impervious, Inflow Depth > 2.70" for 2yr Storm event				
Inflow =	0.78 cfs @	12.07 hrs,	Volume=	2,513 cf	
Outflow =	0.03 cfs @	14.81 hrs,	Volume=	1,810 cf,	Atten= 96%, Lag= 164.1 min
Discarded =	0.03 cfs @	14.81 hrs,	Volume=	1,810 cf	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 6
Peak Elev= 161.53' @ 14.81 hrs Surf.Area= 782 sf Storage= 1,320 cf

Plug-Flow detention time= 277.7 min calculated for 1,810 cf (72% of inflow)
Center-of-Mass det. time= 188.8 min (973.1 - 784.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	159.00'	1,157 cf	**22.75'W x 34.38'L x 5.50'H Field A** 4,302 cf Overall - 1,409 cf Embedded = 2,893 cf x 40.0% Voids
#2A	159.75'	1,409 cf	**ADS_StormTech MC-3500 d +Cap**x 12 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 12 Chambers in 3 Rows Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf
		2,566 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	159.00'	**1.500 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 149.00'
#2	Secondary	165.75'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	162.00'	**12.0" Round Culvert to CB 6** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 161.80' / 162.00' S= -0.0143 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#4	Device 3	161.80'	**6.0" Vert. LFO** C= 0.600 Limited to weir flow at low heads
#5	Secondary	164.75'	**6.0" Vert. HLO** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 14.81 hrs HW=161.53' (Free Discharge)
└─**1=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=159.00' (Free Discharge)
└─**3=Culvert to CB 6** (Controls 0.00 cfs)
  └─**4=LFO** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=159.00' (Free Discharge)
├─**2=Orifice/Grate** (Controls 0.00 cfs)
└─**5=HLO** (Controls 0.00 cfs)

Pond INF-1: ADS Stormtech 3500 - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

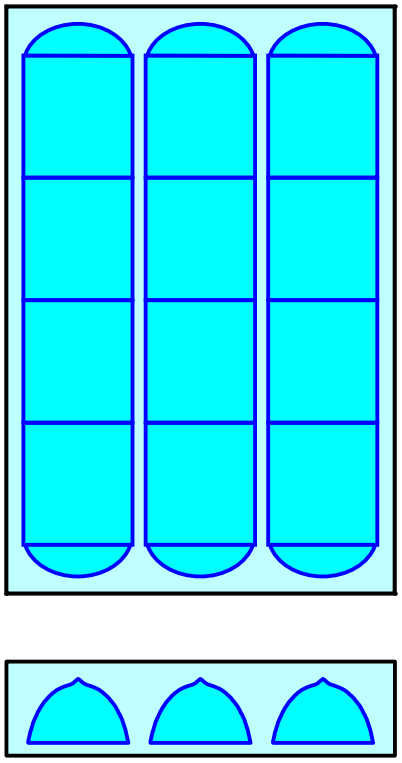
4 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 32.38' Row Length +12.0" End Stone x 2 = 34.38' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

12 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 1,408.8 cf Chamber Storage

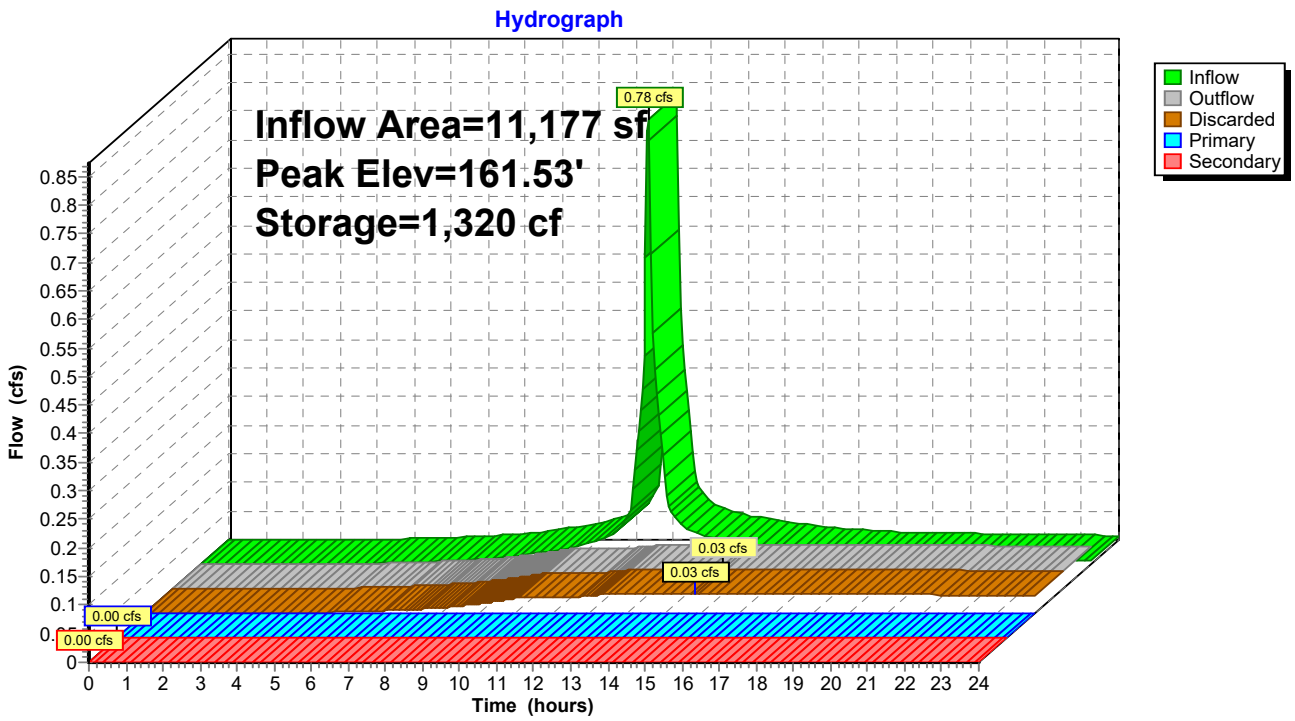
4,301.8 cf Field - 1,408.8 cf Chambers = 2,893.0 cf Stone x 40.0% Voids = 1,157.2 cf Stone Storage

Chamber Storage + Stone Storage = 2,566.0 cf = 0.059 af
Overall Storage Efficiency = 59.6%
Overall System Size = 34.38' x 22.75' x 5.50'

12 Chambers
159.3 cy Field
107.1 cy Stone



Pond INF-1: ADS Stormtech 3500



Stage-Area-Storage for Pond INF-1: ADS Stormtech 3500

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
159.00	**782**	0
159.10	782	31
159.20	782	63
159.30	782	94
159.40	782	125
159.50	782	156
159.60	782	188
159.70	782	219
159.80	782	266
159.90	782	330
160.00	782	393
160.10	782	456
160.20	782	519
160.30	782	581
160.40	782	643
160.50	782	705
160.60	782	767
160.70	782	828
160.80	782	889
160.90	782	950
161.00	782	1,010
161.10	782	1,070
161.20	782	1,129
161.30	782	1,188
161.40	782	1,247
161.50	782	1,304
161.60	782	1,362
161.70	782	1,418
161.80	782	1,474
161.90	782	1,530
162.00	782	1,585
162.10	782	1,638
162.20	782	1,692
162.30	782	1,744
162.40	782	1,795
162.50	782	1,845
162.60	782	1,894
162.70	782	1,942
162.80	782	1,988
162.90	782	2,033
163.00	782	2,076
163.10	782	2,116
163.20	782	2,153
163.30	782	2,188
163.40	782	2,221
163.50	782	2,253
163.60	782	2,284
163.70	782	2,316
163.80	782	2,347
163.90	782	2,378
164.00	782	2,410
164.10	782	2,441
164.20	782	2,472
164.30	782	2,503
164.40	782	2,535
164.50	782	**2,566**
164.60	782	2,566
164.70	782	2,566
164.80	782	2,566
164.90	782	2,566
165.00	782	2,566
165.10	782	2,566
165.20	782	2,566
165.30	782	2,566
165.40	782	2,566
165.50	782	2,566
165.60	782	2,566
165.70	782	2,566

Summary for Pond INF-2: Cultec 330

Inflow Area = 742 sf,100.00% Impervious, Inflow Depth > 3.13" for 2yr Storm event
Inflow = 0.06 cfs @ 12.07 hrs, Volume= 193 cf
Outflow = 0.03 cfs @ 12.05 hrs, Volume= 193 cf, Atten= 38%, Lag= 0.0 min
Discarded = 0.03 cfs @ 12.05 hrs, Volume= 193 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 152.48' @ 12.17 hrs Surf.Area= 288 sf Storage= 13 cf

Plug-Flow detention time= 3.3 min calculated for 193 cf (100% of inflow)
Center-of-Mass det. time= 3.0 min (757.1 - 754.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	152.36'	279 cf	**6.33'W x 45.50'L x 3.54'H Field A** 1,021 cf Overall - 324 cf Embedded = 696 cf x 40.0% Voids
#2A	152.86'	324 cf	**Cultec R-330XLHD** x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		603 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	152.36'	**5.220 in/hr Exfiltration over Surface area**
#2	Primary	157.50'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.05 hrs HW=152.43' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=152.36' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond INF-2: Cultec 330 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

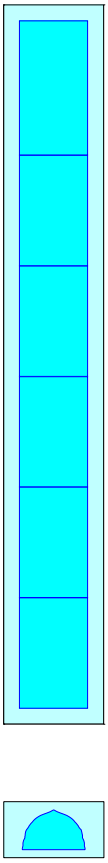
6 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 43.50' Row Length +12.0" End Stone x 2 = 45.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

6 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 324.1 cf Chamber Storage

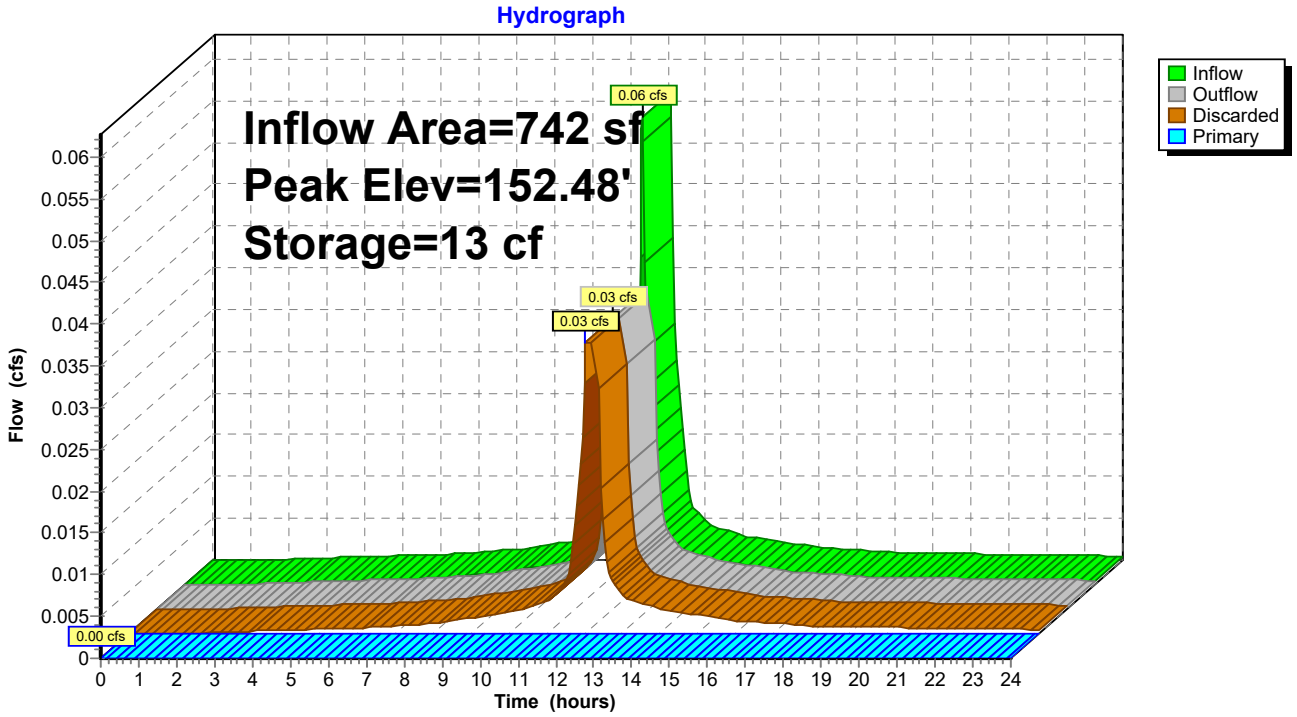
1,020.6 cf Field - 324.1 cf Chambers = 696.5 cf Stone x 40.0% Voids = 278.6 cf Stone Storage

Chamber Storage + Stone Storage = 602.7 cf = 0.014 af
Overall Storage Efficiency = 59.1%
Overall System Size = 45.50' x 6.33' x 3.54'

6 Chambers
37.8 cy Field
25.8 cy Stone



Pond INF-2: Cultec 330



Stage-Area-Storage for Pond INF-2: Cultec 330

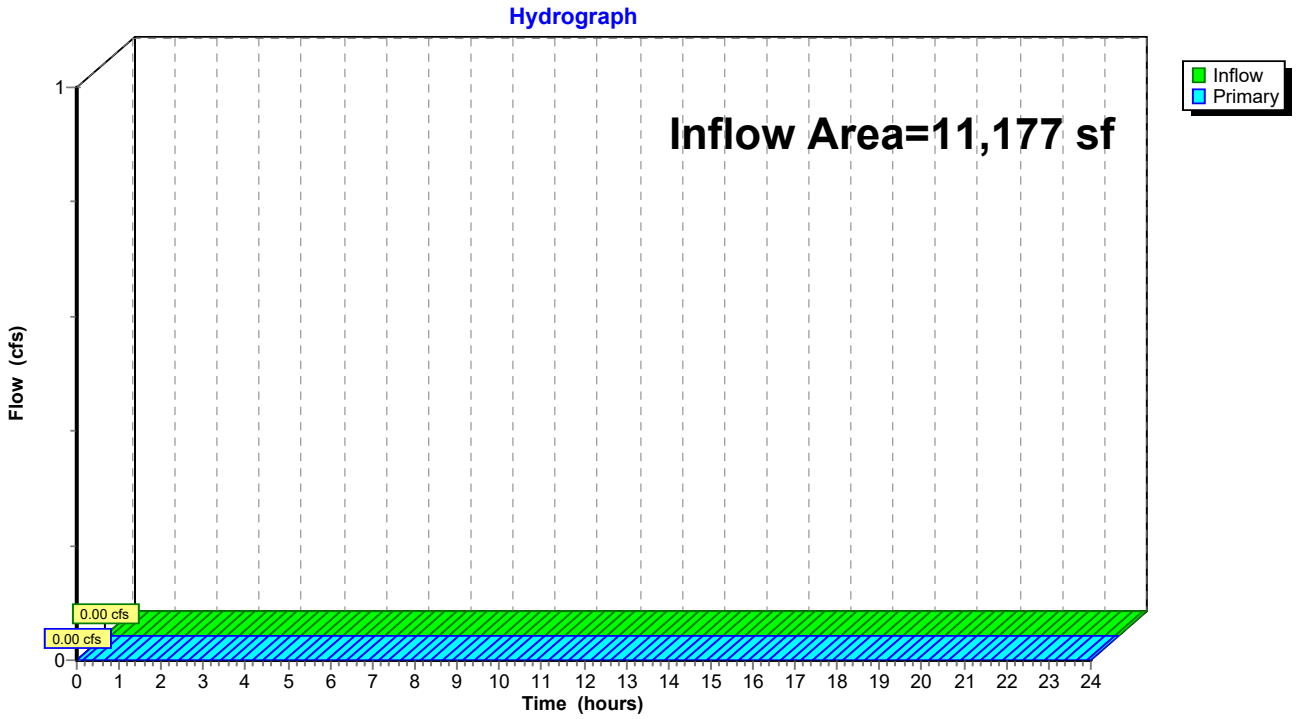
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
152.36	**288**	0
152.46	288	12
152.56	288	23
152.66	288	35
152.76	288	46
152.86	288	58
152.96	288	80
153.06	288	101
153.16	288	123
153.26	288	145
153.36	288	166
153.46	288	188
153.56	288	209
153.66	288	230
153.76	288	251
153.86	288	272
153.96	288	293
154.06	288	314
154.16	288	334
154.26	288	354
154.36	288	374
154.46	288	394
154.56	288	413
154.66	288	431
154.76	288	449
154.86	288	467
154.96	288	484
155.06	288	500
155.16	288	515
155.26	288	528
155.36	288	540
155.46	288	552
155.56	288	563
155.66	288	575
155.76	288	586
155.86	288	**598**
155.96	288	**603**
156.06	288	603
156.16	288	603
156.26	288	603
156.36	288	603
156.46	288	603
156.56	288	603
156.66	288	603
156.76	288	603
156.86	288	603
156.96	288	603
157.06	288	603
157.16	288	603
157.26	288	603
157.36	288	603
157.46	288	603

Summary for Link PR POC 1: EX CB 6

Inflow Area = 11,177 sf, 76.51% Impervious, Inflow Depth = 0.00" for 2yr Storm event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 1: EX CB 6

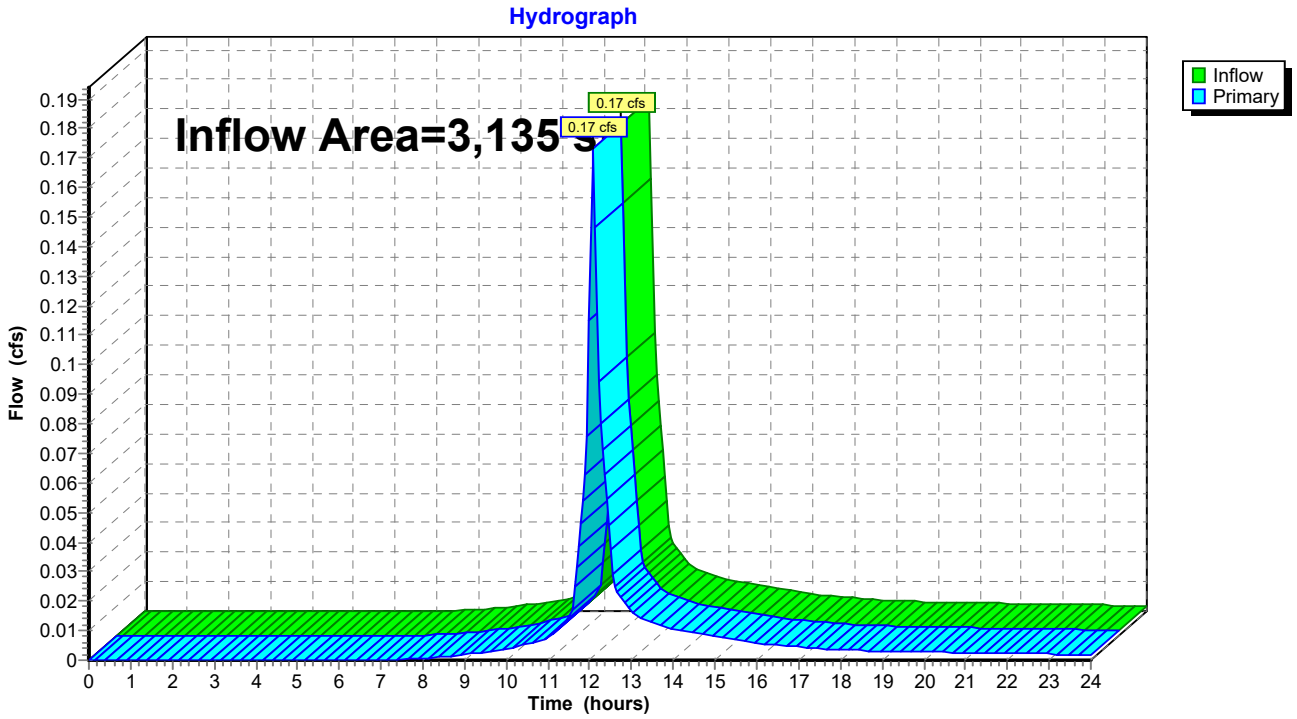


Summary for Link PR POC 2: EX CB 39

Inflow Area = 3,135 sf, 36.43% Impervious, Inflow Depth > 2.06" for 2yr Storm event
Inflow = 0.17 cfs @ 12.08 hrs, Volume= 537 cf
Primary = 0.17 cfs @ 12.08 hrs, Volume= 537 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 2: EX CB 39

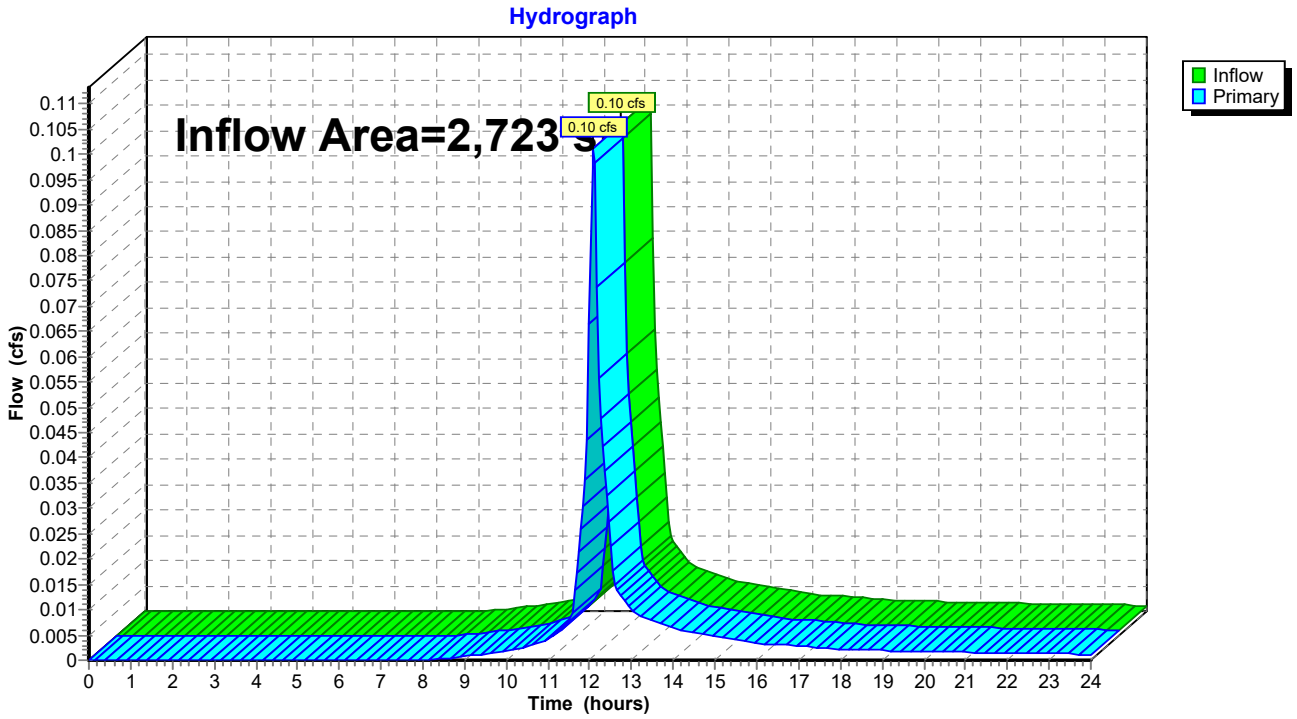


Summary for Link PR POC 3: EX CB 37

Inflow Area = 2,723 sf, 48.62% Impervious, Inflow Depth > 1.38" for 2yr Storm event
Inflow = 0.10 cfs @ 12.08 hrs, Volume= 313 cf
Primary = 0.10 cfs @ 12.08 hrs, Volume= 313 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 3: EX CB 37

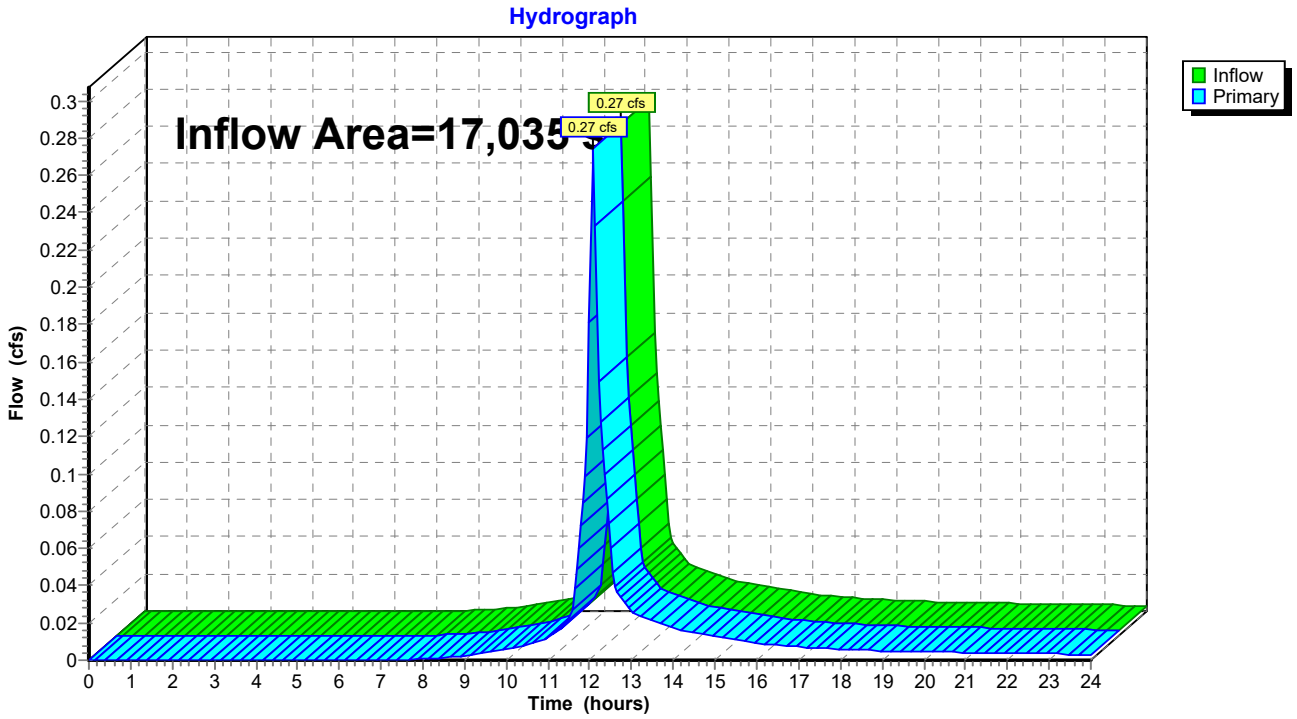


Summary for Link T-PR: Proposed Conditions Overall Discharge

Inflow Area = 17,035 sf, 64.68% Impervious, Inflow Depth > 0.60" for 2yr Storm event
Inflow = 0.27 cfs @ 12.08 hrs, Volume= 850 cf
Primary = 0.27 cfs @ 12.08 hrs, Volume= 850 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link T-PR: Proposed Conditions Overall Discharge



Summary for Subcatchment PR-1: Pr Drainage Area 1

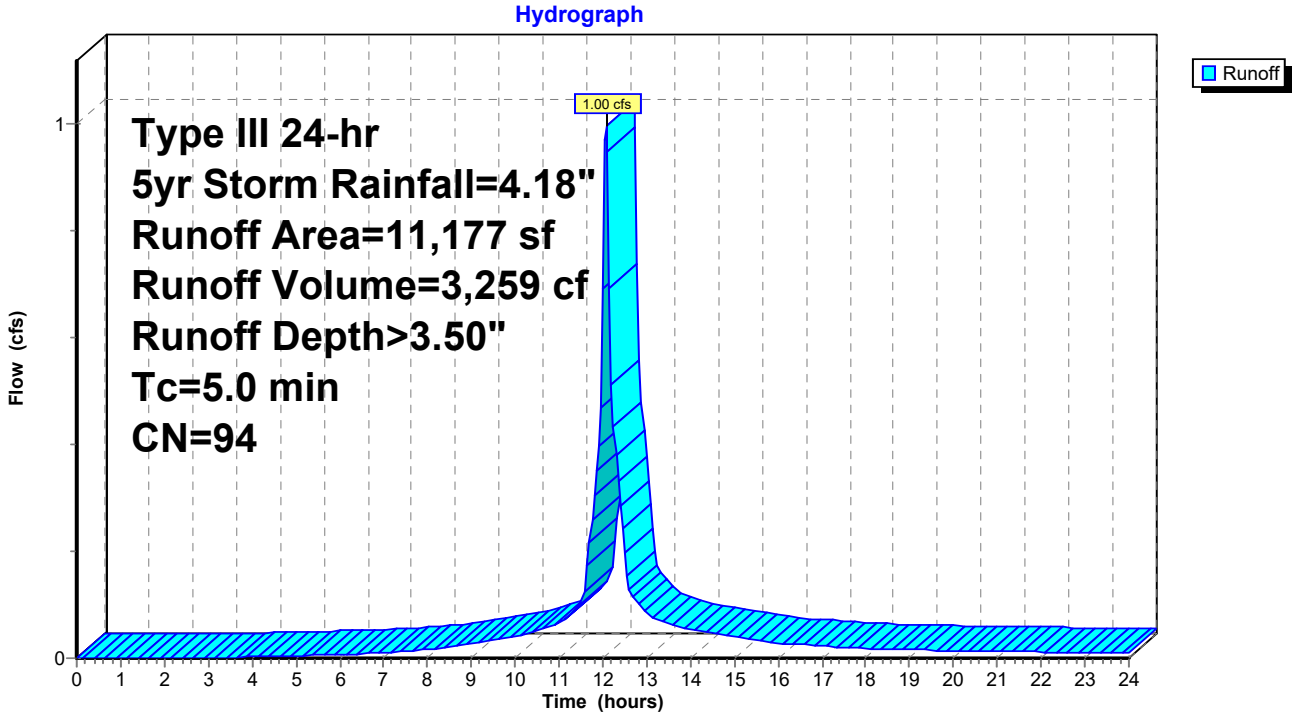
Runoff = 1.00 cfs @ 12.07 hrs, Volume= 3,259 cf, Depth> 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 5yr Storm Rainfall=4.18"

	Area (sf)	CN	Description
*	5,809	98	Roof Area
*	2,743	98	Hardscape Areas
	2,625	80	>75% Grass cover, Good, HSG D
	11,177	94	Weighted Average
	2,625		23.49% Pervious Area
	8,552		76.51% Impervious Area

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

Subcatchment PR-1: Pr Drainage Area 1



Summary for Subcatchment PR-2A: Pr Drainage Area 2

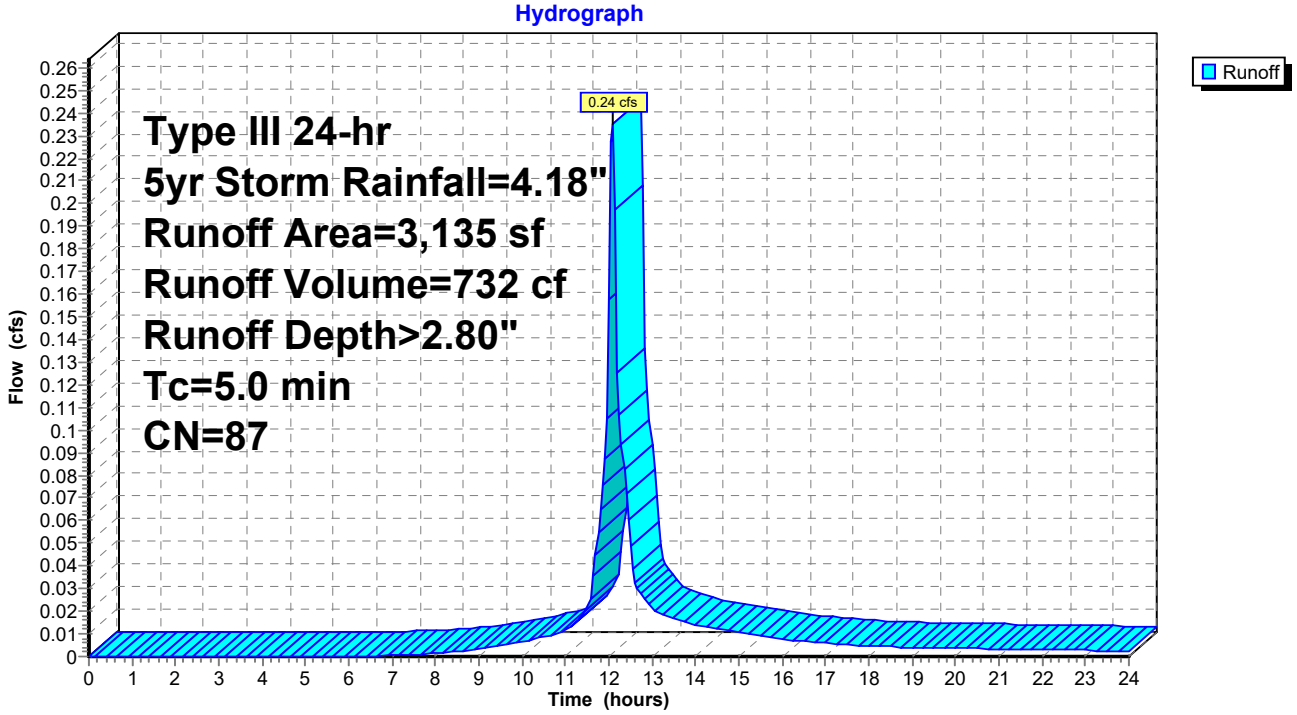
Runoff = 0.24 cfs @ 12.07 hrs, Volume= 732 cf, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 5yr Storm Rainfall=4.18"

	Area (sf)	CN	Description
*	1,142	98	Hardscape Area
	1,993	80	>75% Grass cover, Good, HSG D
	3,135	87	Weighted Average
	1,993		63.57% Pervious Area
	1,142		36.43% Impervious Area

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

Subcatchment PR-2A: Pr Drainage Area 2



Summary for Subcatchment PR-3A: Pr Drainage Area 3

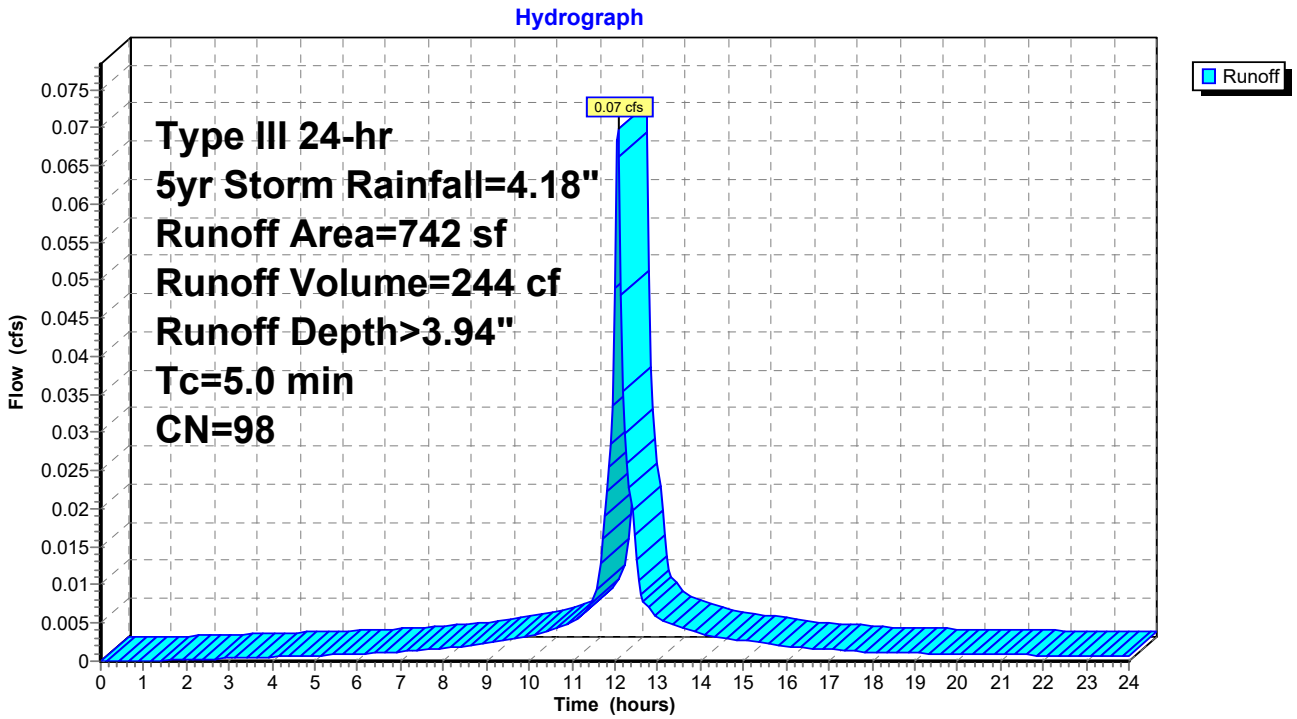
Runoff = 0.07 cfs @ 12.07 hrs, Volume= 244 cf, Depth> 3.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 5yr Storm Rainfall=4.18"

	Area (sf)	CN	Description
*	742	98	Roof Area
	742		100.00% Impervious Area

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

Subcatchment PR-3A: Pr Drainage Area 3



Summary for Subcatchment PR-3B: Pr Drainage Area 3

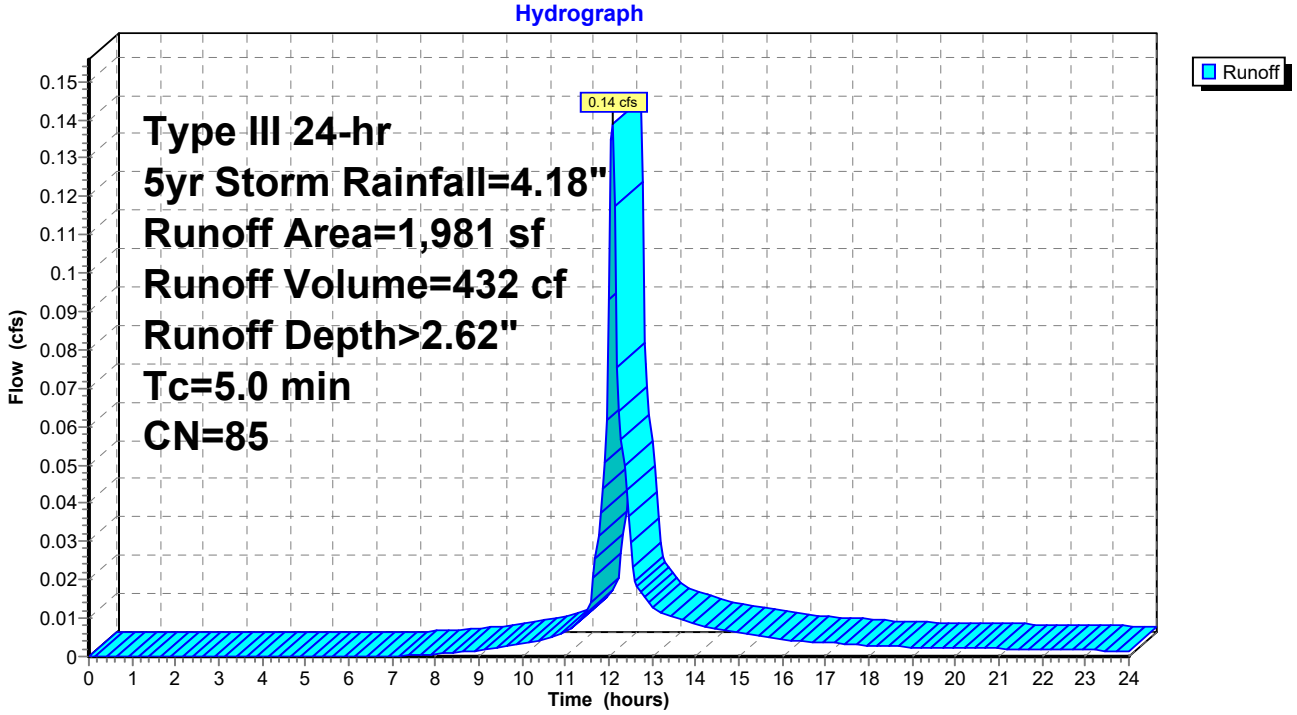
Runoff = 0.14 cfs @ 12.08 hrs, Volume= 432 cf, Depth> 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 5yr Storm Rainfall=4.18"

	Area (sf)	CN	Description
*	582	98	Hardscape Area
	1,399	80	>75% Grass cover, Good, HSG D
	1,981	85	Weighted Average
	1,399		70.62% Pervious Area
	582		29.38% Impervious Area

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

Subcatchment PR-3B: Pr Drainage Area 3



Summary for Pond INF-1: ADS Stormtech 3500

Inflow Area =	11,177 sf, 76.51% Impervious, Inflow Depth > 3.50" for 5yr Storm event				
Inflow =	1.00 cfs @	12.07 hrs,	Volume=	3,259 cf	
Outflow =	0.09 cfs @	12.99 hrs,	Volume=	2,216 cf,	Atten= 91%, Lag= 54.9 min
Discarded =	0.04 cfs @	12.99 hrs,	Volume=	1,964 cf	
Primary =	0.05 cfs @	12.99 hrs,	Volume=	252 cf	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 6
Peak Elev= 162.12' @ 12.99 hrs Surf.Area= 782 sf Storage= 1,648 cf

Plug-Flow detention time= 255.9 min calculated for 2,216 cf (68% of inflow)
Center-of-Mass det. time= 161.6 min (939.1 - 777.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	159.00'	1,157 cf	**22.75'W x 34.38'L x 5.50'H Field A** 4,302 cf Overall - 1,409 cf Embedded = 2,893 cf x 40.0% Voids
#2A	159.75'	1,409 cf	**ADS_StormTech MC-3500 d +Cap**x 12 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 12 Chambers in 3 Rows Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf
		2,566 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	159.00'	**1.500 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 149.00'
#2	Secondary	165.75'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	162.00'	**12.0" Round Culvert to CB 6** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 161.80' / 162.00' S= -0.0143 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#4	Device 3	161.80'	**6.0" Vert. LFO** C= 0.600 Limited to weir flow at low heads
#5	Secondary	164.75'	**6.0" Vert. HLO** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.99 hrs HW=162.12' (Free Discharge)
└─**1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.05 cfs @ 12.99 hrs HW=162.12' (Free Discharge)
└─**3=Culvert to CB 6** (Inlet Controls 0.05 cfs @ 0.92 fps)
  └─**4=LFO** (Passes 0.05 cfs of 0.22 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=159.00' (Free Discharge)
├─**2=Orifice/Grate** (Controls 0.00 cfs)
└─**5=HLO** (Controls 0.00 cfs)

Pond INF-1: ADS Stormtech 3500 - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

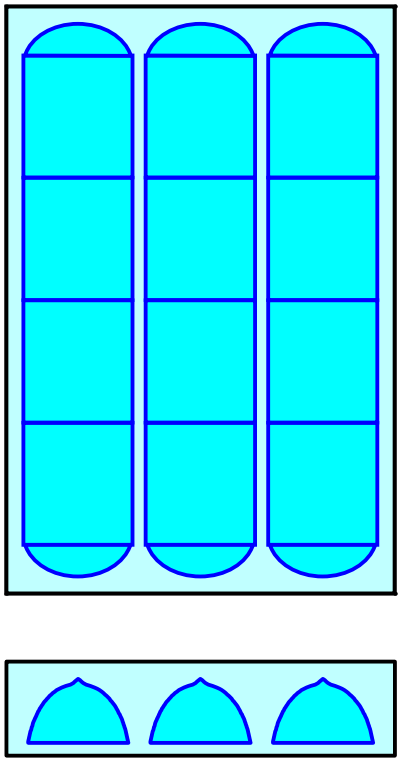
4 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 32.38' Row Length +12.0" End Stone x 2 = 34.38' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

12 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 1,408.8 cf Chamber Storage

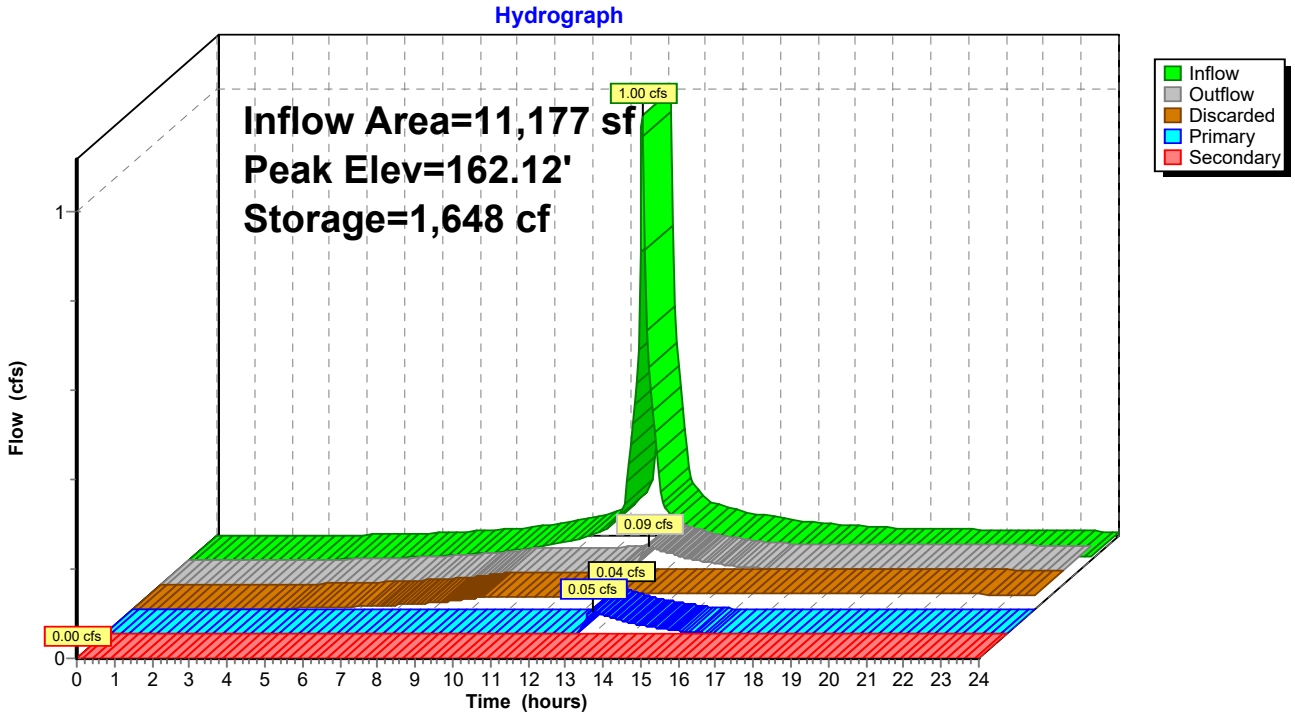
4,301.8 cf Field - 1,408.8 cf Chambers = 2,893.0 cf Stone x 40.0% Voids = 1,157.2 cf Stone Storage

Chamber Storage + Stone Storage = 2,566.0 cf = 0.059 af
Overall Storage Efficiency = 59.6%
Overall System Size = 34.38' x 22.75' x 5.50'

12 Chambers
159.3 cy Field
107.1 cy Stone



Pond INF-1: ADS Stormtech 3500



Stage-Area-Storage for Pond INF-1: ADS Stormtech 3500

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
159.00	**782**	0
159.10	782	31
159.20	782	63
159.30	782	94
159.40	782	125
159.50	782	156
159.60	782	188
159.70	782	219
159.80	782	266
159.90	782	330
160.00	782	393
160.10	782	456
160.20	782	519
160.30	782	581
160.40	782	643
160.50	782	705
160.60	782	767
160.70	782	828
160.80	782	889
160.90	782	950
161.00	782	1,010
161.10	782	1,070
161.20	782	1,129
161.30	782	1,188
161.40	782	1,247
161.50	782	1,304
161.60	782	1,362
161.70	782	1,418
161.80	782	1,474
161.90	782	1,530
162.00	782	1,585
162.10	782	1,638
162.20	782	1,692
162.30	782	1,744
162.40	782	1,795
162.50	782	1,845
162.60	782	1,894
162.70	782	1,942
162.80	782	1,988
162.90	782	2,033
163.00	782	2,076
163.10	782	2,116
163.20	782	2,153
163.30	782	2,188
163.40	782	2,221
163.50	782	2,253
163.60	782	2,284
163.70	782	2,316
163.80	782	2,347
163.90	782	2,378
164.00	782	2,410
164.10	782	2,441
164.20	782	2,472
164.30	782	2,503
164.40	782	2,535
164.50	782	**2,566**
164.60	782	2,566
164.70	782	2,566
164.80	782	2,566
164.90	782	2,566
165.00	782	2,566
165.10	782	2,566
165.20	782	2,566
165.30	782	2,566
165.40	782	2,566
165.50	782	2,566
165.60	782	2,566
165.70	782	2,566

Summary for Pond INF-2: Cultec 330

Inflow Area = 742 sf,100.00% Impervious, Inflow Depth > 3.94" for 5yr Storm event
Inflow = 0.07 cfs @ 12.07 hrs, Volume= 244 cf
Outflow = 0.03 cfs @ 12.00 hrs, Volume= 244 cf, Atten= 50%, Lag= 0.0 min
Discarded = 0.03 cfs @ 12.00 hrs, Volume= 244 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 152.55' @ 12.21 hrs Surf.Area= 288 sf Storage= 22 cf

Plug-Flow detention time= 4.2 min calculated for 244 cf (100% of inflow)
Center-of-Mass det. time= 3.9 min (753.8 - 749.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	152.36'	279 cf	**6.33'W x 45.50'L x 3.54'H Field A** 1,021 cf Overall - 324 cf Embedded = 696 cf x 40.0% Voids
#2A	152.86'	324 cf	**Cultec R-330XLHD** x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		603 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	152.36'	**5.220 in/hr Exfiltration over Surface area**
#2	Primary	157.50'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.00 hrs HW=152.42' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=152.36' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond INF-2: Cultec 330 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

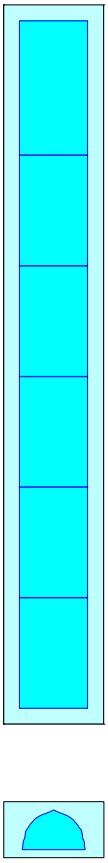
6 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 43.50' Row Length +12.0" End Stone x 2 = 45.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

6 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 324.1 cf Chamber Storage

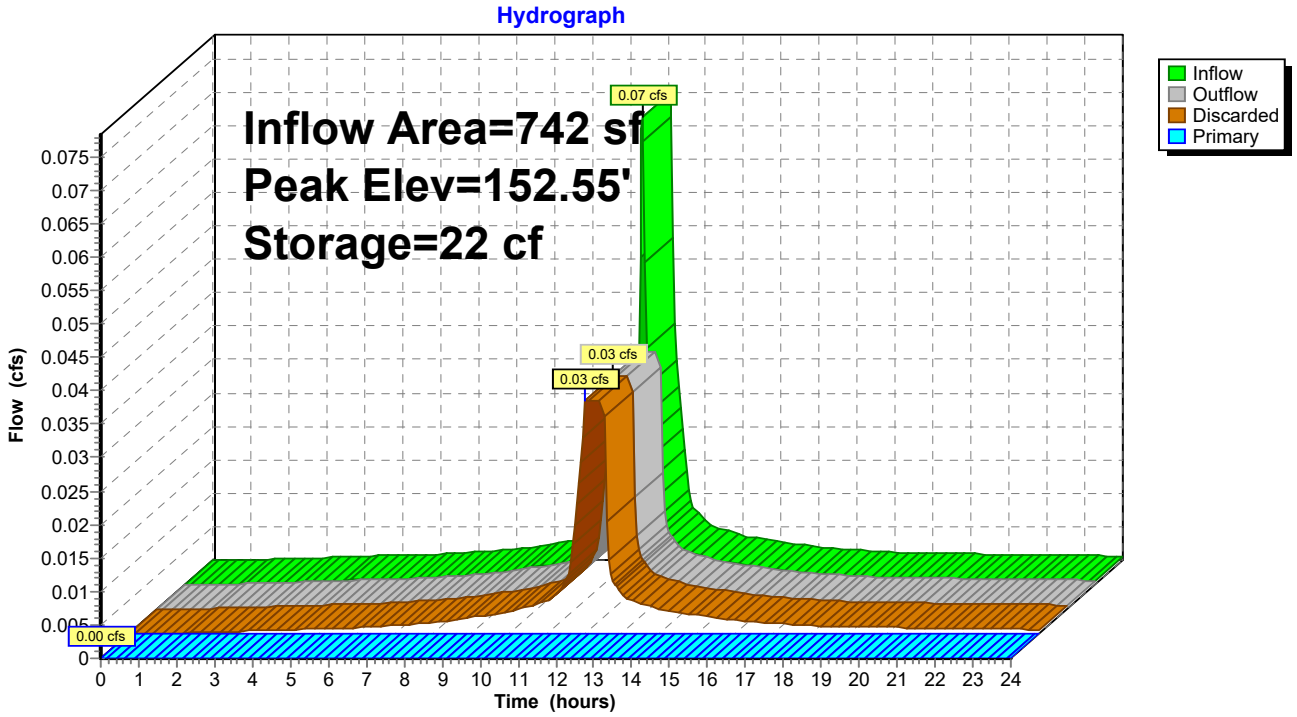
1,020.6 cf Field - 324.1 cf Chambers = 696.5 cf Stone x 40.0% Voids = 278.6 cf Stone Storage

Chamber Storage + Stone Storage = 602.7 cf = 0.014 af
Overall Storage Efficiency = 59.1%
Overall System Size = 45.50' x 6.33' x 3.54'

6 Chambers
37.8 cy Field
25.8 cy Stone



Pond INF-2: Cultec 330



Stage-Area-Storage for Pond INF-2: Cultec 330

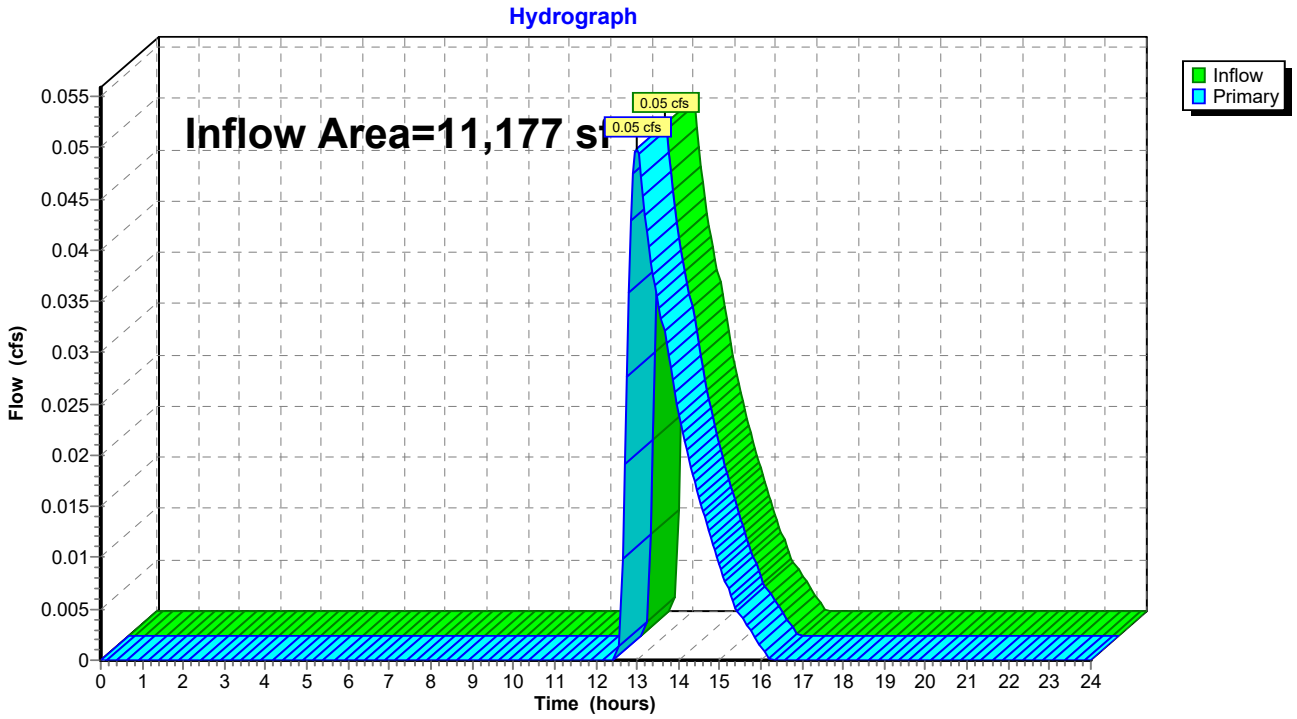
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
152.36	**288**	0
152.46	288	12
152.56	288	23
152.66	288	35
152.76	288	46
152.86	288	58
152.96	288	80
153.06	288	101
153.16	288	123
153.26	288	145
153.36	288	166
153.46	288	188
153.56	288	209
153.66	288	230
153.76	288	251
153.86	288	272
153.96	288	293
154.06	288	314
154.16	288	334
154.26	288	354
154.36	288	374
154.46	288	394
154.56	288	413
154.66	288	431
154.76	288	449
154.86	288	467
154.96	288	484
155.06	288	500
155.16	288	515
155.26	288	528
155.36	288	540
155.46	288	552
155.56	288	563
155.66	288	575
155.76	288	586
155.86	288	**598**
155.96	288	**603**
156.06	288	603
156.16	288	603
156.26	288	603
156.36	288	603
156.46	288	603
156.56	288	603
156.66	288	603
156.76	288	603
156.86	288	603
156.96	288	603
157.06	288	603
157.16	288	603
157.26	288	603
157.36	288	603
157.46	288	603

Summary for Link PR POC 1: EX CB 6

Inflow Area = 11,177 sf, 76.51% Impervious, Inflow Depth = 0.27" for 5yr Storm event
Inflow = 0.05 cfs @ 12.99 hrs, Volume= 252 cf
Primary = 0.05 cfs @ 12.99 hrs, Volume= 252 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 1: EX CB 6

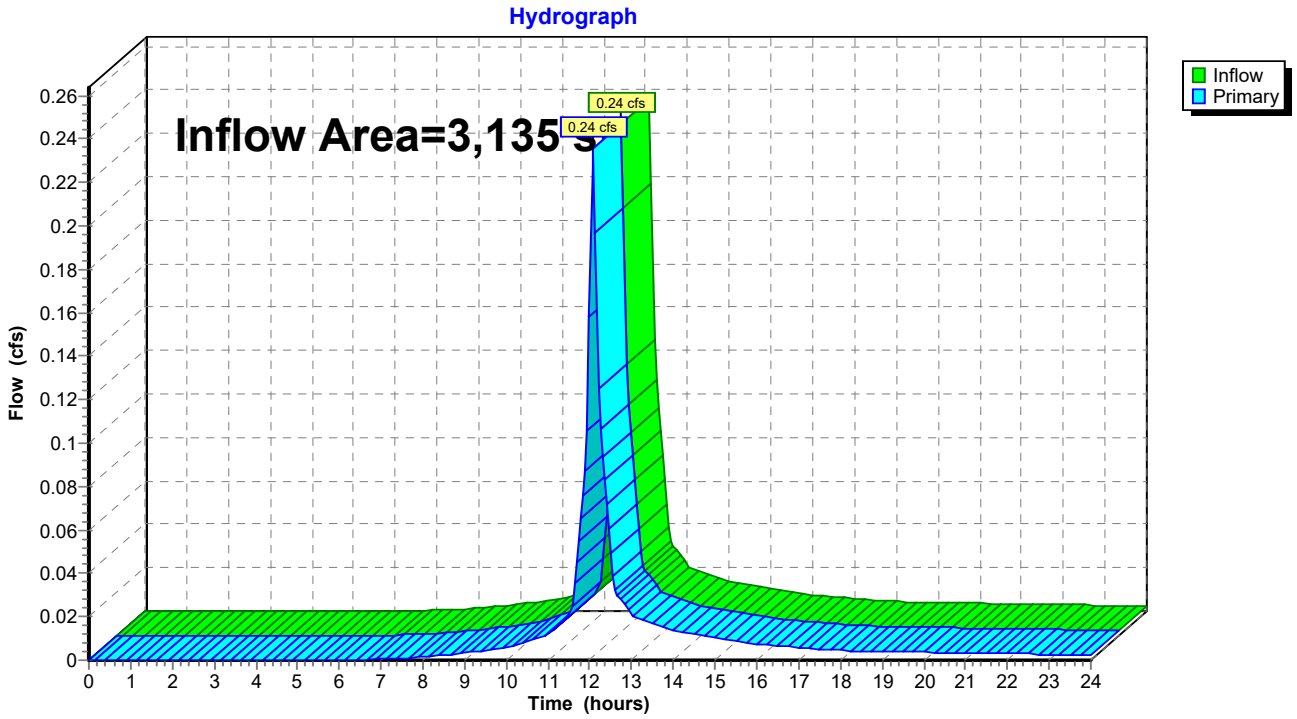


Summary for Link PR POC 2: EX CB 39

Inflow Area = 3,135 sf, 36.43% Impervious, Inflow Depth > 2.80" for 5yr Storm event
Inflow = 0.24 cfs @ 12.07 hrs, Volume= 732 cf
Primary = 0.24 cfs @ 12.07 hrs, Volume= 732 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 2: EX CB 39

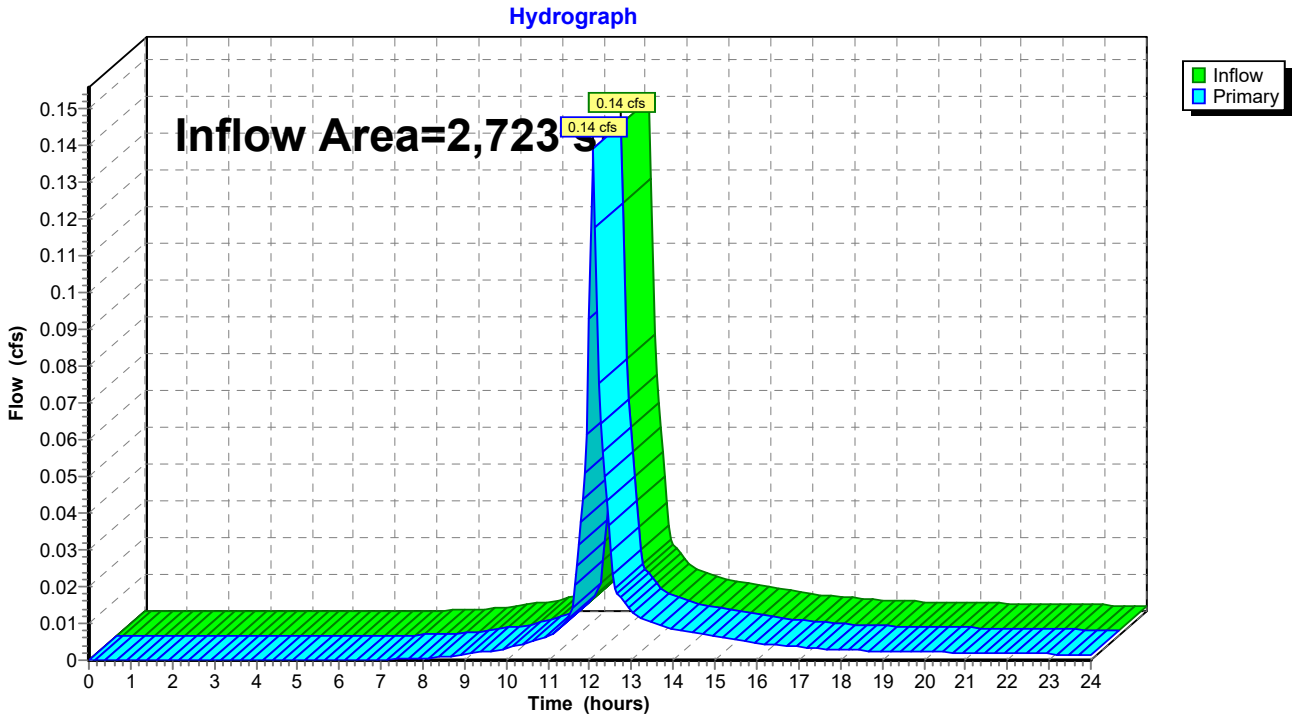


Summary for Link PR POC 3: EX CB 37

Inflow Area = 2,723 sf, 48.62% Impervious, Inflow Depth > 1.90" for 5yr Storm event
Inflow = 0.14 cfs @ 12.08 hrs, Volume= 432 cf
Primary = 0.14 cfs @ 12.08 hrs, Volume= 432 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 3: EX CB 37

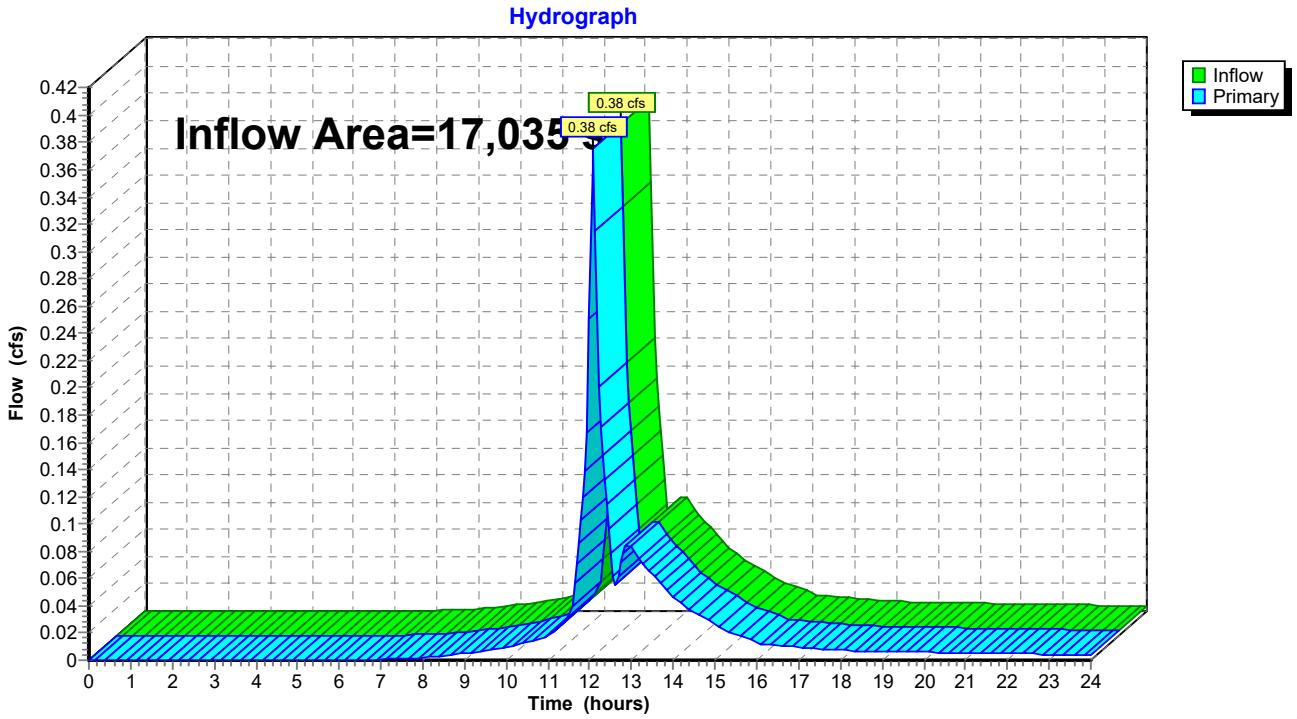


Summary for Link T-PR: Proposed Conditions Overall Discharge

Inflow Area = 17,035 sf, 64.68% Impervious, Inflow Depth > 1.00" for 5yr Storm event
Inflow = 0.38 cfs @ 12.07 hrs, Volume= 1,416 cf
Primary = 0.38 cfs @ 12.07 hrs, Volume= 1,416 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link T-PR: Proposed Conditions Overall Discharge



Summary for Subcatchment PR-1: Pr Drainage Area 1

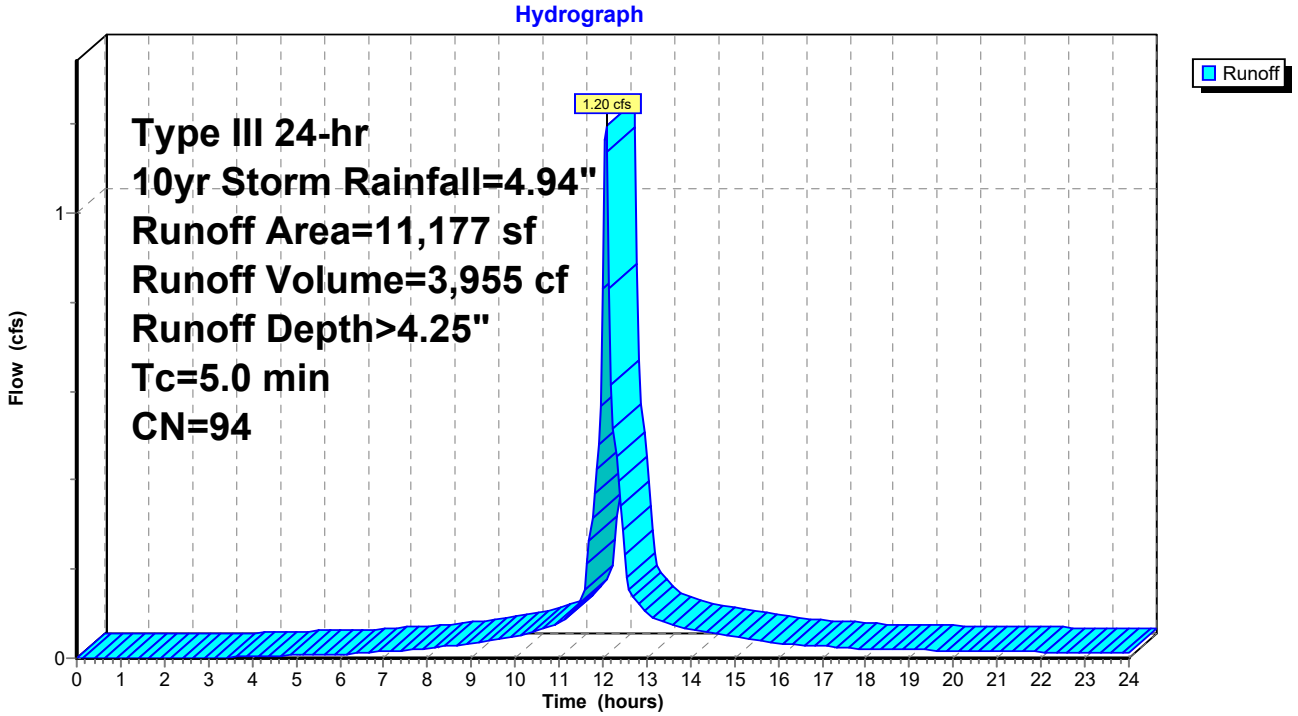
Runoff = 1.20 cfs @ 12.07 hrs, Volume= 3,955 cf, Depth> 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10yr Storm Rainfall=4.94"

	Area (sf)	CN	Description
*	5,809	98	Roof Area
*	2,743	98	Hardscape Areas
	2,625	80	>75% Grass cover, Good, HSG D
	11,177	94	Weighted Average
	2,625		23.49% Pervious Area
	8,552		76.51% Impervious Area

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

Subcatchment PR-1: Pr Drainage Area 1



Summary for Subcatchment PR-2A: Pr Drainage Area 2

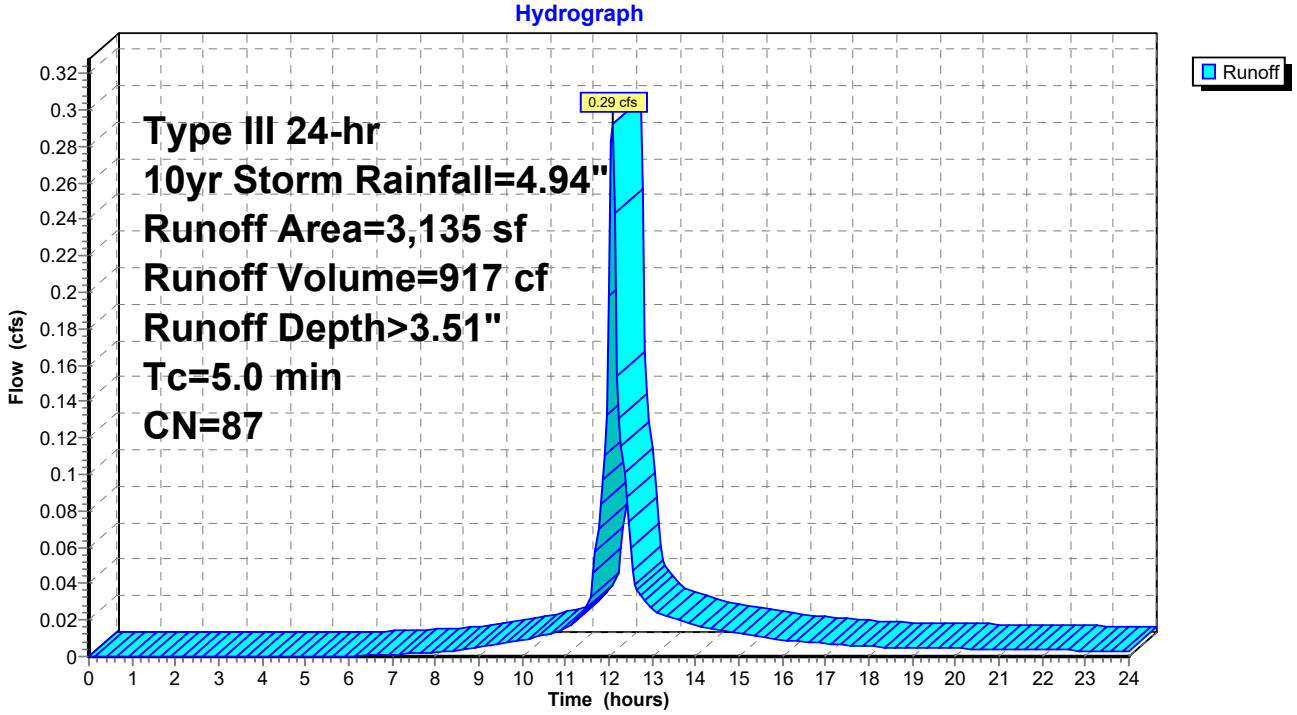
Runoff = 0.29 cfs @ 12.07 hrs, Volume= 917 cf, Depth> 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10yr Storm Rainfall=4.94"

	Area (sf)	CN	Description
*	1,142	98	Hardscape Area
	1,993	80	>75% Grass cover, Good, HSG D
	3,135	87	Weighted Average
	1,993		63.57% Pervious Area
	1,142		36.43% Impervious Area

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

Subcatchment PR-2A: Pr Drainage Area 2



Summary for Subcatchment PR-3A: Pr Drainage Area 3

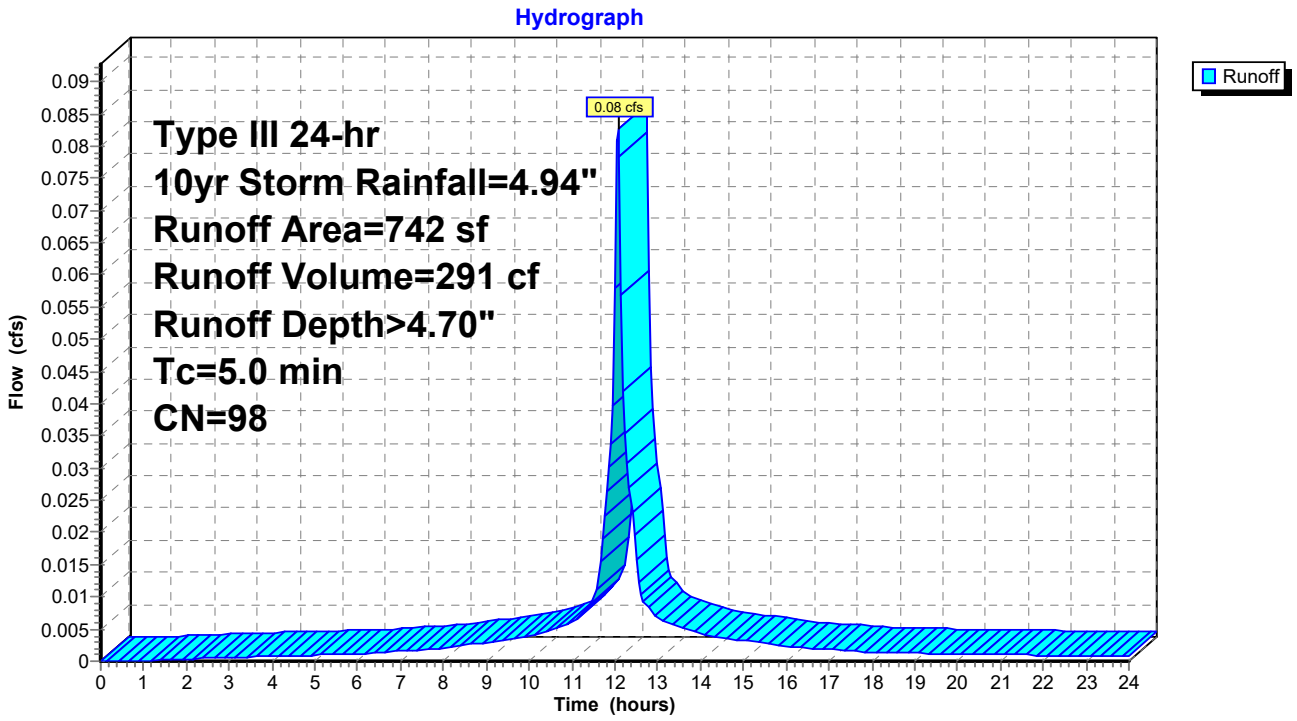
Runoff = 0.08 cfs @ 12.07 hrs, Volume= 291 cf, Depth> 4.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10yr Storm Rainfall=4.94"

	Area (sf)	CN	Description
*	742	98	Roof Area
	742		100.00% Impervious Area

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

Subcatchment PR-3A: Pr Drainage Area 3



Summary for Subcatchment PR-3B: Pr Drainage Area 3

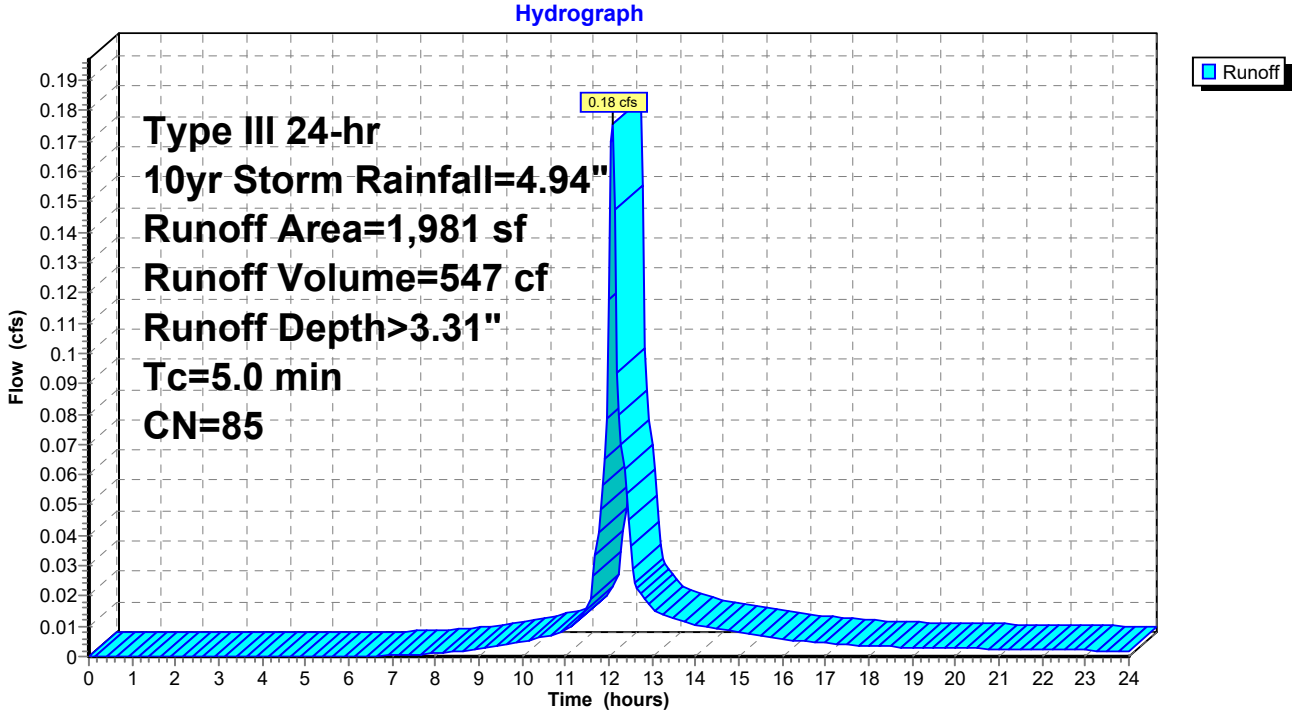
Runoff = 0.18 cfs @ 12.07 hrs, Volume= 547 cf, Depth> 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10yr Storm Rainfall=4.94"

	Area (sf)	CN	Description
*	582	98	Hardscape Area
	1,399	80	>75% Grass cover, Good, HSG D
	1,981	85	Weighted Average
	1,399		70.62% Pervious Area
	582		29.38% Impervious Area

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

Subcatchment PR-3B: Pr Drainage Area 3



Summary for Pond INF-1: ADS Stormtech 3500

Inflow Area =	11,177 sf, 76.51% Impervious, Inflow Depth > 4.25" for 10yr Storm event				
Inflow =	1.20 cfs @	12.07 hrs,	Volume=	3,955 cf	
Outflow =	0.33 cfs @	12.41 hrs,	Volume=	2,830 cf,	Atten= 72%, Lag= 20.4 min
Discarded =	0.04 cfs @	12.41 hrs,	Volume=	2,045 cf	
Primary =	0.30 cfs @	12.41 hrs,	Volume=	785 cf	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 6
Peak Elev= 162.30' @ 12.41 hrs Surf.Area= 782 sf Storage= 1,746 cf

Plug-Flow detention time= 212.0 min calculated for 2,824 cf (71% of inflow)
Center-of-Mass det. time= 123.1 min (895.7 - 772.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	159.00'	1,157 cf	**22.75'W x 34.38'L x 5.50'H Field A** 4,302 cf Overall - 1,409 cf Embedded = 2,893 cf x 40.0% Voids
#2A	159.75'	1,409 cf	**ADS_StormTech MC-3500 d +Cap**x 12 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 12 Chambers in 3 Rows Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf
		2,566 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	159.00'	**1.500 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 149.00'
#2	Secondary	165.75'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	162.00'	**12.0" Round Culvert to CB 6** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 161.80' / 162.00' S= -0.0143 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#4	Device 3	161.80'	**6.0" Vert. LFO** C= 0.600 Limited to weir flow at low heads
#5	Secondary	164.75'	**6.0" Vert. HLO** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.41 hrs HW=162.30' (Free Discharge)
└─**1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.29 cfs @ 12.41 hrs HW=162.30' (Free Discharge)
└─**3=Culvert to CB 6** (Inlet Controls 0.29 cfs @ 1.48 fps)
  └─**4=LFO** (Passes 0.29 cfs of 0.47 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=159.00' (Free Discharge)
├─**2=Orifice/Grate** (Controls 0.00 cfs)
└─**5=HLO** (Controls 0.00 cfs)

Pond INF-1: ADS Stormtech 3500 - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

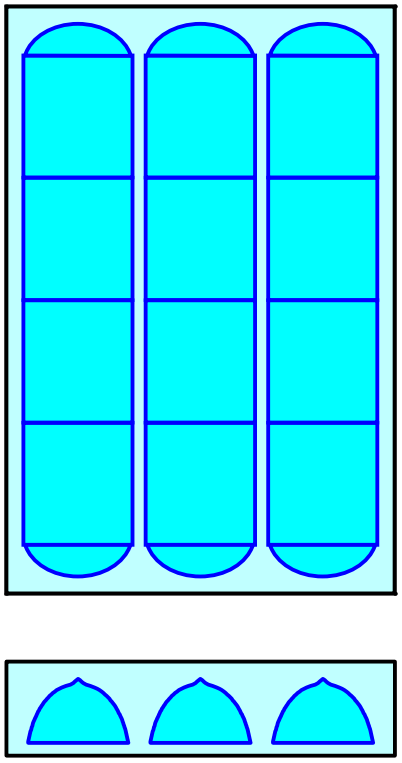
4 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 32.38' Row Length +12.0" End Stone x 2 = 34.38' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

12 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 1,408.8 cf Chamber Storage

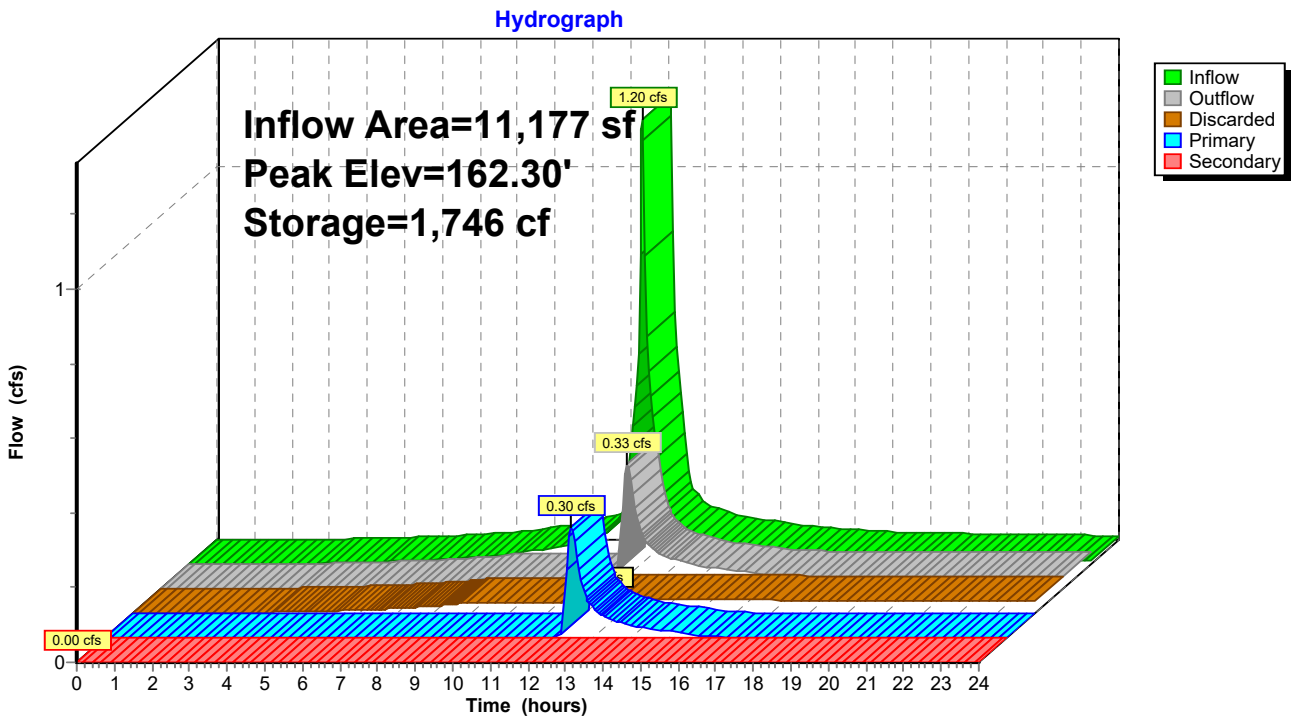
4,301.8 cf Field - 1,408.8 cf Chambers = 2,893.0 cf Stone x 40.0% Voids = 1,157.2 cf Stone Storage

Chamber Storage + Stone Storage = 2,566.0 cf = 0.059 af
Overall Storage Efficiency = 59.6%
Overall System Size = 34.38' x 22.75' x 5.50'

12 Chambers
159.3 cy Field
107.1 cy Stone



Pond INF-1: ADS Stormtech 3500



Stage-Area-Storage for Pond INF-1: ADS Stormtech 3500

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
159.00	**782**	0
159.10	782	31
159.20	782	63
159.30	782	94
159.40	782	125
159.50	782	156
159.60	782	188
159.70	782	219
159.80	782	266
159.90	782	330
160.00	782	393
160.10	782	456
160.20	782	519
160.30	782	581
160.40	782	643
160.50	782	705
160.60	782	767
160.70	782	828
160.80	782	889
160.90	782	950
161.00	782	1,010
161.10	782	1,070
161.20	782	1,129
161.30	782	1,188
161.40	782	1,247
161.50	782	1,304
161.60	782	1,362
161.70	782	1,418
161.80	782	1,474
161.90	782	1,530
162.00	782	1,585
162.10	782	1,638
162.20	782	1,692
162.30	782	1,744
162.40	782	1,795
162.50	782	1,845
162.60	782	1,894
162.70	782	1,942
162.80	782	1,988
162.90	782	2,033
163.00	782	2,076
163.10	782	2,116
163.20	782	2,153
163.30	782	2,188
163.40	782	2,221
163.50	782	2,253
163.60	782	2,284
163.70	782	2,316
163.80	782	2,347
163.90	782	2,378
164.00	782	2,410
164.10	782	2,441
164.20	782	2,472
164.30	782	2,503
164.40	782	2,535
164.50	782	**2,566**
164.60	782	2,566
164.70	782	2,566
164.80	782	2,566
164.90	782	2,566
165.00	782	2,566
165.10	782	2,566
165.20	782	2,566
165.30	782	2,566
165.40	782	2,566
165.50	782	2,566
165.60	782	2,566
165.70	782	2,566

Summary for Pond INF-2: Cultec 330

Inflow Area = 742 sf,100.00% Impervious, Inflow Depth > 4.70" for 10yr Storm event
Inflow = 0.08 cfs @ 12.07 hrs, Volume= 291 cf
Outflow = 0.03 cfs @ 11.95 hrs, Volume= 291 cf, Atten= 58%, Lag= 0.0 min
Discarded = 0.03 cfs @ 11.95 hrs, Volume= 291 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 152.64' @ 12.26 hrs Surf.Area= 288 sf Storage= 32 cf

Plug-Flow detention time= 5.3 min calculated for 291 cf (100% of inflow)
Center-of-Mass det. time= 5.0 min (752.0 - 747.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	152.36'	279 cf	**6.33'W x 45.50'L x 3.54'H Field A** 1,021 cf Overall - 324 cf Embedded = 696 cf x 40.0% Voids
#2A	152.86'	324 cf	**Cultec R-330XLHD** x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		603 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	152.36'	**5.220 in/hr Exfiltration over Surface area**
#2	Primary	157.50'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 11.95 hrs HW=152.41' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=152.36' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond INF-2: Cultec 330 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

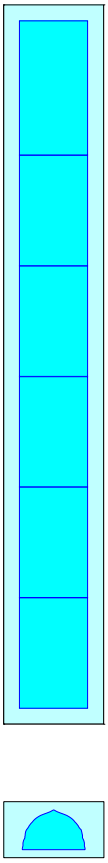
6 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 43.50' Row Length +12.0" End Stone x 2 = 45.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

6 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 324.1 cf Chamber Storage

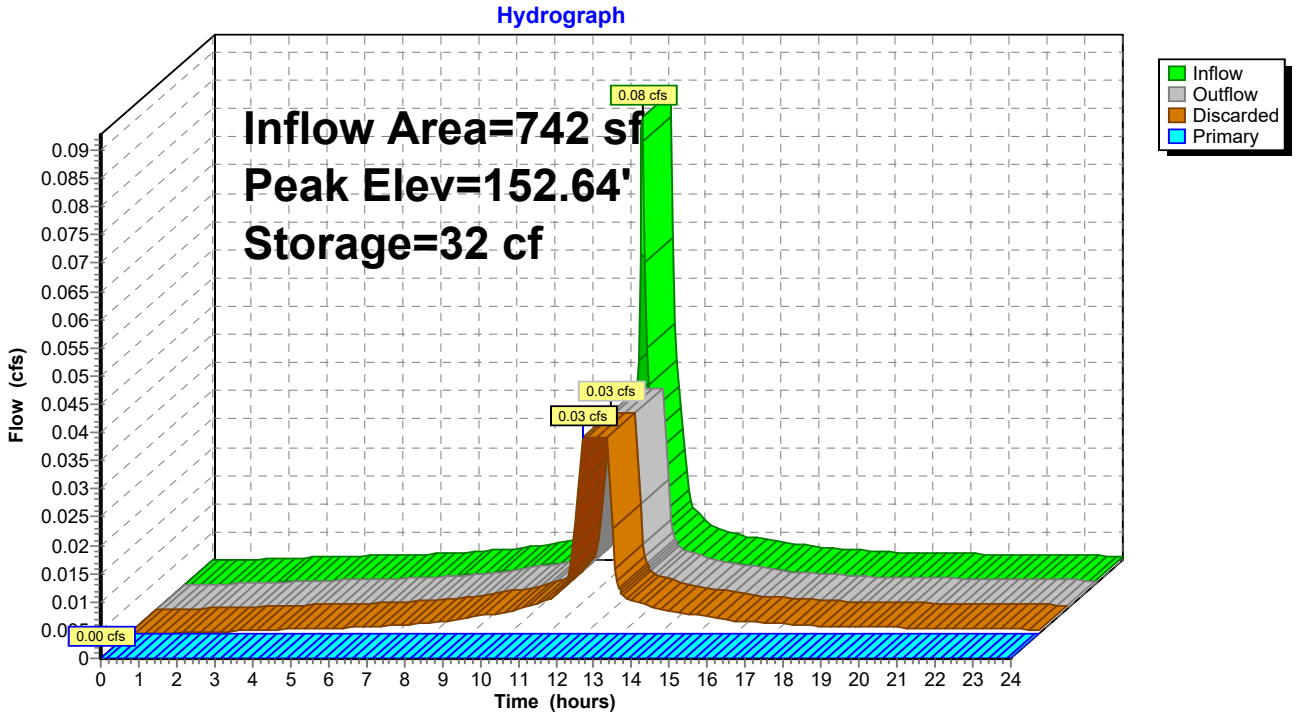
1,020.6 cf Field - 324.1 cf Chambers = 696.5 cf Stone x 40.0% Voids = 278.6 cf Stone Storage

Chamber Storage + Stone Storage = 602.7 cf = 0.014 af
Overall Storage Efficiency = 59.1%
Overall System Size = 45.50' x 6.33' x 3.54'

6 Chambers
37.8 cy Field
25.8 cy Stone



Pond INF-2: Cultec 330



Stage-Area-Storage for Pond INF-2: Cultec 330

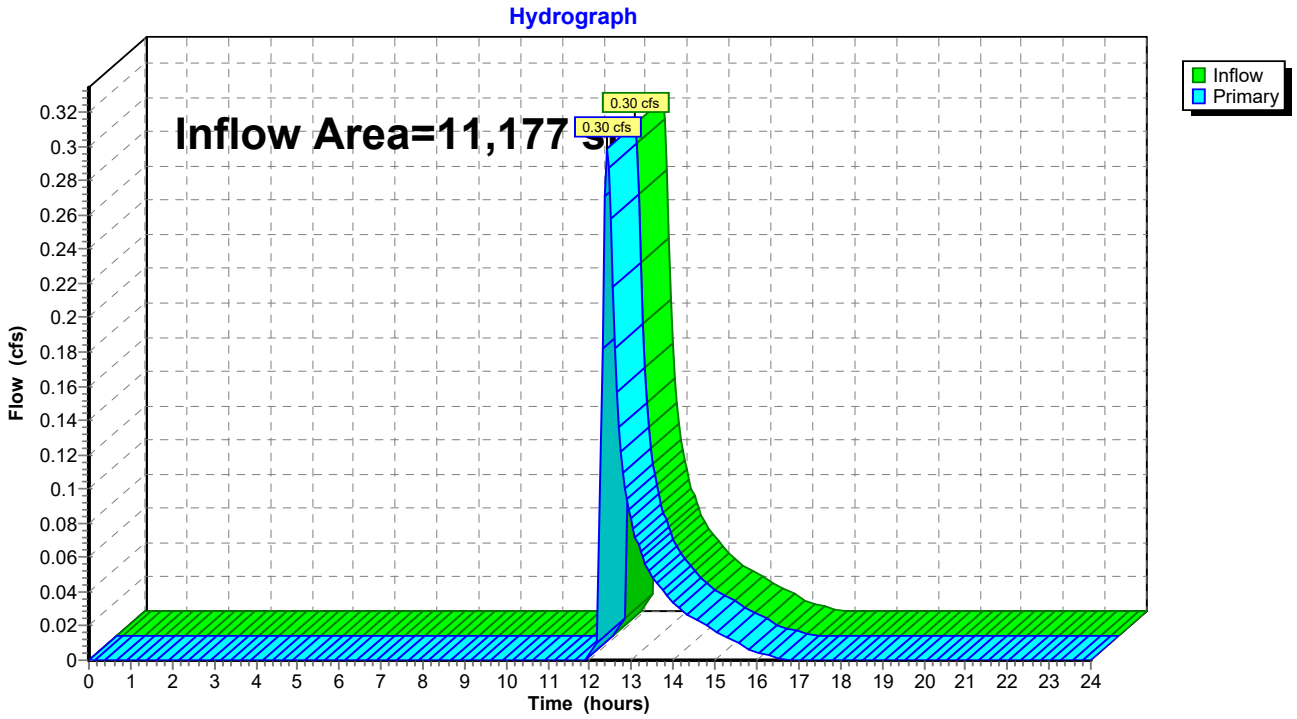
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
152.36	**288**	0
152.46	288	12
152.56	288	23
152.66	288	35
152.76	288	46
152.86	288	58
152.96	288	80
153.06	288	101
153.16	288	123
153.26	288	145
153.36	288	166
153.46	288	188
153.56	288	209
153.66	288	230
153.76	288	251
153.86	288	272
153.96	288	293
154.06	288	314
154.16	288	334
154.26	288	354
154.36	288	374
154.46	288	394
154.56	288	413
154.66	288	431
154.76	288	449
154.86	288	467
154.96	288	484
155.06	288	500
155.16	288	515
155.26	288	528
155.36	288	540
155.46	288	552
155.56	288	563
155.66	288	575
155.76	288	586
155.86	288	**598**
155.96	288	**603**
156.06	288	603
156.16	288	603
156.26	288	603
156.36	288	603
156.46	288	603
156.56	288	603
156.66	288	603
156.76	288	603
156.86	288	603
156.96	288	603
157.06	288	603
157.16	288	603
157.26	288	603
157.36	288	603
157.46	288	603

Summary for Link PR POC 1: EX CB 6

Inflow Area = 11,177 sf, 76.51% Impervious, Inflow Depth = 0.84" for 10yr Storm event
Inflow = 0.30 cfs @ 12.41 hrs, Volume= 785 cf
Primary = 0.30 cfs @ 12.41 hrs, Volume= 785 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 1: EX CB 6

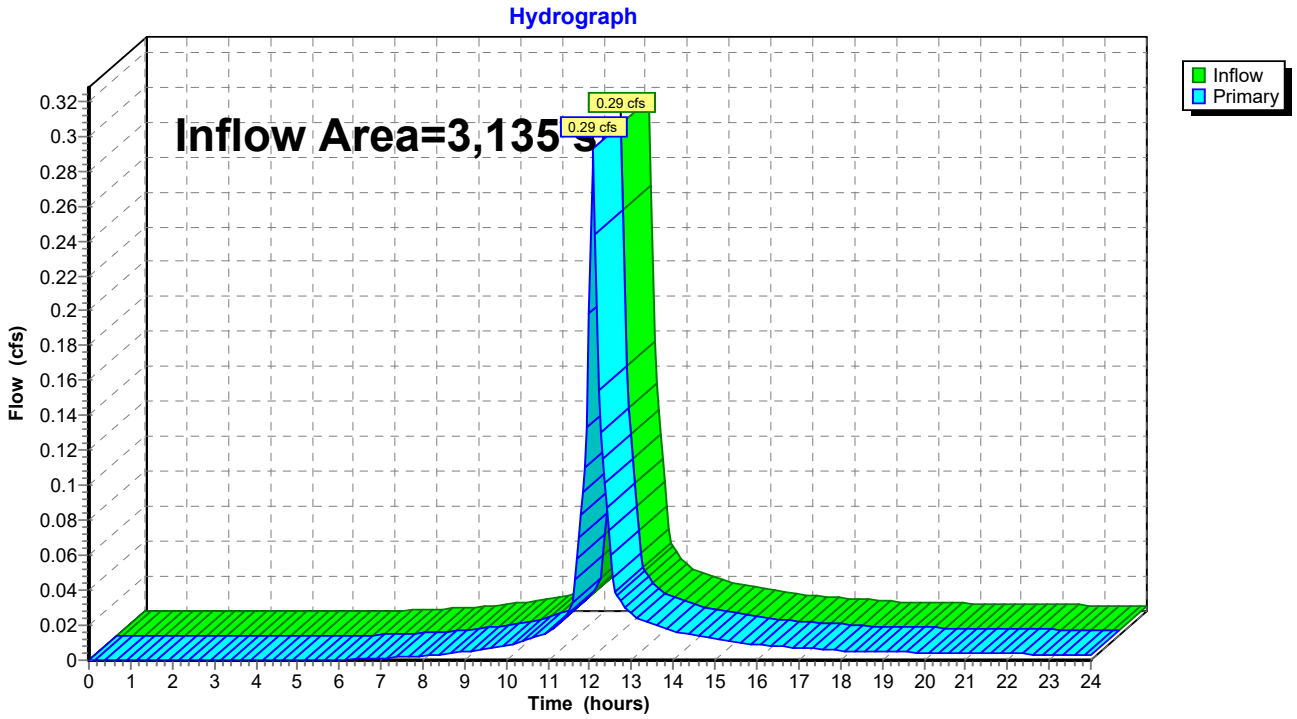


Summary for Link PR POC 2: EX CB 39

Inflow Area = 3,135 sf, 36.43% Impervious, Inflow Depth > 3.51" for 10yr Storm event
Inflow = 0.29 cfs @ 12.07 hrs, Volume= 917 cf
Primary = 0.29 cfs @ 12.07 hrs, Volume= 917 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 2: EX CB 39

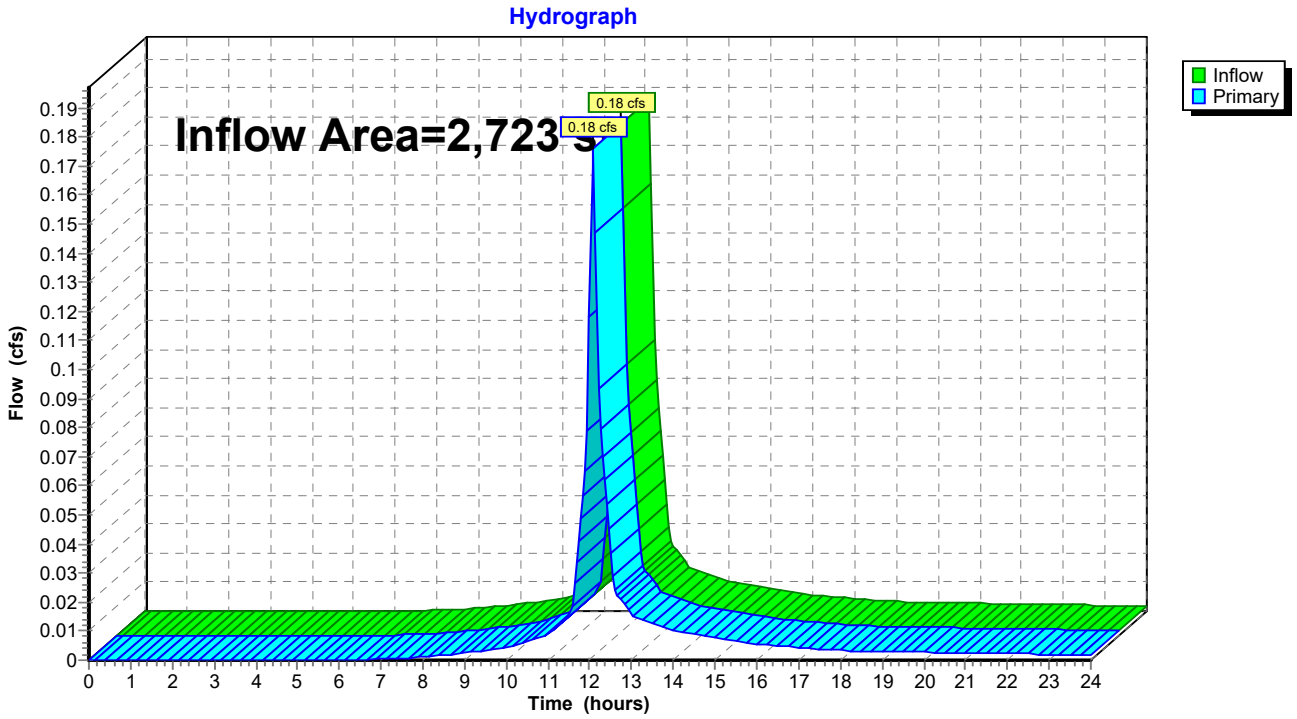


Summary for Link PR POC 3: EX CB 37

Inflow Area = 2,723 sf, 48.62% Impervious, Inflow Depth > 2.41" for 10yr Storm event
Inflow = 0.18 cfs @ 12.07 hrs, Volume= 547 cf
Primary = 0.18 cfs @ 12.07 hrs, Volume= 547 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 3: EX CB 37

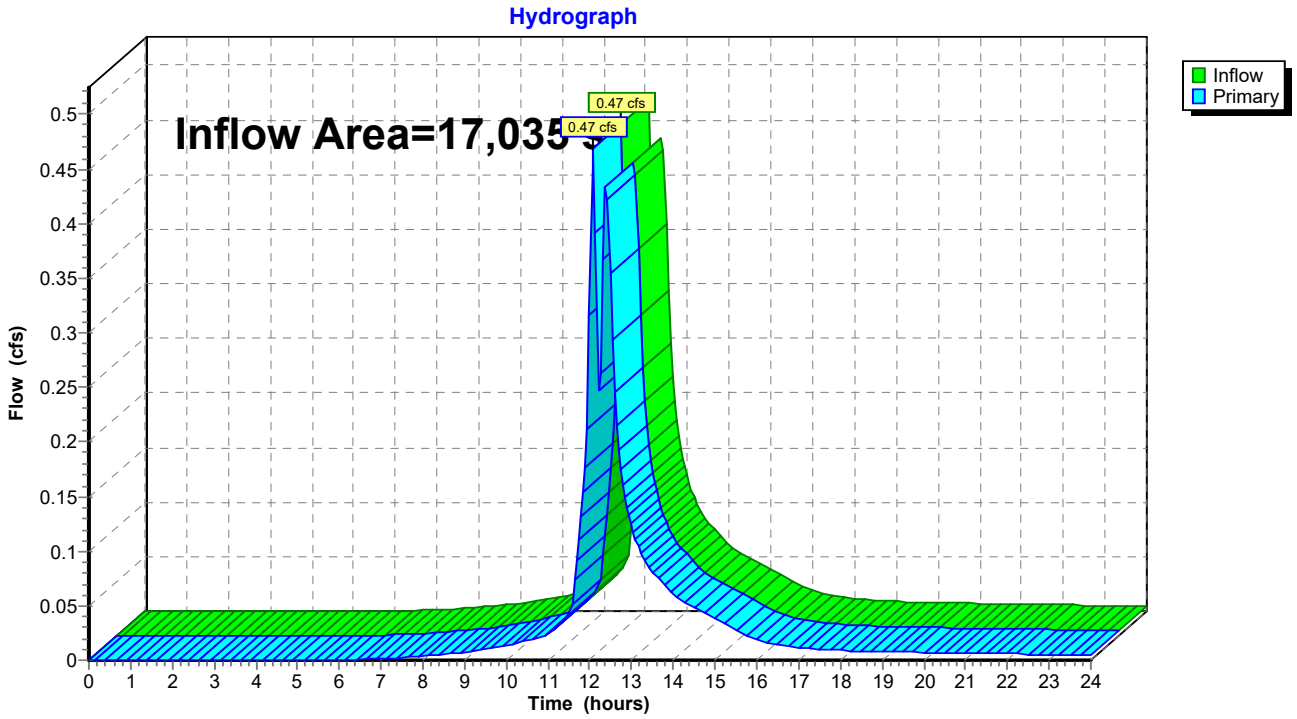


Summary for Link T-PR: Proposed Conditions Overall Discharge

Inflow Area = 17,035 sf, 64.68% Impervious, Inflow Depth > 1.58" for 10yr Storm event
Inflow = 0.47 cfs @ 12.07 hrs, Volume= 2,248 cf
Primary = 0.47 cfs @ 12.07 hrs, Volume= 2,248 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link T-PR: Proposed Conditions Overall Discharge



Summary for Subcatchment PR-1: Pr Drainage Area 1

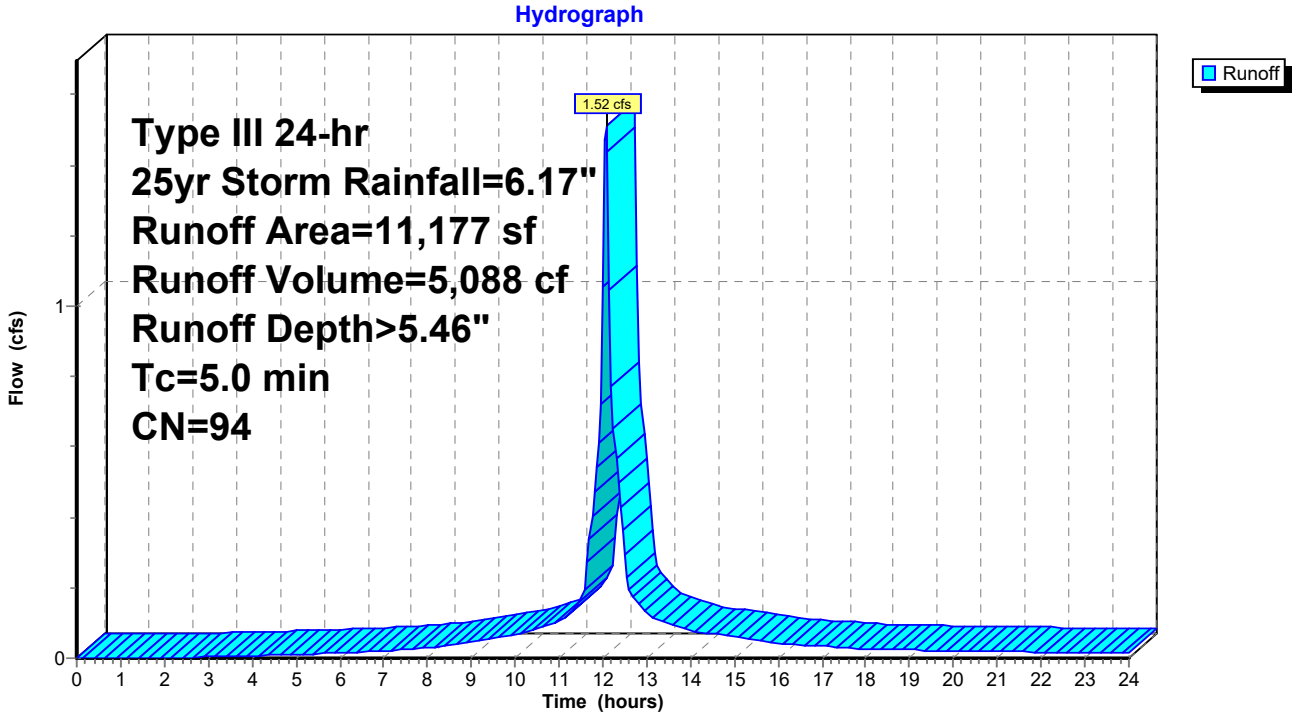
Runoff = 1.52 cfs @ 12.07 hrs, Volume= 5,088 cf, Depth> 5.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25yr Storm Rainfall=6.17"

	Area (sf)	CN	Description
*	5,809	98	Roof Area
*	2,743	98	Hardscape Areas
	2,625	80	>75% Grass cover, Good, HSG D
	11,177	94	Weighted Average
	2,625		23.49% Pervious Area
	8,552		76.51% Impervious Area

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

Subcatchment PR-1: Pr Drainage Area 1



Summary for Subcatchment PR-2A: Pr Drainage Area 2

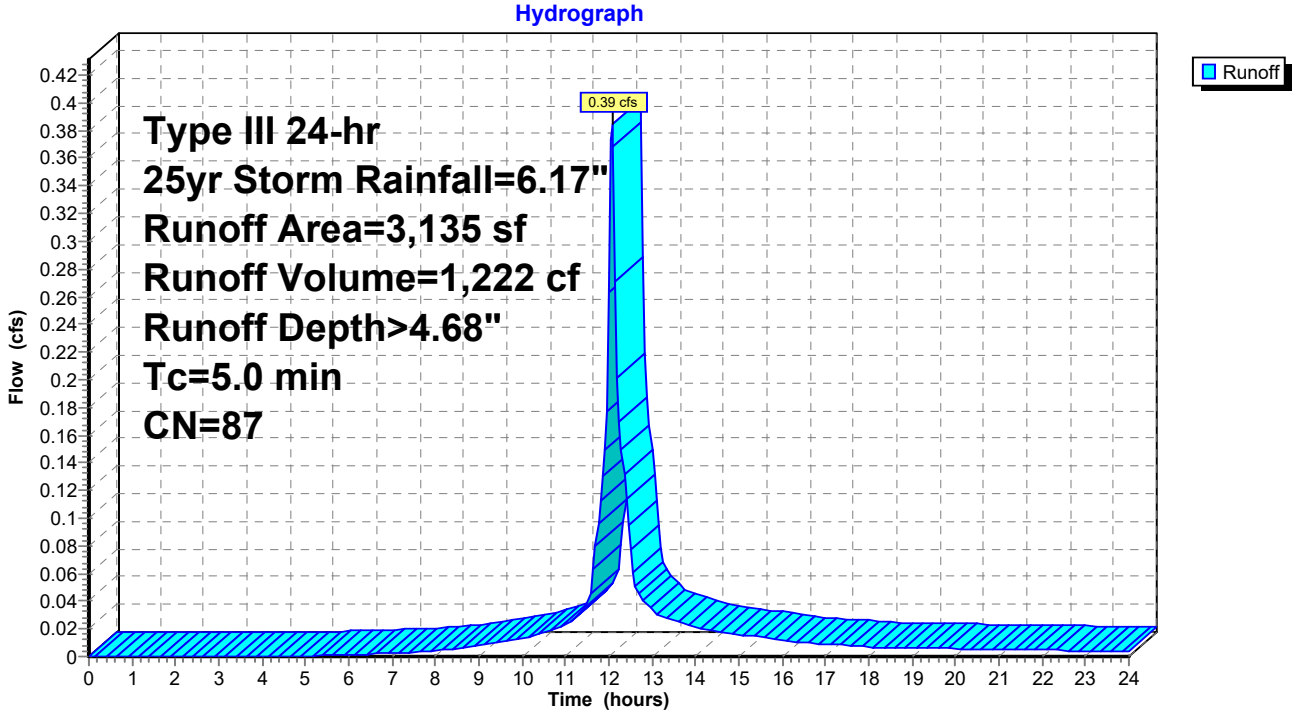
Runoff = 0.39 cfs @ 12.07 hrs, Volume= 1,222 cf, Depth> 4.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25yr Storm Rainfall=6.17"

	Area (sf)	CN	Description
*	1,142	98	Hardscape Area
	1,993	80	>75% Grass cover, Good, HSG D
	3,135	87	Weighted Average
	1,993		63.57% Pervious Area
	1,142		36.43% Impervious Area

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

Subcatchment PR-2A: Pr Drainage Area 2



Summary for Subcatchment PR-3A: Pr Drainage Area 3

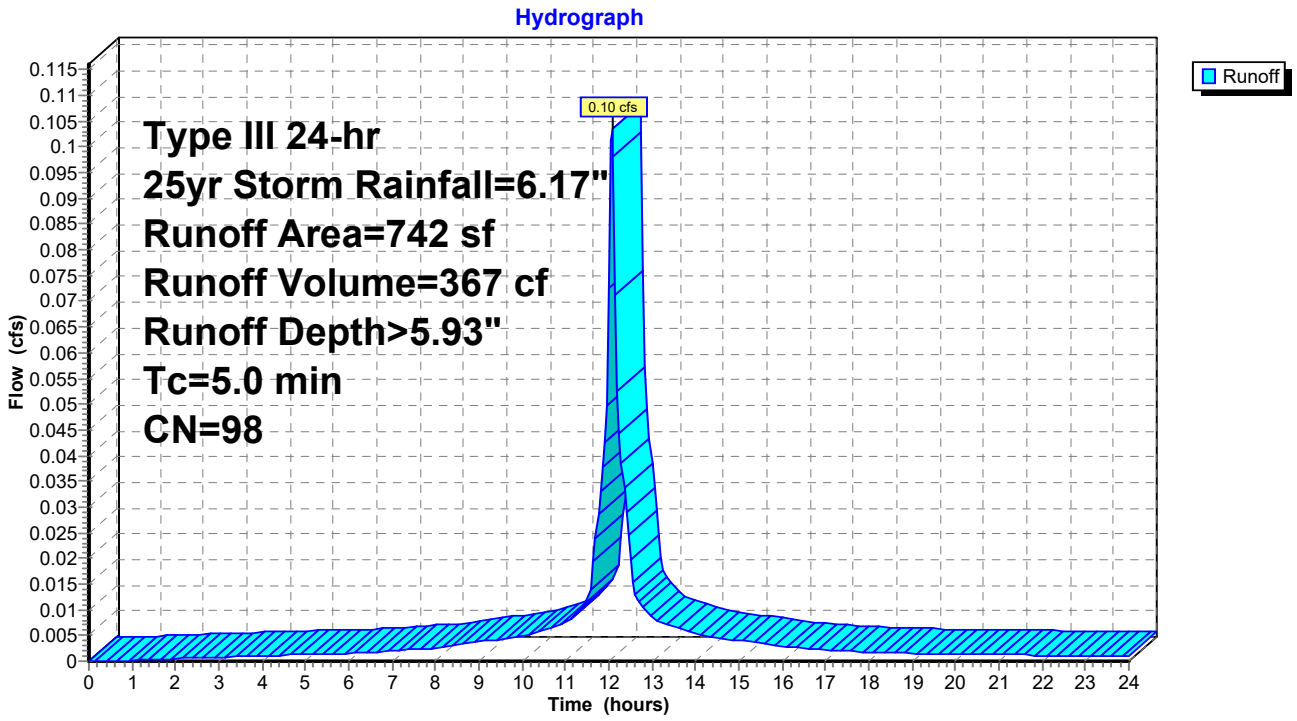
Runoff = 0.10 cfs @ 12.07 hrs, Volume= 367 cf, Depth> 5.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25yr Storm Rainfall=6.17"

	Area (sf)	CN	Description
*	742	98	Roof Area
	742		100.00% Impervious Area

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

Subcatchment PR-3A: Pr Drainage Area 3



Summary for Subcatchment PR-3B: Pr Drainage Area 3

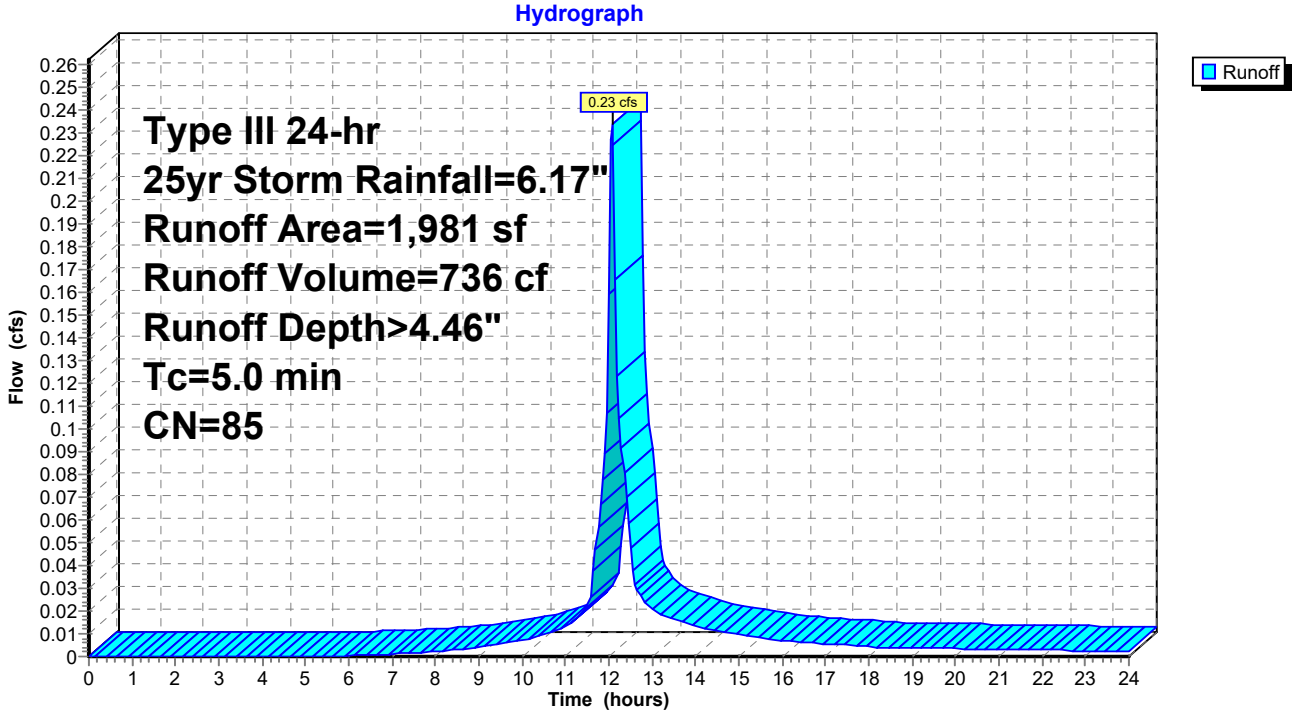
Runoff = 0.23 cfs @ 12.07 hrs, Volume= 736 cf, Depth> 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25yr Storm Rainfall=6.17"

	Area (sf)	CN	Description
*	582	98	Hardscape Area
	1,399	80	>75% Grass cover, Good, HSG D
	1,981	85	Weighted Average
	1,399		70.62% Pervious Area
	582		29.38% Impervious Area

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

Subcatchment PR-3B: Pr Drainage Area 3



Summary for Pond INF-1: ADS Stormtech 3500

Inflow Area =	11,177 sf, 76.51% Impervious, Inflow Depth > 5.46" for 25yr Storm event				
Inflow =	1.52 cfs @	12.07 hrs,	Volume=	5,088 cf	
Outflow =	0.74 cfs @	12.22 hrs,	Volume=	3,846 cf,	Atten= 51%, Lag= 9.0 min
Discarded =	0.04 cfs @	12.22 hrs,	Volume=	2,158 cf	
Primary =	0.70 cfs @	12.22 hrs,	Volume=	1,688 cf	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 6
Peak Elev= 162.60' @ 12.22 hrs Surf.Area= 782 sf Storage= 1,893 cf

Plug-Flow detention time= 169.0 min calculated for 3,838 cf (75% of inflow)
Center-of-Mass det. time= 86.3 min (852.8 - 766.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	159.00'	1,157 cf	**22.75'W x 34.38'L x 5.50'H Field A** 4,302 cf Overall - 1,409 cf Embedded = 2,893 cf x 40.0% Voids
#2A	159.75'	1,409 cf	**ADS_StormTech MC-3500 d +Cap**x 12 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 12 Chambers in 3 Rows Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf
		2,566 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	159.00'	**1.500 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 149.00'
#2	Secondary	165.75'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	162.00'	**12.0" Round Culvert to CB 6** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 161.80' / 162.00' S= -0.0143 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#4	Device 3	161.80'	**6.0" Vert. LFO** C= 0.600 Limited to weir flow at low heads
#5	Secondary	164.75'	**6.0" Vert. HLO** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.22 hrs HW=162.59' (Free Discharge)
└─**1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.69 cfs @ 12.22 hrs HW=162.59' (Free Discharge)
└─**3=Culvert to CB 6** (Passes 0.69 cfs of 0.99 cfs potential flow)
  └─**4=LFO** (Orifice Controls 0.69 cfs @ 3.53 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=159.00' (Free Discharge)
├─**2=Orifice/Grate** (Controls 0.00 cfs)
└─**5=HLO** (Controls 0.00 cfs)

Pond INF-1: ADS Stormtech 3500 - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

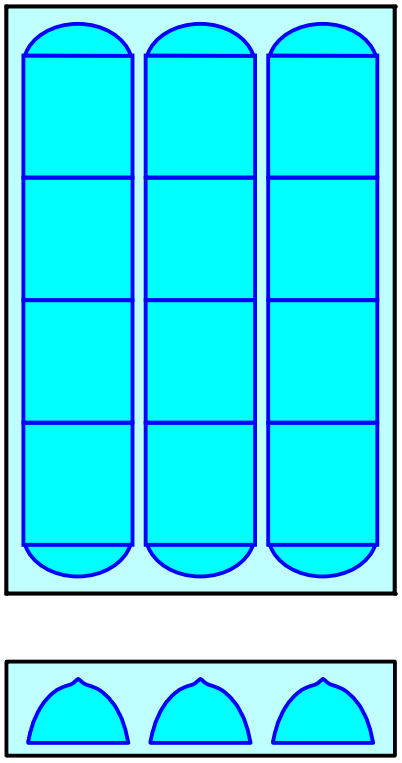
4 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 32.38' Row Length +12.0" End Stone x 2 = 34.38' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

12 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 1,408.8 cf Chamber Storage

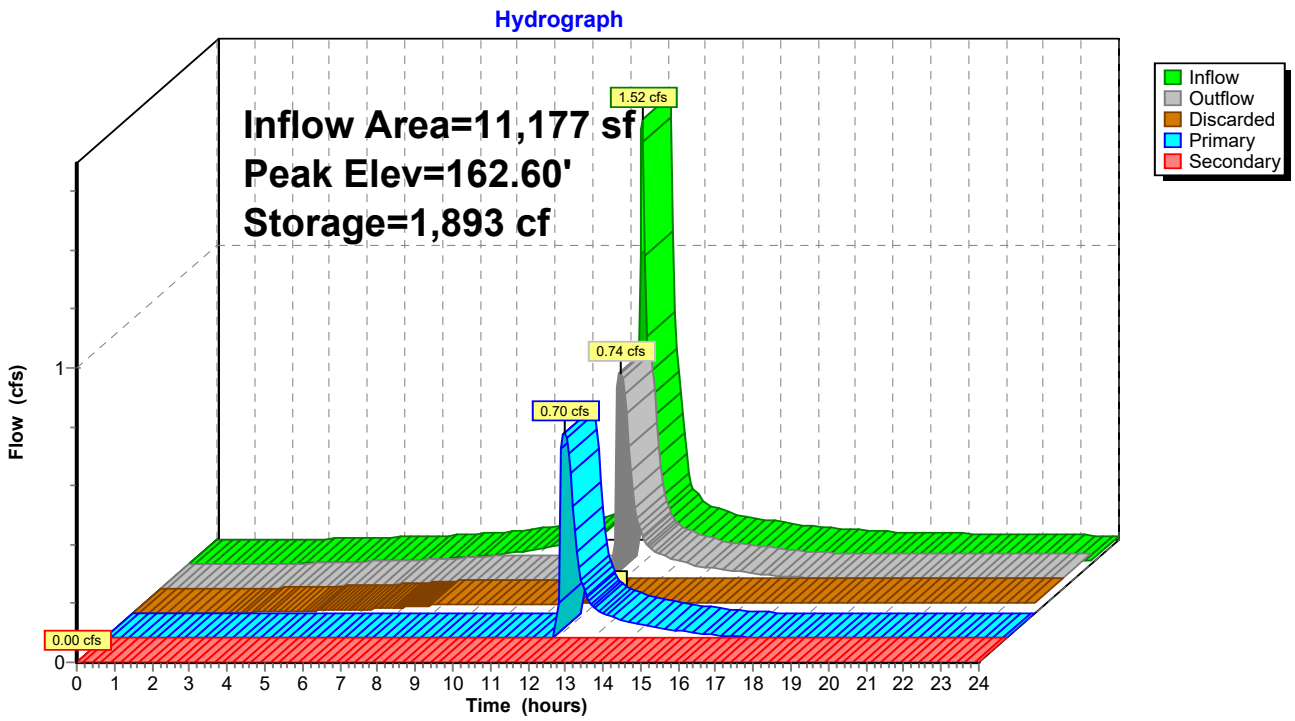
4,301.8 cf Field - 1,408.8 cf Chambers = 2,893.0 cf Stone x 40.0% Voids = 1,157.2 cf Stone Storage

Chamber Storage + Stone Storage = 2,566.0 cf = 0.059 af
Overall Storage Efficiency = 59.6%
Overall System Size = 34.38' x 22.75' x 5.50'

12 Chambers
159.3 cy Field
107.1 cy Stone



Pond INF-1: ADS Stormtech 3500



Stage-Area-Storage for Pond INF-1: ADS Stormtech 3500

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
159.00	**782**	0
159.10	782	31
159.20	782	63
159.30	782	94
159.40	782	125
159.50	782	156
159.60	782	188
159.70	782	219
159.80	782	266
159.90	782	330
160.00	782	393
160.10	782	456
160.20	782	519
160.30	782	581
160.40	782	643
160.50	782	705
160.60	782	767
160.70	782	828
160.80	782	889
160.90	782	950
161.00	782	1,010
161.10	782	1,070
161.20	782	1,129
161.30	782	1,188
161.40	782	1,247
161.50	782	1,304
161.60	782	1,362
161.70	782	1,418
161.80	782	1,474
161.90	782	1,530
162.00	782	1,585
162.10	782	1,638
162.20	782	1,692
162.30	782	1,744
162.40	782	1,795
162.50	782	1,845
162.60	782	1,894
162.70	782	1,942
162.80	782	1,988
162.90	782	2,033
163.00	782	2,076
163.10	782	2,116
163.20	782	2,153
163.30	782	2,188
163.40	782	2,221
163.50	782	2,253
163.60	782	2,284
163.70	782	2,316
163.80	782	2,347
163.90	782	2,378
164.00	782	2,410
164.10	782	2,441
164.20	782	2,472
164.30	782	2,503
164.40	782	2,535
164.50	782	**2,566**
164.60	782	2,566
164.70	782	2,566
164.80	782	2,566
164.90	782	2,566
165.00	782	2,566
165.10	782	2,566
165.20	782	2,566
165.30	782	2,566
165.40	782	2,566
165.50	782	2,566
165.60	782	2,566
165.70	782	2,566

Summary for Pond INF-2: Cultec 330

Inflow Area = 742 sf,100.00% Impervious, Inflow Depth > 5.93" for 25yr Storm event
Inflow = 0.10 cfs @ 12.07 hrs, Volume= 367 cf
Outflow = 0.03 cfs @ 11.90 hrs, Volume= 366 cf, Atten= 66%, Lag= 0.0 min
Discarded = 0.03 cfs @ 11.90 hrs, Volume= 366 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 152.81' @ 12.34 hrs Surf.Area= 288 sf Storage= 52 cf

Plug-Flow detention time= 7.8 min calculated for 366 cf (100% of inflow)
Center-of-Mass det. time= 7.5 min (751.0 - 743.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	152.36'	279 cf	**6.33'W x 45.50'L x 3.54'H Field A** 1,021 cf Overall - 324 cf Embedded = 696 cf x 40.0% Voids
#2A	152.86'	324 cf	**Cultec R-330XLHD** x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		603 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	152.36'	**5.220 in/hr Exfiltration over Surface area**
#2	Primary	157.50'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 11.90 hrs HW=152.42' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=152.36' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond INF-2: Cultec 330 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

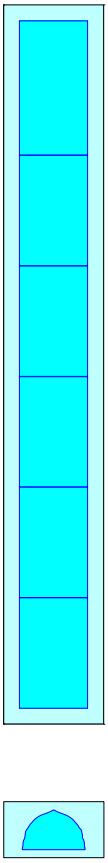
6 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 43.50' Row Length +12.0" End Stone x 2 = 45.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

6 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 324.1 cf Chamber Storage

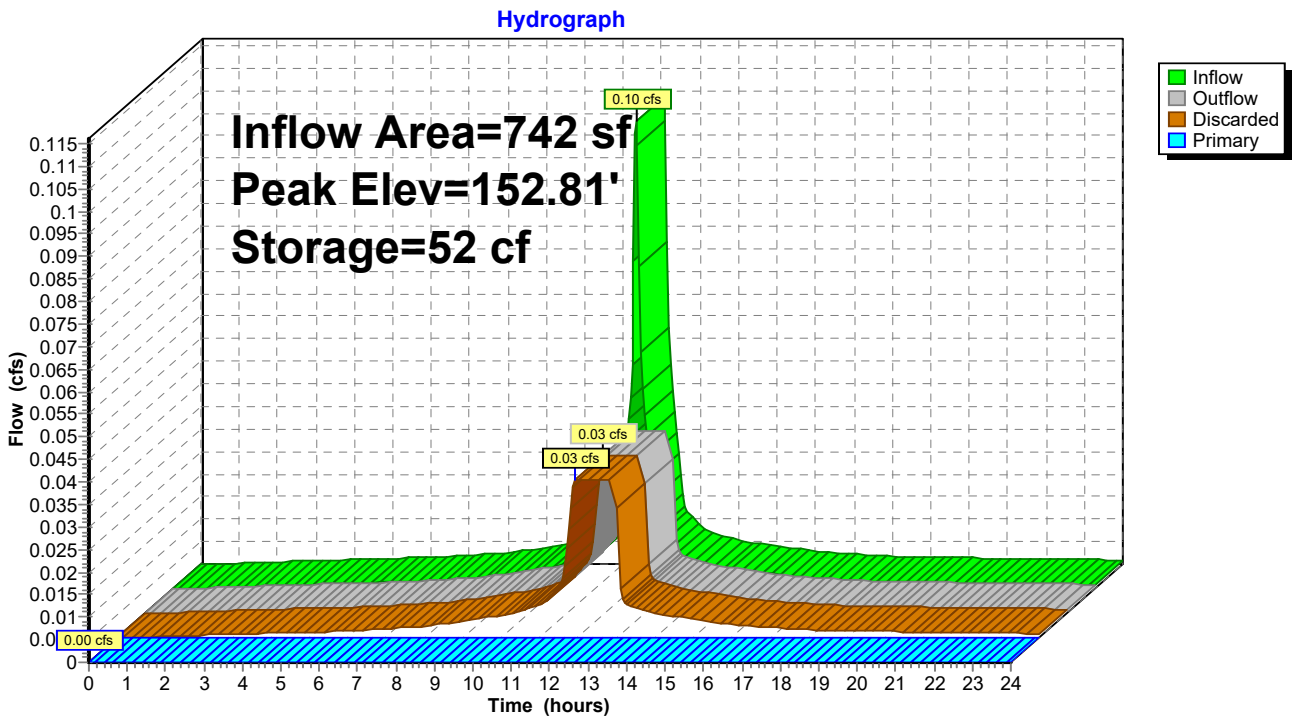
1,020.6 cf Field - 324.1 cf Chambers = 696.5 cf Stone x 40.0% Voids = 278.6 cf Stone Storage

Chamber Storage + Stone Storage = 602.7 cf = 0.014 af
Overall Storage Efficiency = 59.1%
Overall System Size = 45.50' x 6.33' x 3.54'

6 Chambers
37.8 cy Field
25.8 cy Stone



Pond INF-2: Cultec 330



Stage-Area-Storage for Pond INF-2: Cultec 330

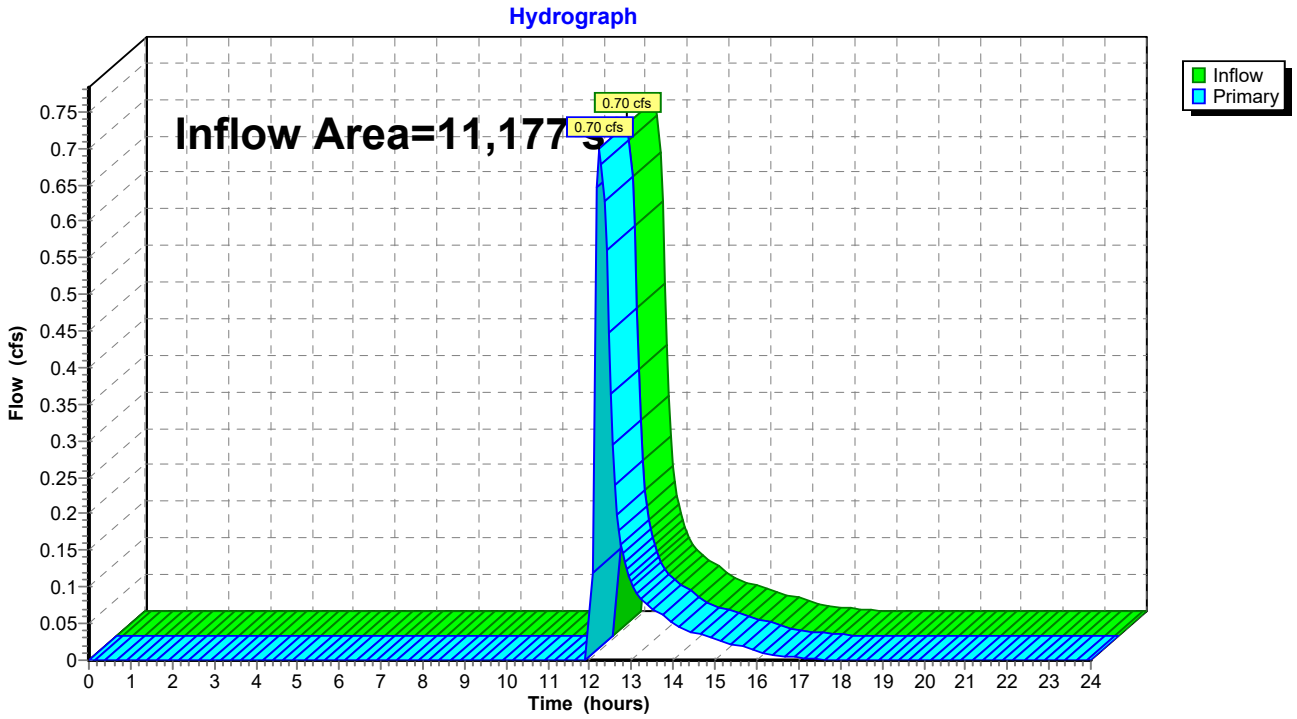
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
152.36	**288**	0
152.46	288	12
152.56	288	23
152.66	288	35
152.76	288	46
152.86	288	58
152.96	288	80
153.06	288	101
153.16	288	123
153.26	288	145
153.36	288	166
153.46	288	188
153.56	288	209
153.66	288	230
153.76	288	251
153.86	288	272
153.96	288	293
154.06	288	314
154.16	288	334
154.26	288	354
154.36	288	374
154.46	288	394
154.56	288	413
154.66	288	431
154.76	288	449
154.86	288	467
154.96	288	484
155.06	288	500
155.16	288	515
155.26	288	528
155.36	288	540
155.46	288	552
155.56	288	563
155.66	288	575
155.76	288	586
155.86	288	**598**
155.96	288	**603**
156.06	288	603
156.16	288	603
156.26	288	603
156.36	288	603
156.46	288	603
156.56	288	603
156.66	288	603
156.76	288	603
156.86	288	603
156.96	288	603
157.06	288	603
157.16	288	603
157.26	288	603
157.36	288	603
157.46	288	603

Summary for Link PR POC 1: EX CB 6

Inflow Area = 11,177 sf, 76.51% Impervious, Inflow Depth = 1.81" for 25yr Storm event
Inflow = 0.70 cfs @ 12.22 hrs, Volume= 1,688 cf
Primary = 0.70 cfs @ 12.22 hrs, Volume= 1,688 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 1: EX CB 6

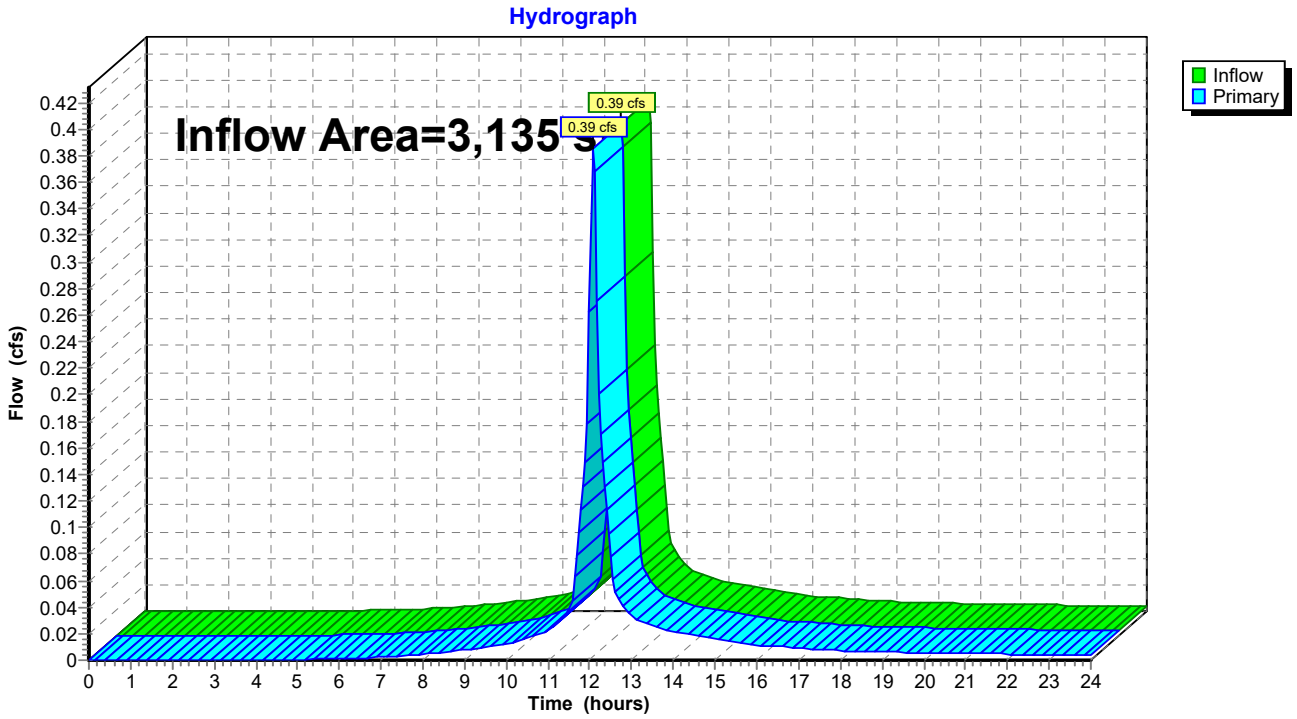


Summary for Link PR POC 2: EX CB 39

Inflow Area = 3,135 sf, 36.43% Impervious, Inflow Depth > 4.68" for 25yr Storm event
Inflow = 0.39 cfs @ 12.07 hrs, Volume= 1,222 cf
Primary = 0.39 cfs @ 12.07 hrs, Volume= 1,222 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 2: EX CB 39

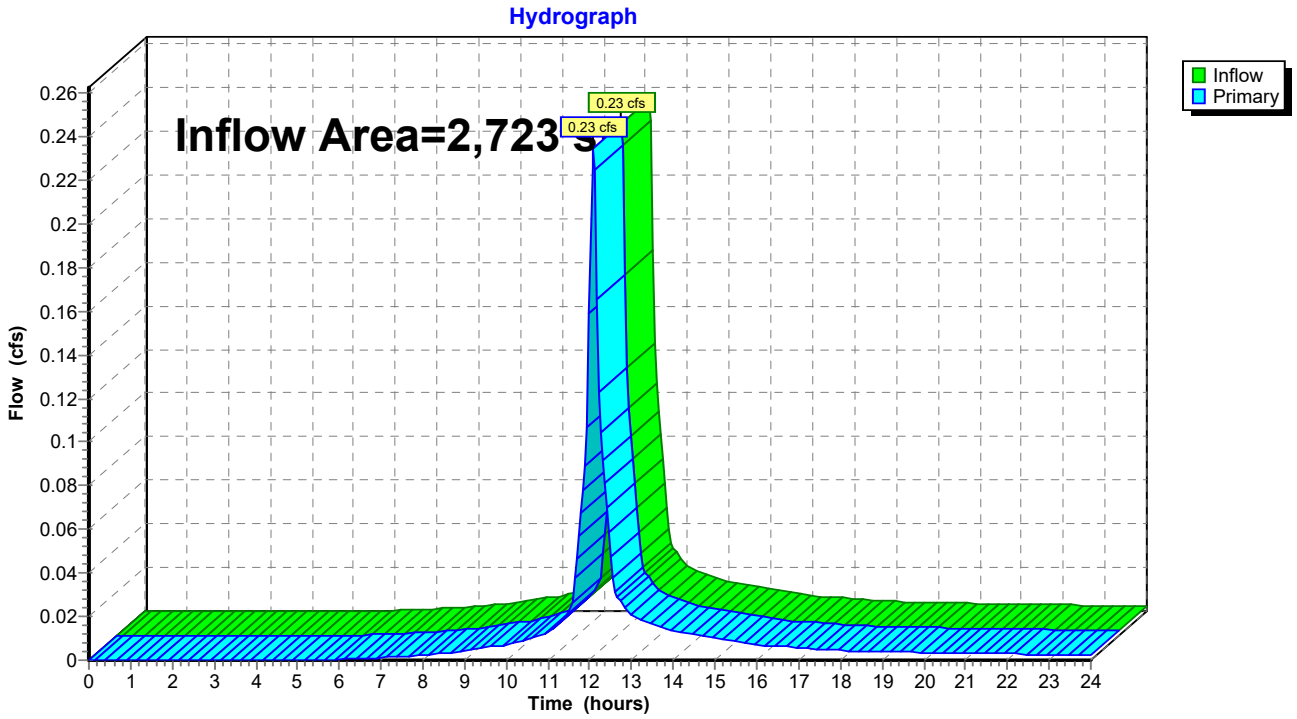


Summary for Link PR POC 3: EX CB 37

Inflow Area = 2,723 sf, 48.62% Impervious, Inflow Depth > 3.25" for 25yr Storm event
Inflow = 0.23 cfs @ 12.07 hrs, Volume= 736 cf
Primary = 0.23 cfs @ 12.07 hrs, Volume= 736 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 3: EX CB 37

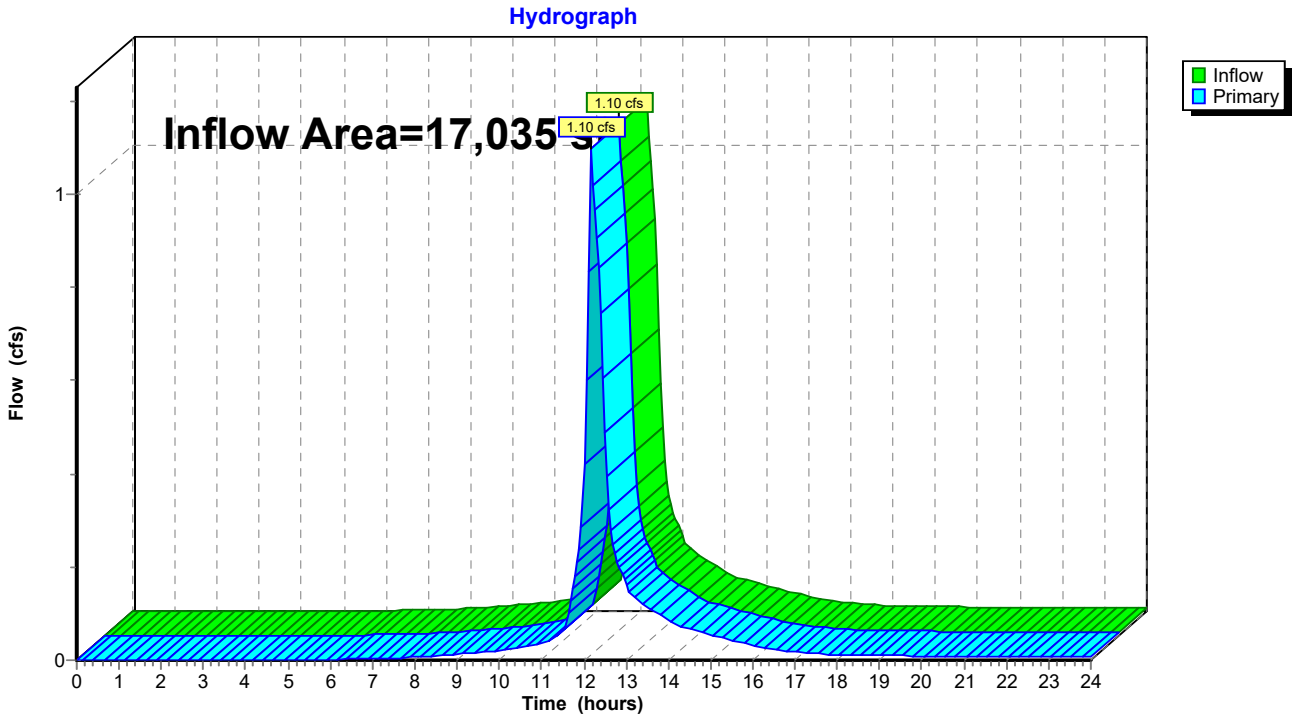


Summary for Link T-PR: Proposed Conditions Overall Discharge

Inflow Area = 17,035 sf, 64.68% Impervious, Inflow Depth > 2.57" for 25yr Storm event
Inflow = 1.10 cfs @ 12.16 hrs, Volume= 3,646 cf
Primary = 1.10 cfs @ 12.16 hrs, Volume= 3,646 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link T-PR: Proposed Conditions Overall Discharge



Summary for Subcatchment PR-1: Pr Drainage Area 1

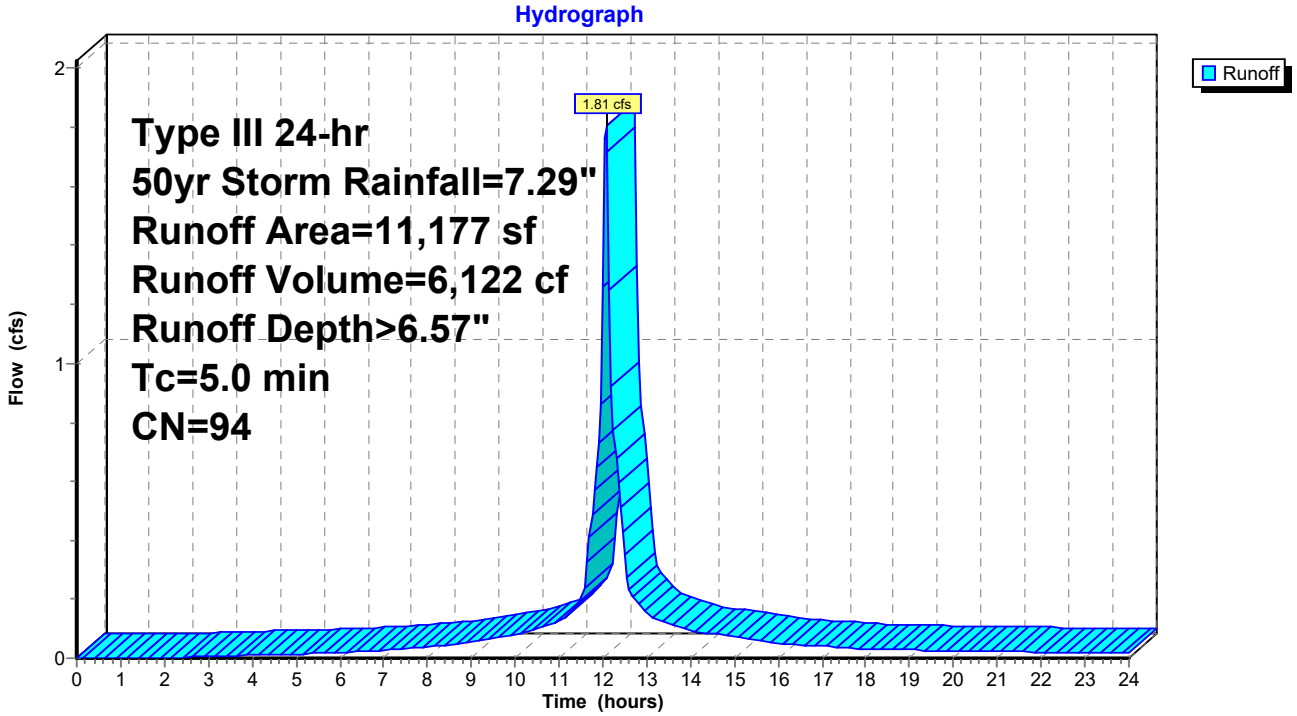
Runoff = 1.81 cfs @ 12.07 hrs, Volume= 6,122 cf, Depth> 6.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50yr Storm Rainfall=7.29"

	Area (sf)	CN	Description
*	5,809	98	Roof Area
*	2,743	98	Hardscape Areas
	2,625	80	>75% Grass cover, Good, HSG D
	11,177	94	Weighted Average
	2,625		23.49% Pervious Area
	8,552		76.51% Impervious Area

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

Subcatchment PR-1: Pr Drainage Area 1



Summary for Subcatchment PR-2A: Pr Drainage Area 2

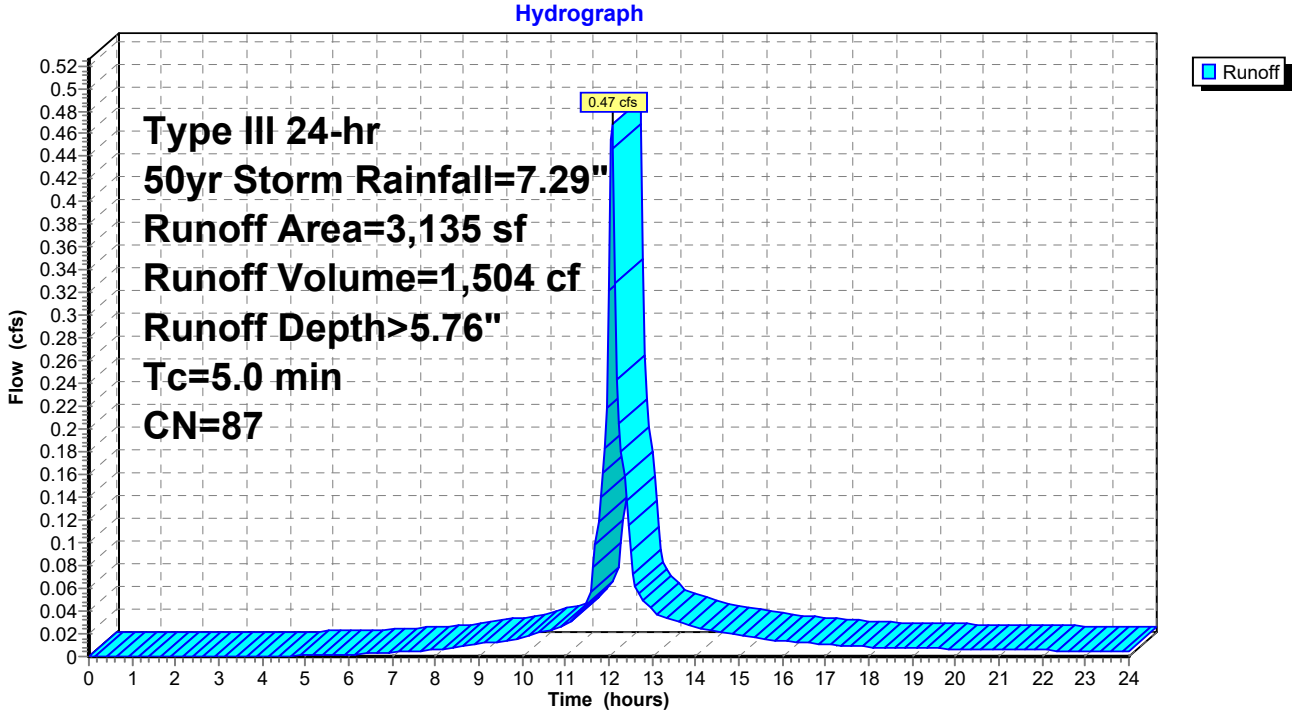
Runoff = 0.47 cfs @ 12.07 hrs, Volume= 1,504 cf, Depth> 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50yr Storm Rainfall=7.29"

	Area (sf)	CN	Description
*	1,142	98	Hardscape Area
	1,993	80	>75% Grass cover, Good, HSG D
	3,135	87	Weighted Average
	1,993		63.57% Pervious Area
	1,142		36.43% Impervious Area

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

Subcatchment PR-2A: Pr Drainage Area 2



Summary for Subcatchment PR-3A: Pr Drainage Area 3

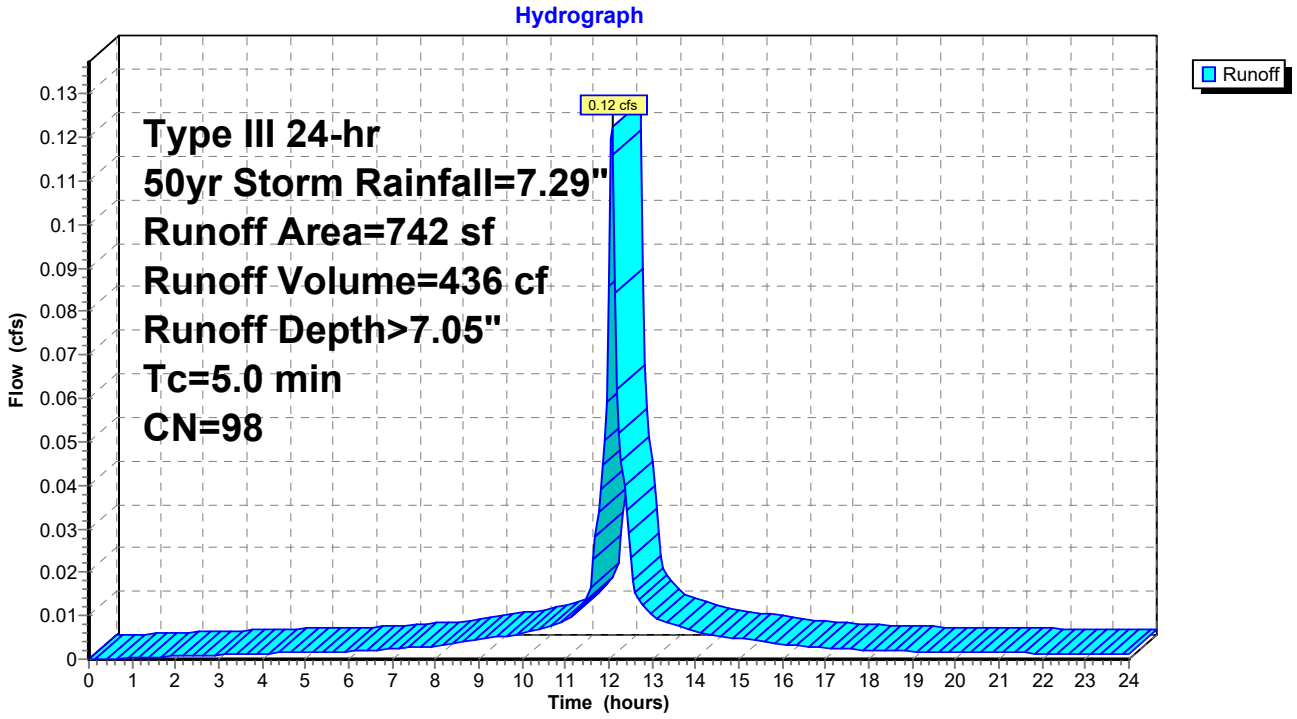
Runoff = 0.12 cfs @ 12.07 hrs, Volume= 436 cf, Depth> 7.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50yr Storm Rainfall=7.29"

	Area (sf)	CN	Description
*	742	98	Roof Area
	742		100.00% Impervious Area

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

Subcatchment PR-3A: Pr Drainage Area 3



Summary for Subcatchment PR-3B: Pr Drainage Area 3

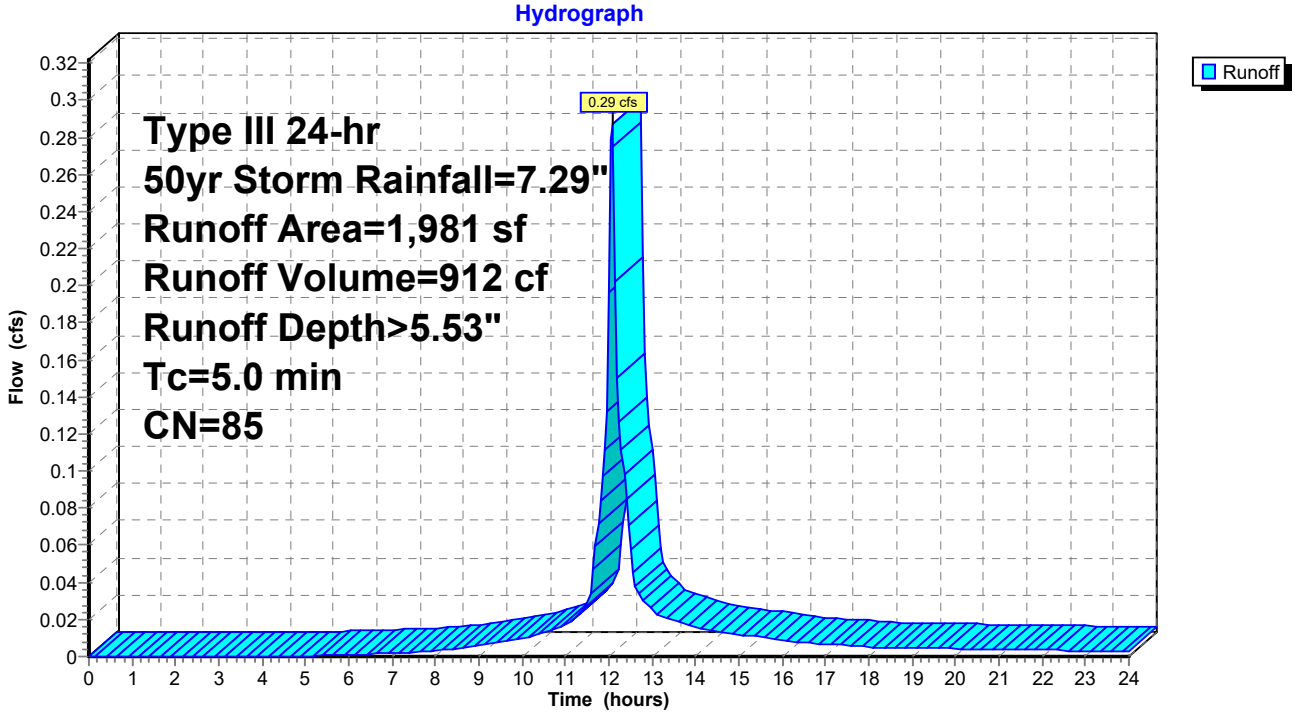
Runoff = 0.29 cfs @ 12.07 hrs, Volume= 912 cf, Depth> 5.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50yr Storm Rainfall=7.29"

	Area (sf)	CN	Description
*	582	98	Hardscape Area
	1,399	80	>75% Grass cover, Good, HSG D
	1,981	85	Weighted Average
	1,399		70.62% Pervious Area
	582		29.38% Impervious Area

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

Subcatchment PR-3B: Pr Drainage Area 3



Summary for Pond INF-1: ADS Stormtech 3500

Inflow Area =	11,177 sf, 76.51% Impervious, Inflow Depth > 6.57" for 50yr Storm event				
Inflow =	1.81 cfs @	12.07 hrs,	Volume=	6,122 cf	
Outflow =	1.01 cfs @	12.19 hrs,	Volume=	4,798 cf,	Atten= 44%, Lag= 7.3 min
Discarded =	0.04 cfs @	12.19 hrs,	Volume=	2,248 cf	
Primary =	0.97 cfs @	12.19 hrs,	Volume=	2,551 cf	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 6
Peak Elev= 163.10' @ 12.19 hrs Surf.Area= 782 sf Storage= 2,118 cf

Plug-Flow detention time= 145.8 min calculated for 4,788 cf (78% of inflow)
Center-of-Mass det. time= 67.8 min (830.1 - 762.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	159.00'	1,157 cf	**22.75'W x 34.38'L x 5.50'H Field A** 4,302 cf Overall - 1,409 cf Embedded = 2,893 cf x 40.0% Voids
#2A	159.75'	1,409 cf	**ADS_StormTech MC-3500 d +Cap**x 12 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 12 Chambers in 3 Rows Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf
		2,566 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	159.00'	**1.500 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 149.00'
#2	Secondary	165.75'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	162.00'	**12.0" Round Culvert to CB 6** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 161.80' / 162.00' S= -0.0143 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#4	Device 3	161.80'	**6.0" Vert. LFO** C= 0.600 Limited to weir flow at low heads
#5	Secondary	164.75'	**6.0" Vert. HLO** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.19 hrs HW=163.10' (Free Discharge)
└─**1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.97 cfs @ 12.19 hrs HW=163.10' (Free Discharge)
└─**3=Culvert to CB 6** (Passes 0.97 cfs of 2.31 cfs potential flow)
  └─**4=LFO** (Orifice Controls 0.97 cfs @ 4.93 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=159.00' (Free Discharge)
├─**2=Orifice/Grate** (Controls 0.00 cfs)
└─**5=HLO** (Controls 0.00 cfs)

Pond INF-1: ADS Stormtech 3500 - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

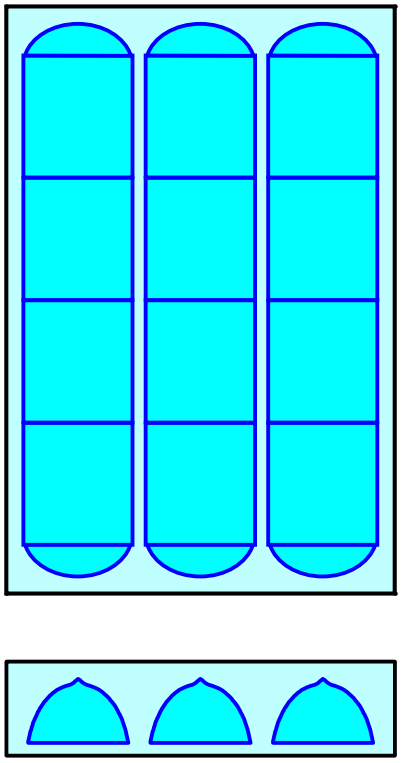
4 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 32.38' Row Length +12.0" End Stone x 2 = 34.38' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

12 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 1,408.8 cf Chamber Storage

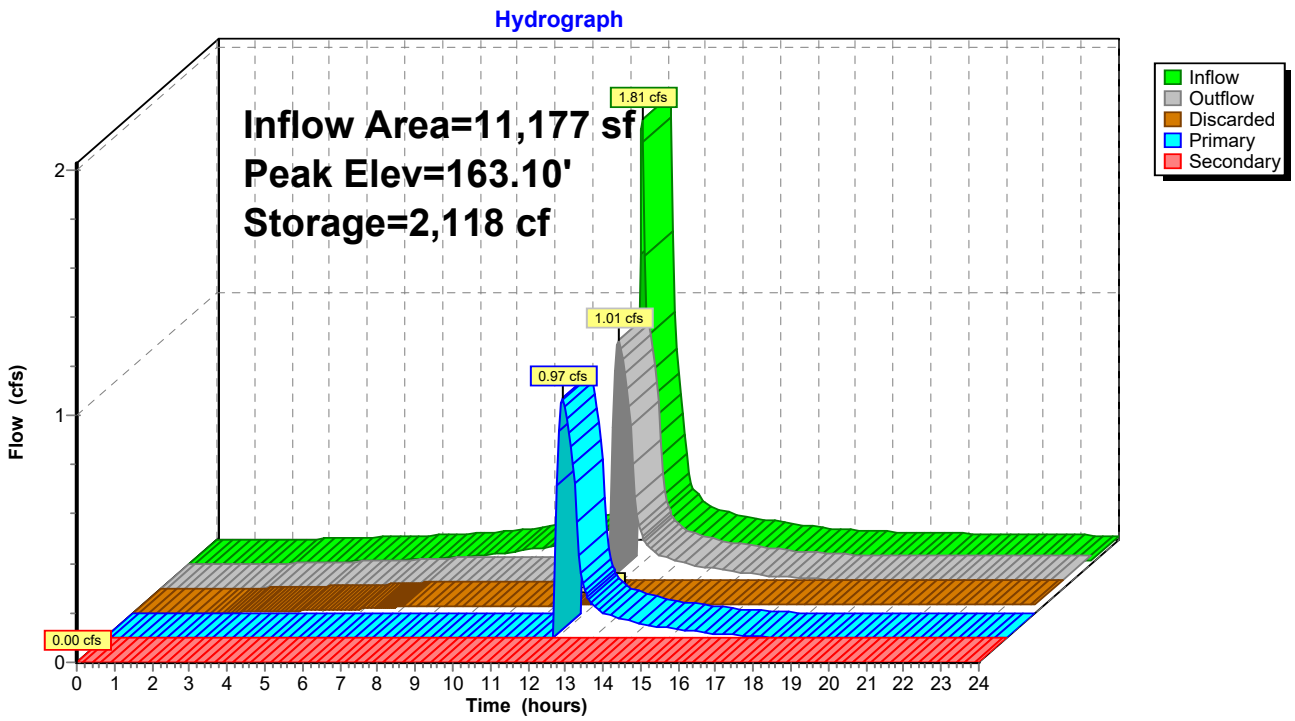
4,301.8 cf Field - 1,408.8 cf Chambers = 2,893.0 cf Stone x 40.0% Voids = 1,157.2 cf Stone Storage

Chamber Storage + Stone Storage = 2,566.0 cf = 0.059 af
Overall Storage Efficiency = 59.6%
Overall System Size = 34.38' x 22.75' x 5.50'

12 Chambers
159.3 cy Field
107.1 cy Stone



Pond INF-1: ADS Stormtech 3500



Stage-Area-Storage for Pond INF-1: ADS Stormtech 3500

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
159.00	**782**	0
159.10	782	31
159.20	782	63
159.30	782	94
159.40	782	125
159.50	782	156
159.60	782	188
159.70	782	219
159.80	782	266
159.90	782	330
160.00	782	393
160.10	782	456
160.20	782	519
160.30	782	581
160.40	782	643
160.50	782	705
160.60	782	767
160.70	782	828
160.80	782	889
160.90	782	950
161.00	782	1,010
161.10	782	1,070
161.20	782	1,129
161.30	782	1,188
161.40	782	1,247
161.50	782	1,304
161.60	782	1,362
161.70	782	1,418
161.80	782	1,474
161.90	782	1,530
162.00	782	1,585
162.10	782	1,638
162.20	782	1,692
162.30	782	1,744
162.40	782	1,795
162.50	782	1,845
162.60	782	1,894
162.70	782	1,942
162.80	782	1,988
162.90	782	2,033
163.00	782	2,076
163.10	782	2,116
163.20	782	2,153
163.30	782	2,188
163.40	782	2,221
163.50	782	2,253
163.60	782	2,284
163.70	782	2,316
163.80	782	2,347
163.90	782	2,378
164.00	782	2,410
164.10	782	2,441
164.20	782	2,472
164.30	782	2,503
164.40	782	2,535
164.50	782	**2,566**
164.60	782	2,566
164.70	782	2,566
164.80	782	2,566
164.90	782	2,566
165.00	782	2,566
165.10	782	2,566
165.20	782	2,566
165.30	782	2,566
165.40	782	2,566
165.50	782	2,566
165.60	782	2,566
165.70	782	2,566

Summary for Pond INF-2: Cultec 330

Inflow Area = 742 sf,100.00% Impervious, Inflow Depth > 7.05" for 50yr Storm event
Inflow = 0.12 cfs @ 12.07 hrs, Volume= 436 cf
Outflow = 0.03 cfs @ 11.85 hrs, Volume= 436 cf, Atten= 72%, Lag= 0.0 min
Discarded = 0.03 cfs @ 11.85 hrs, Volume= 436 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 152.93' @ 12.40 hrs Surf.Area= 288 sf Storage= 74 cf

Plug-Flow detention time= 10.7 min calculated for 435 cf (100% of inflow)
Center-of-Mass det. time= 10.4 min (751.5 - 741.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	152.36'	279 cf	**6.33'W x 45.50'L x 3.54'H Field A** 1,021 cf Overall - 324 cf Embedded = 696 cf x 40.0% Voids
#2A	152.86'	324 cf	**Cultec R-330XLHD** x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		603 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	152.36'	**5.220 in/hr Exfiltration over Surface area**
#2	Primary	157.50'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 11.85 hrs HW=152.42' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=152.36' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond INF-2: Cultec 330 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

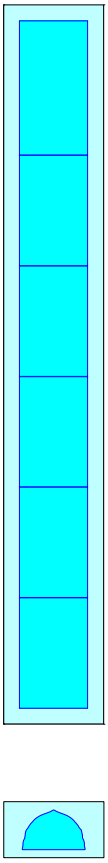
6 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 43.50' Row Length +12.0" End Stone x 2 = 45.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

6 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 324.1 cf Chamber Storage

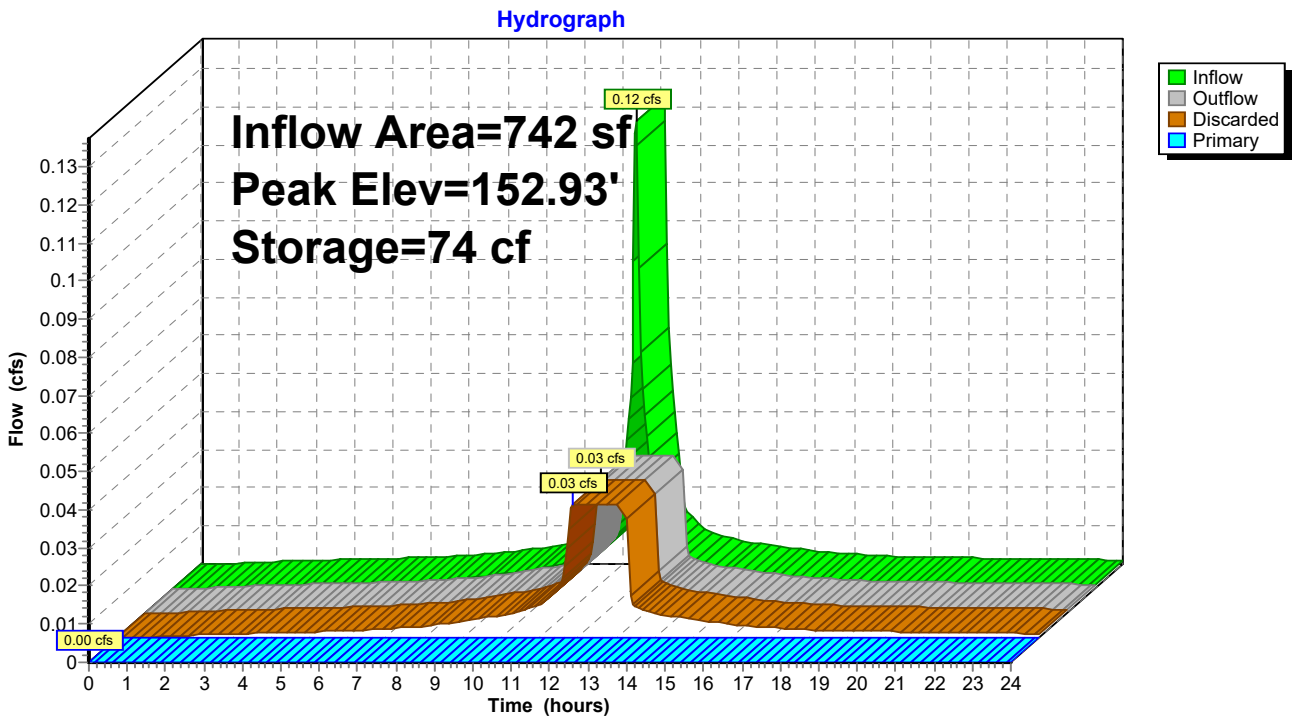
1,020.6 cf Field - 324.1 cf Chambers = 696.5 cf Stone x 40.0% Voids = 278.6 cf Stone Storage

Chamber Storage + Stone Storage = 602.7 cf = 0.014 af
Overall Storage Efficiency = 59.1%
Overall System Size = 45.50' x 6.33' x 3.54'

6 Chambers
37.8 cy Field
25.8 cy Stone



Pond INF-2: Cultec 330



Stage-Area-Storage for Pond INF-2: Cultec 330

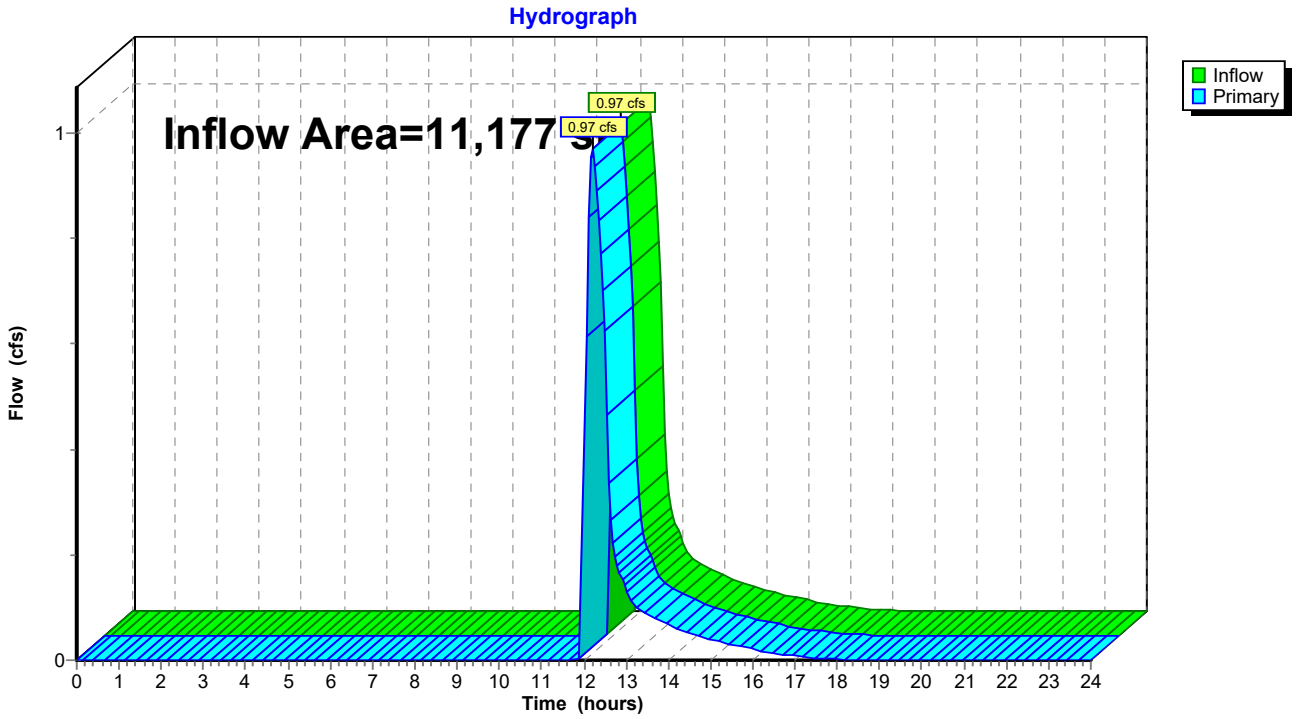
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
152.36	**288**	0
152.46	288	12
152.56	288	23
152.66	288	35
152.76	288	46
152.86	288	58
152.96	288	80
153.06	288	101
153.16	288	123
153.26	288	145
153.36	288	166
153.46	288	188
153.56	288	209
153.66	288	230
153.76	288	251
153.86	288	272
153.96	288	293
154.06	288	314
154.16	288	334
154.26	288	354
154.36	288	374
154.46	288	394
154.56	288	413
154.66	288	431
154.76	288	449
154.86	288	467
154.96	288	484
155.06	288	500
155.16	288	515
155.26	288	528
155.36	288	540
155.46	288	552
155.56	288	563
155.66	288	575
155.76	288	586
155.86	288	**598**
155.96	288	**603**
156.06	288	603
156.16	288	603
156.26	288	603
156.36	288	603
156.46	288	603
156.56	288	603
156.66	288	603
156.76	288	603
156.86	288	603
156.96	288	603
157.06	288	603
157.16	288	603
157.26	288	603
157.36	288	603
157.46	288	603

Summary for Link PR POC 1: EX CB 6

Inflow Area = 11,177 sf, 76.51% Impervious, Inflow Depth = 2.74" for 50yr Storm event
Inflow = 0.97 cfs @ 12.19 hrs, Volume= 2,551 cf
Primary = 0.97 cfs @ 12.19 hrs, Volume= 2,551 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 1: EX CB 6

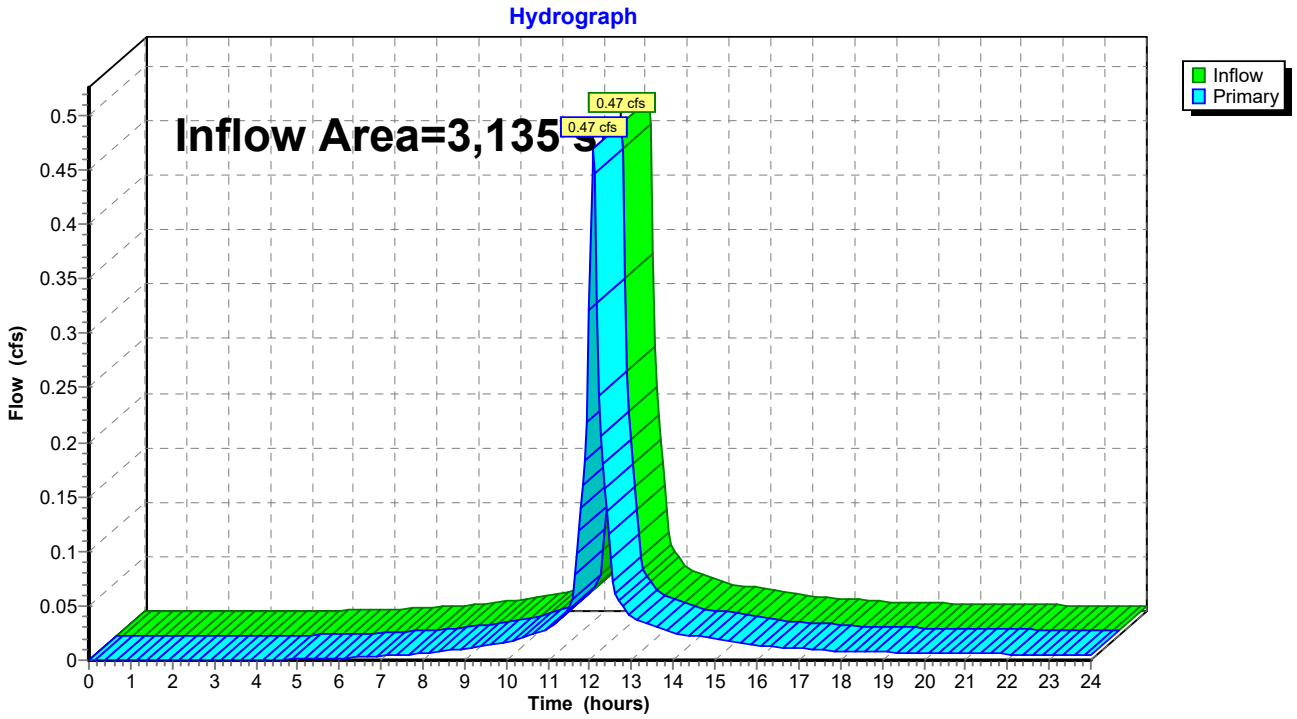


Summary for Link PR POC 2: EX CB 39

Inflow Area = 3,135 sf, 36.43% Impervious, Inflow Depth > 5.76" for 50yr Storm event
Inflow = 0.47 cfs @ 12.07 hrs, Volume= 1,504 cf
Primary = 0.47 cfs @ 12.07 hrs, Volume= 1,504 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 2: EX CB 39

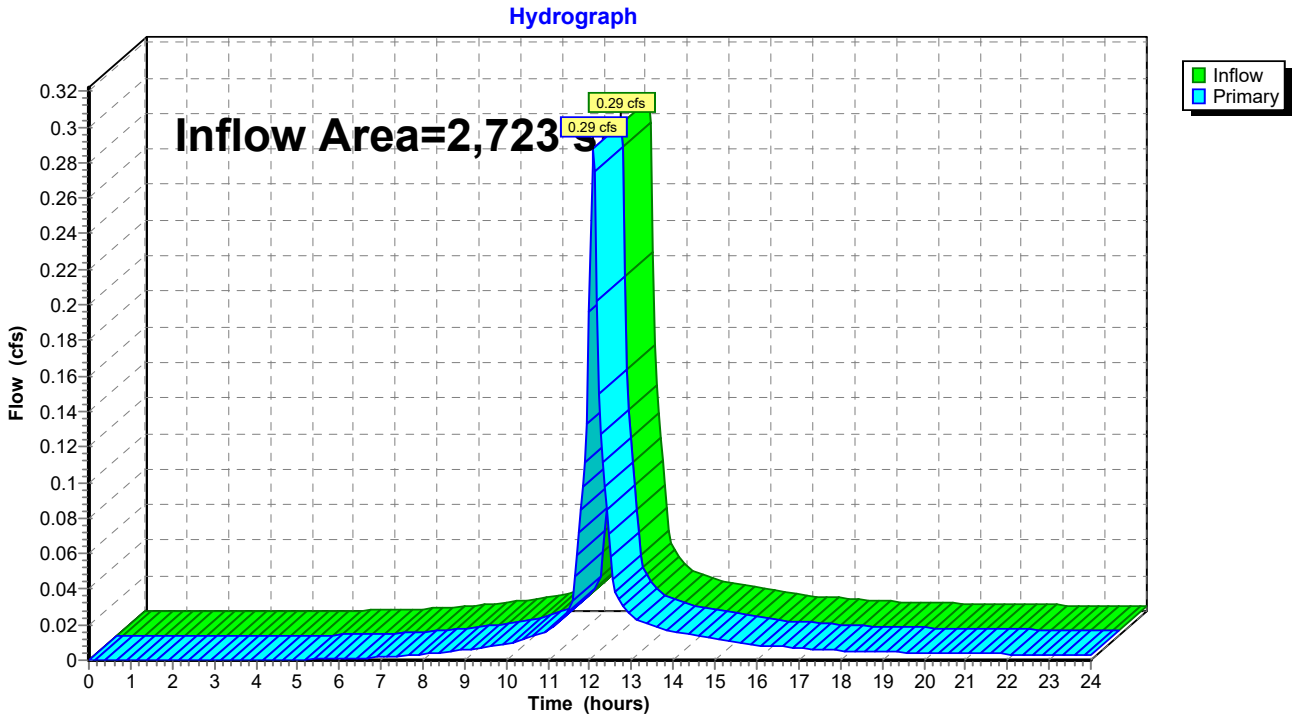


Summary for Link PR POC 3: EX CB 37

Inflow Area = 2,723 sf, 48.62% Impervious, Inflow Depth > 4.02" for 50yr Storm event
Inflow = 0.29 cfs @ 12.07 hrs, Volume= 912 cf
Primary = 0.29 cfs @ 12.07 hrs, Volume= 912 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 3: EX CB 37

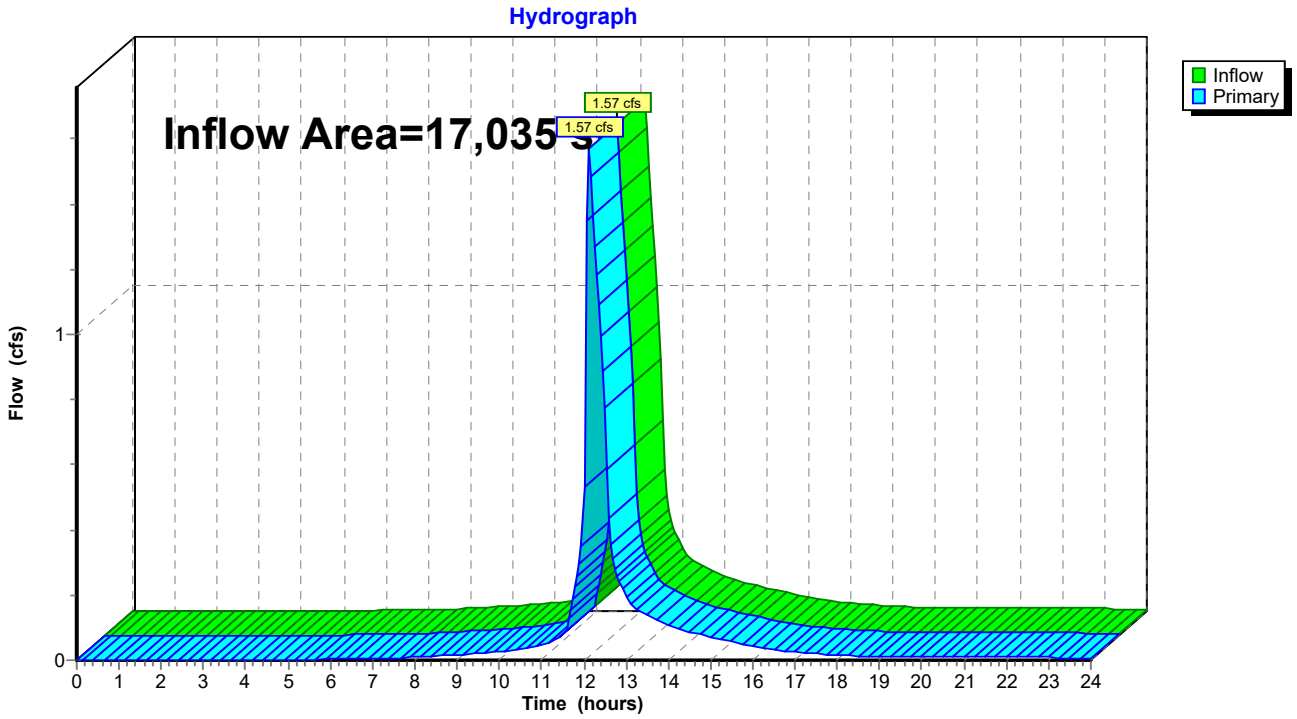


Summary for Link T-PR: Proposed Conditions Overall Discharge

Inflow Area = 17,035 sf, 64.68% Impervious, Inflow Depth > 3.50" for 50yr Storm event
Inflow = 1.57 cfs @ 12.11 hrs, Volume= 4,967 cf
Primary = 1.57 cfs @ 12.11 hrs, Volume= 4,967 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link T-PR: Proposed Conditions Overall Discharge



Summary for Subcatchment PR-1: Pr Drainage Area 1

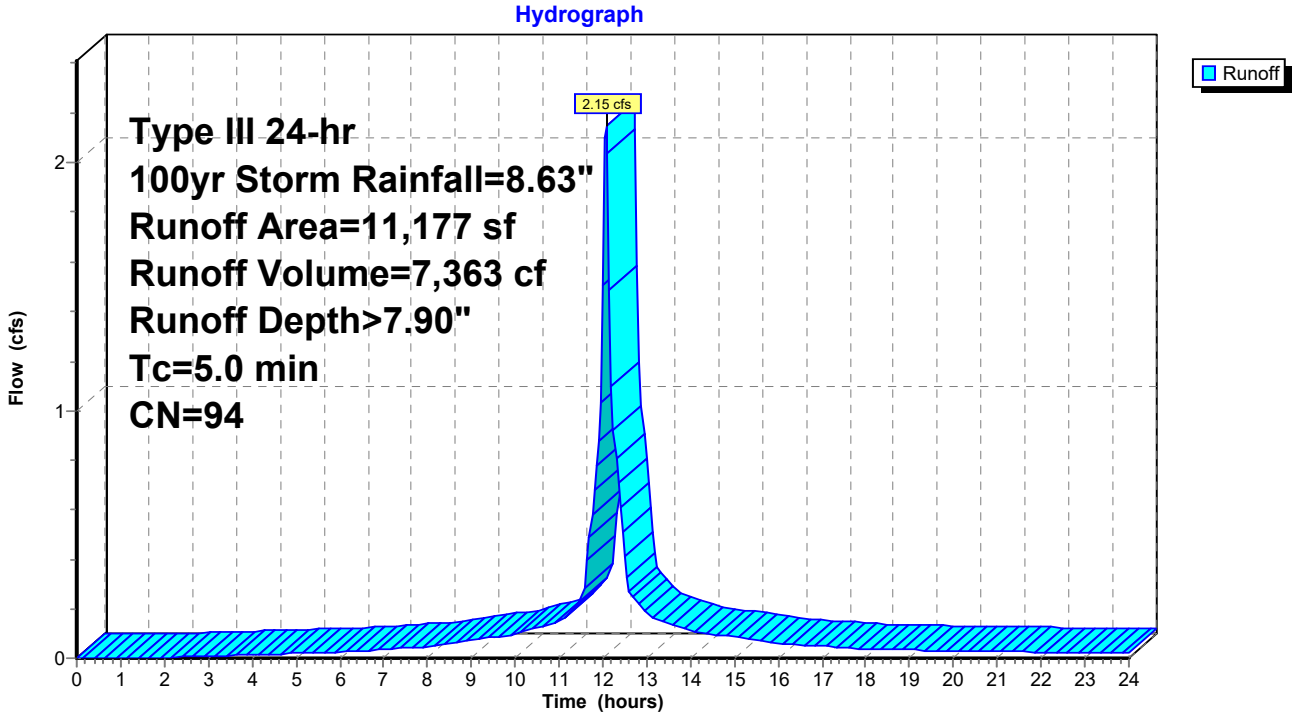
Runoff = 2.15 cfs @ 12.07 hrs, Volume= 7,363 cf, Depth> 7.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100yr Storm Rainfall=8.63"

	Area (sf)	CN	Description
*	5,809	98	Roof Area
*	2,743	98	Hardscape Areas
	2,625	80	>75% Grass cover, Good, HSG D
	11,177	94	Weighted Average
	2,625		23.49% Pervious Area
	8,552		76.51% Impervious Area

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

Subcatchment PR-1: Pr Drainage Area 1



Summary for Subcatchment PR-2A: Pr Drainage Area 2

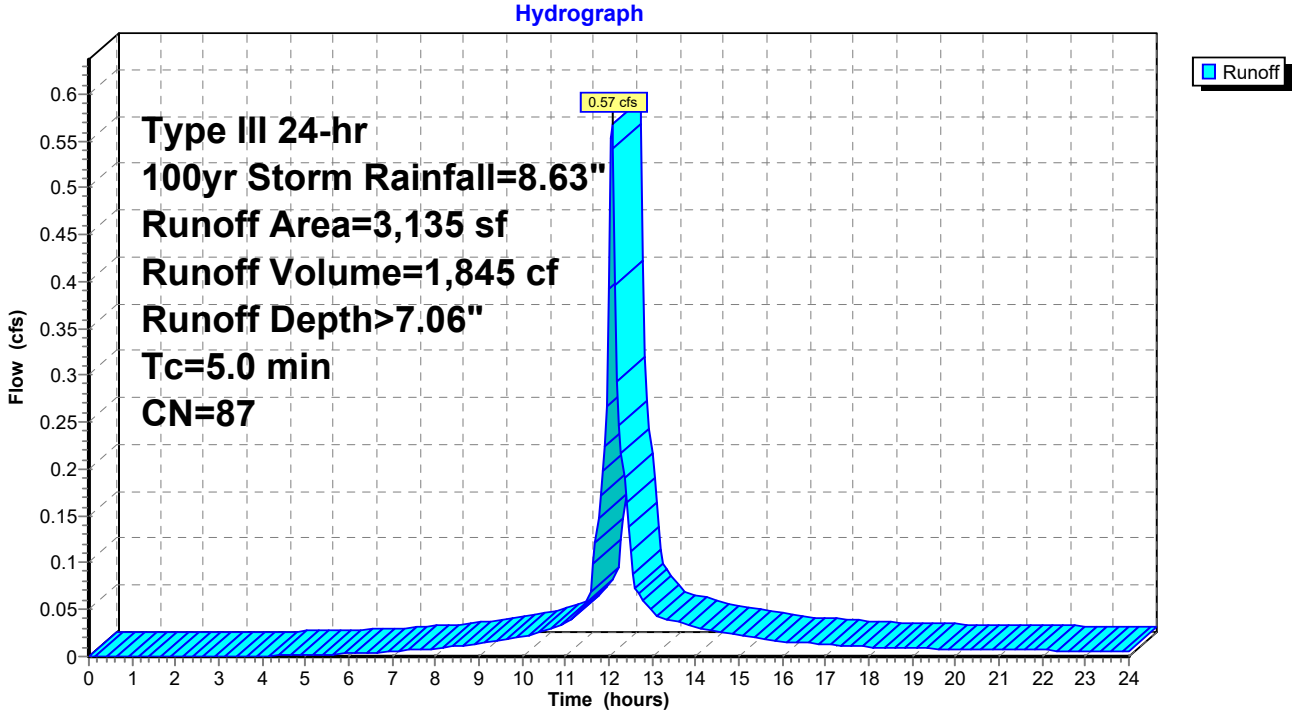
Runoff = 0.57 cfs @ 12.07 hrs, Volume= 1,845 cf, Depth> 7.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100yr Storm Rainfall=8.63"

	Area (sf)	CN	Description
*	1,142	98	Hardscape Area
	1,993	80	>75% Grass cover, Good, HSG D
	3,135	87	Weighted Average
	1,993		63.57% Pervious Area
	1,142		36.43% Impervious Area

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

Subcatchment PR-2A: Pr Drainage Area 2



Summary for Subcatchment PR-3A: Pr Drainage Area 3

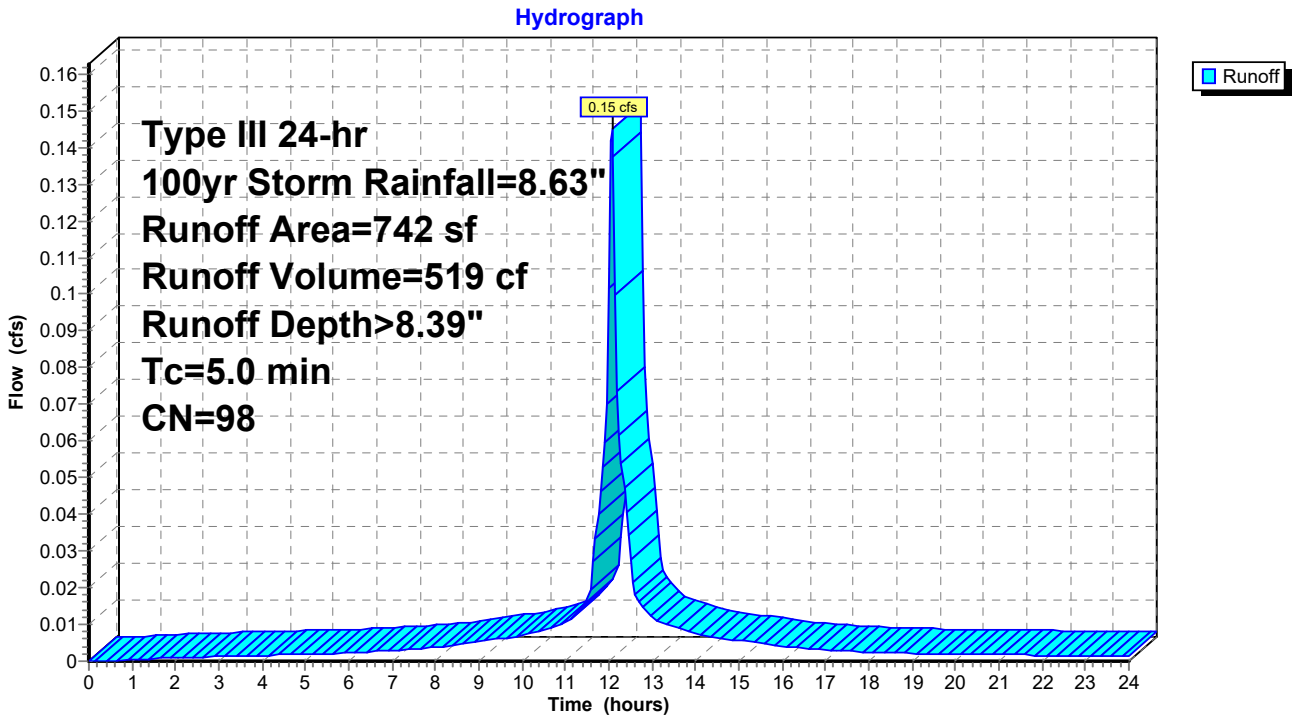
Runoff = 0.15 cfs @ 12.07 hrs, Volume= 519 cf, Depth> 8.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100yr Storm Rainfall=8.63"

	Area (sf)	CN	Description
*	742	98	Roof Area
	742		100.00% Impervious Area

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

Subcatchment PR-3A: Pr Drainage Area 3



Summary for Subcatchment PR-3B: Pr Drainage Area 3

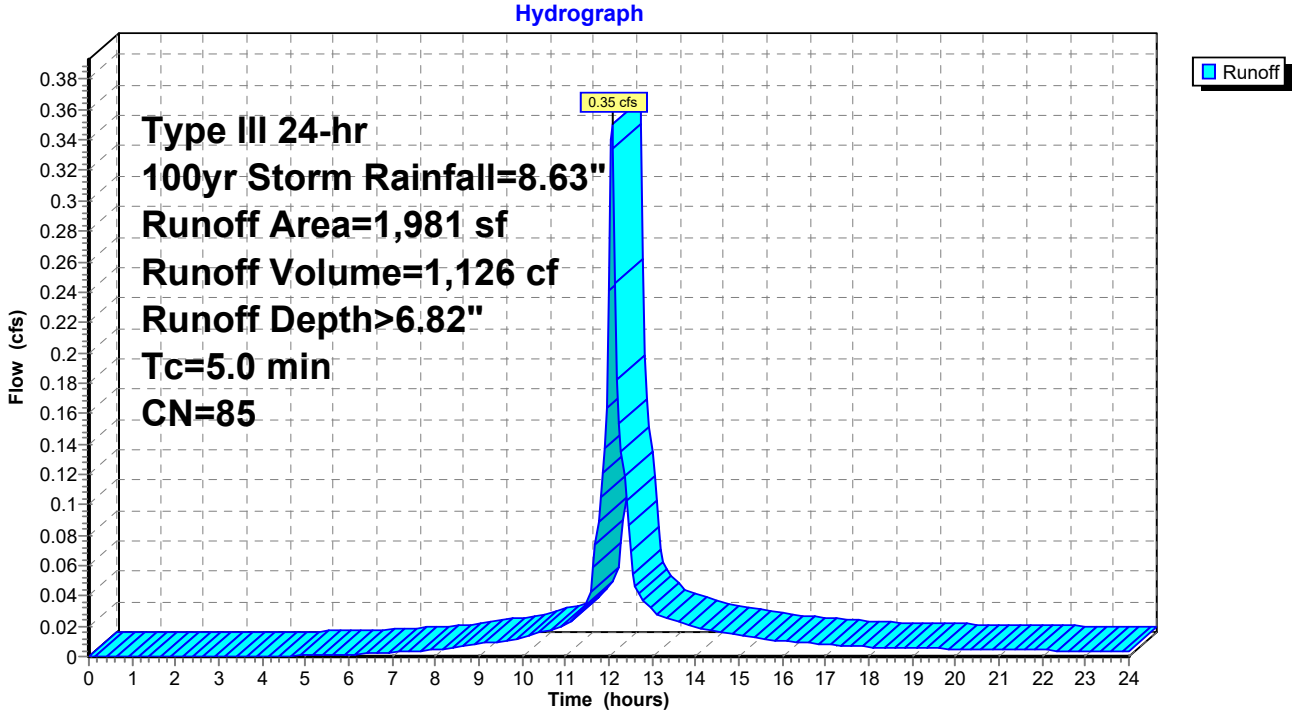
Runoff = 0.35 cfs @ 12.07 hrs, Volume= 1,126 cf, Depth> 6.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100yr Storm Rainfall=8.63"

	Area (sf)	CN	Description
*	582	98	Hardscape Area
	1,399	80	>75% Grass cover, Good, HSG D
	1,981	85	Weighted Average
	1,399		70.62% Pervious Area
	582		29.38% Impervious Area

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

Subcatchment PR-3B: Pr Drainage Area 3



Summary for Pond INF-1: ADS Stormtech 3500

Inflow Area =	11,177 sf, 76.51% Impervious, Inflow Depth > 7.90" for 100yr Storm event				
Inflow =	2.15 cfs @	12.07 hrs,	Volume=	7,363 cf	
Outflow =	1.30 cfs @	12.17 hrs,	Volume=	5,949 cf,	Atten= 40%, Lag= 6.2 min
Discarded =	0.04 cfs @	12.17 hrs,	Volume=	2,341 cf	
Primary =	1.26 cfs @	12.17 hrs,	Volume=	3,608 cf	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 6
Peak Elev= 163.83' @ 12.17 hrs Surf.Area= 782 sf Storage= 2,356 cf

Plug-Flow detention time= 128.2 min calculated for 5,937 cf (81% of inflow)
Center-of-Mass det. time= 55.0 min (813.3 - 758.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	159.00'	1,157 cf	**22.75'W x 34.38'L x 5.50'H Field A** 4,302 cf Overall - 1,409 cf Embedded = 2,893 cf x 40.0% Voids
#2A	159.75'	1,409 cf	**ADS_StormTech MC-3500 d +Cap**x 12 Inside #1 Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap 12 Chambers in 3 Rows Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf
		2,566 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	159.00'	**1.500 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 149.00'
#2	Secondary	165.75'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Primary	162.00'	**12.0" Round Culvert to CB 6** L= 14.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 161.80' / 162.00' S= -0.0143 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf
#4	Device 3	161.80'	**6.0" Vert. LFO** C= 0.600 Limited to weir flow at low heads
#5	Secondary	164.75'	**6.0" Vert. HLO** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.17 hrs HW=163.79' (Free Discharge)
└─**1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=1.25 cfs @ 12.17 hrs HW=163.79' (Free Discharge)
└─**3=Culvert to CB 6** (Passes 1.25 cfs of 3.39 cfs potential flow)
  └─**4=LFO** (Orifice Controls 1.25 cfs @ 6.35 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=159.00' (Free Discharge)
├─**2=Orifice/Grate** (Controls 0.00 cfs)
└─**5=HLO** (Controls 0.00 cfs)

Pond INF-1: ADS Stormtech 3500 - Chamber Wizard Field A

Chamber Model = ADS_StormTechMC-3500 d +Cap (ADS StormTech® MC-3500 d rev 03/14 with Cap volume)
Effective Size= 70.4"W x 45.0"H => 15.33 sf x 7.17'L = 110.0 cf
Overall Size= 77.0"W x 45.0"H x 7.50'L with 0.33' Overlap
Cap Storage= +14.9 cf x 2 x 3 rows = 89.4 cf

77.0" Wide + 9.0" Spacing = 86.0" C-C Row Spacing

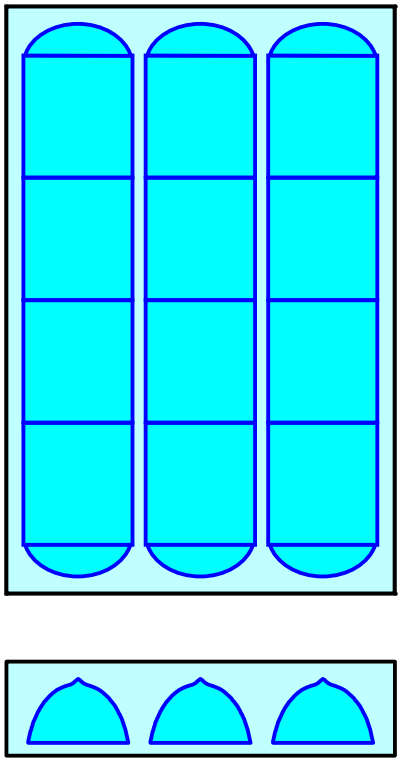
4 Chambers/Row x 7.17' Long +1.85' Cap Length x 2 = 32.38' Row Length +12.0" End Stone x 2 = 34.38' Base Length
3 Rows x 77.0" Wide + 9.0" Spacing x 2 + 12.0" Side Stone x 2 = 22.75' Base Width
9.0" Stone Base + 45.0" Chamber Height + 12.0" Stone Cover = 5.50' Field Height

12 Chambers x 110.0 cf + 14.9 cf Cap Volume x 2 x 3 Rows = 1,408.8 cf Chamber Storage

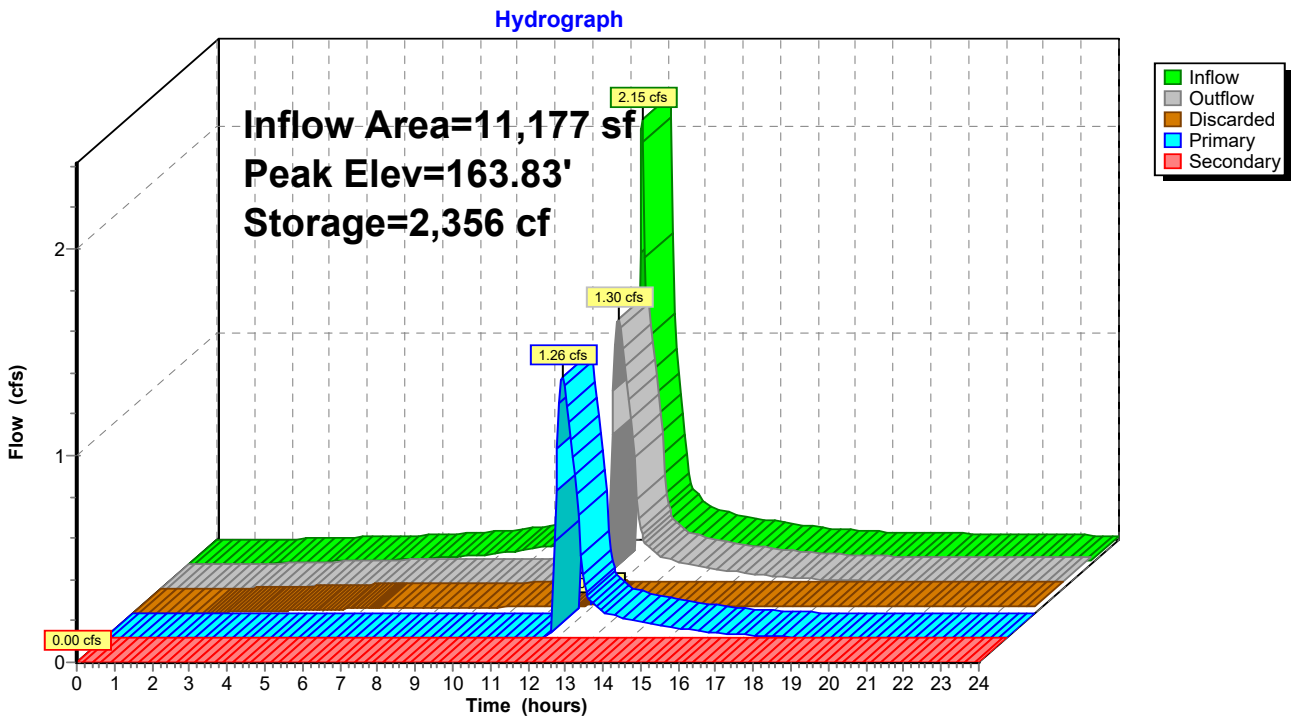
4,301.8 cf Field - 1,408.8 cf Chambers = 2,893.0 cf Stone x 40.0% Voids = 1,157.2 cf Stone Storage

Chamber Storage + Stone Storage = 2,566.0 cf = 0.059 af
Overall Storage Efficiency = 59.6%
Overall System Size = 34.38' x 22.75' x 5.50'

12 Chambers
159.3 cy Field
107.1 cy Stone



Pond INF-1: ADS Stormtech 3500



Stage-Area-Storage for Pond INF-1: ADS Stormtech 3500

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
159.00	**782**	0
159.10	782	31
159.20	782	63
159.30	782	94
159.40	782	125
159.50	782	156
159.60	782	188
159.70	782	219
159.80	782	266
159.90	782	330
160.00	782	393
160.10	782	456
160.20	782	519
160.30	782	581
160.40	782	643
160.50	782	705
160.60	782	767
160.70	782	828
160.80	782	889
160.90	782	950
161.00	782	1,010
161.10	782	1,070
161.20	782	1,129
161.30	782	1,188
161.40	782	1,247
161.50	782	1,304
161.60	782	1,362
161.70	782	1,418
161.80	782	1,474
161.90	782	1,530
162.00	782	1,585
162.10	782	1,638
162.20	782	1,692
162.30	782	1,744
162.40	782	1,795
162.50	782	1,845
162.60	782	1,894
162.70	782	1,942
162.80	782	1,988
162.90	782	2,033
163.00	782	2,076
163.10	782	2,116
163.20	782	2,153
163.30	782	2,188
163.40	782	2,221
163.50	782	2,253
163.60	782	2,284
163.70	782	2,316
163.80	782	2,347
163.90	782	2,378
164.00	782	2,410
164.10	782	2,441
164.20	782	2,472
164.30	782	2,503
164.40	782	2,535
164.50	782	**2,566**
164.60	782	2,566
164.70	782	2,566
164.80	782	2,566
164.90	782	2,566
165.00	782	2,566
165.10	782	2,566
165.20	782	2,566
165.30	782	2,566
165.40	782	2,566
165.50	782	2,566
165.60	782	2,566
165.70	782	2,566

Summary for Pond INF-2: Cultec 330

Inflow Area = 742 sf,100.00% Impervious, Inflow Depth > 8.39" for 100yr Storm event
Inflow = 0.15 cfs @ 12.07 hrs, Volume= 519 cf
Outflow = 0.03 cfs @ 11.80 hrs, Volume= 518 cf, Atten= 76%, Lag= 0.0 min
Discarded = 0.03 cfs @ 11.80 hrs, Volume= 518 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 153.07' @ 12.45 hrs Surf.Area= 288 sf Storage= 102 cf

Plug-Flow detention time= 14.8 min calculated for 517 cf (100% of inflow)
Center-of-Mass det. time= 14.5 min (753.5 - 739.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	152.36'	279 cf	**6.33'W x 45.50'L x 3.54'H Field A** 1,021 cf Overall - 324 cf Embedded = 696 cf x 40.0% Voids
#2A	152.86'	324 cf	**Cultec R-330XLHD** x 6 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 1 rows
		603 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	152.36'	**5.220 in/hr Exfiltration over Surface area**
#2	Primary	157.50'	**12.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 11.80 hrs HW=152.42' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=152.36' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond INF-2: Cultec 330 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 1 rows

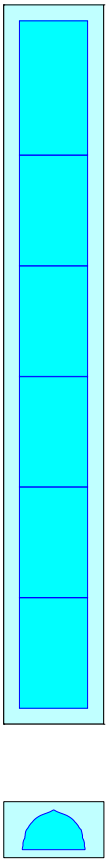
6 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 43.50' Row Length +12.0" End Stone x 2 = 45.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

6 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 324.1 cf Chamber Storage

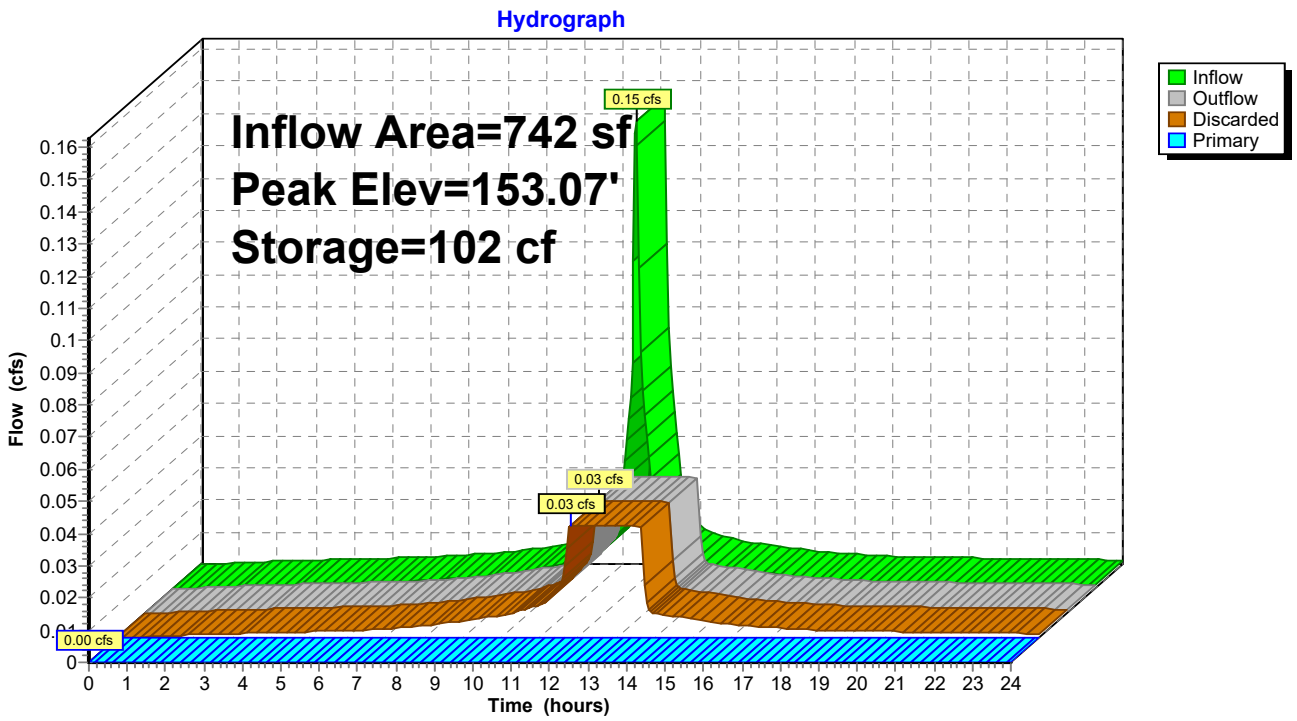
1,020.6 cf Field - 324.1 cf Chambers = 696.5 cf Stone x 40.0% Voids = 278.6 cf Stone Storage

Chamber Storage + Stone Storage = 602.7 cf = 0.014 af
Overall Storage Efficiency = 59.1%
Overall System Size = 45.50' x 6.33' x 3.54'

6 Chambers
37.8 cy Field
25.8 cy Stone



Pond INF-2: Cultec 330



Stage-Area-Storage for Pond INF-2: Cultec 330

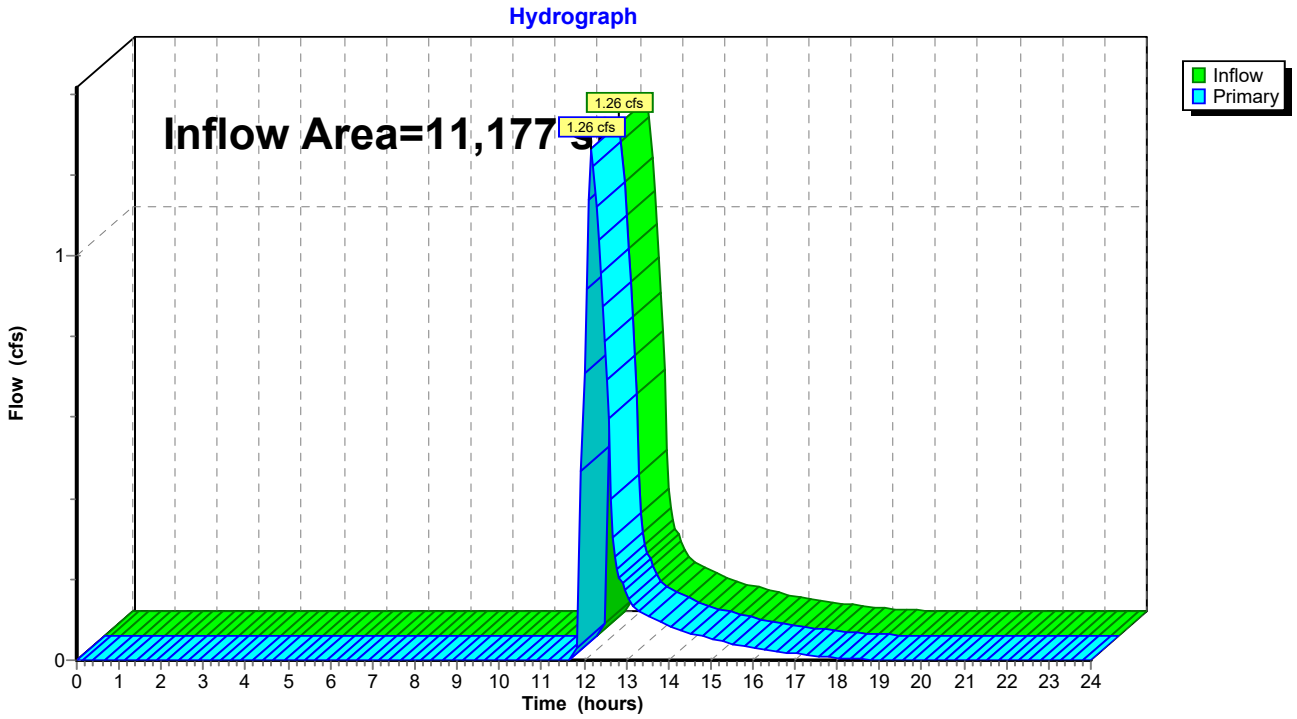
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
152.36	**288**	0
152.46	288	12
152.56	288	23
152.66	288	35
152.76	288	46
152.86	288	58
152.96	288	80
153.06	288	101
153.16	288	123
153.26	288	145
153.36	288	166
153.46	288	188
153.56	288	209
153.66	288	230
153.76	288	251
153.86	288	272
153.96	288	293
154.06	288	314
154.16	288	334
154.26	288	354
154.36	288	374
154.46	288	394
154.56	288	413
154.66	288	431
154.76	288	449
154.86	288	467
154.96	288	484
155.06	288	500
155.16	288	515
155.26	288	528
155.36	288	540
155.46	288	552
155.56	288	563
155.66	288	575
155.76	288	586
155.86	288	**598**
155.96	288	**603**
156.06	288	603
156.16	288	603
156.26	288	603
156.36	288	603
156.46	288	603
156.56	288	603
156.66	288	603
156.76	288	603
156.86	288	603
156.96	288	603
157.06	288	603
157.16	288	603
157.26	288	603
157.36	288	603
157.46	288	603

Summary for Link PR POC 1: EX CB 6

Inflow Area = 11,177 sf, 76.51% Impervious, Inflow Depth = 3.87" for 100yr Storm event
Inflow = 1.26 cfs @ 12.17 hrs, Volume= 3,608 cf
Primary = 1.26 cfs @ 12.17 hrs, Volume= 3,608 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 1: EX CB 6

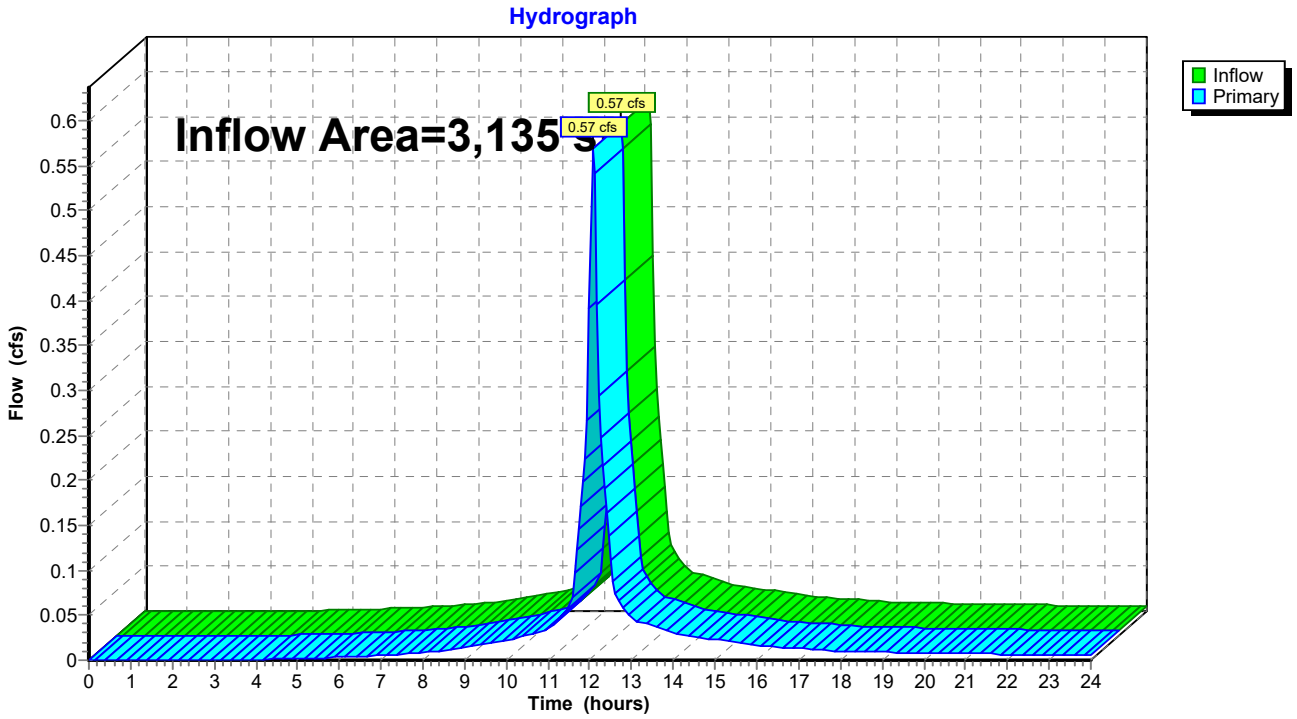


Summary for Link PR POC 2: EX CB 39

Inflow Area = 3,135 sf, 36.43% Impervious, Inflow Depth > 7.06" for 100yr Storm event
Inflow = 0.57 cfs @ 12.07 hrs, Volume= 1,845 cf
Primary = 0.57 cfs @ 12.07 hrs, Volume= 1,845 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 2: EX CB 39

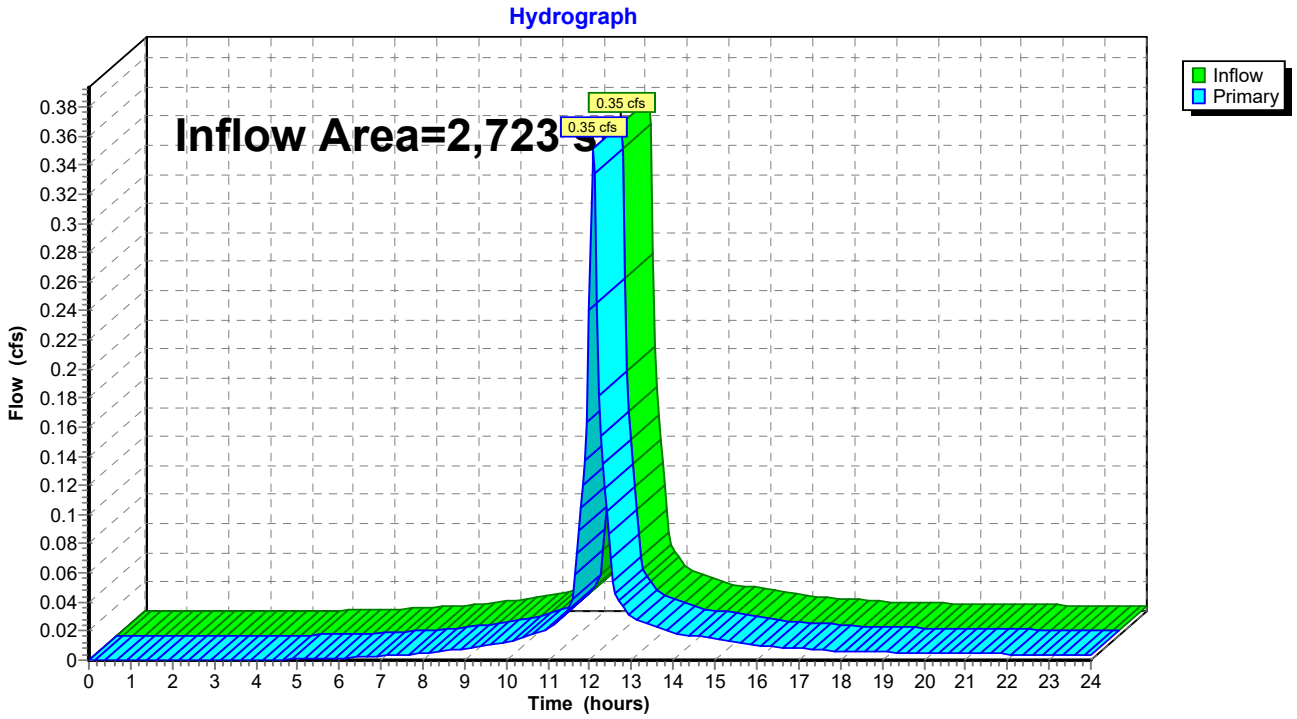


Summary for Link PR POC 3: EX CB 37

Inflow Area = 2,723 sf, 48.62% Impervious, Inflow Depth > 4.96" for 100yr Storm event
Inflow = 0.35 cfs @ 12.07 hrs, Volume= 1,126 cf
Primary = 0.35 cfs @ 12.07 hrs, Volume= 1,126 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link PR POC 3: EX CB 37

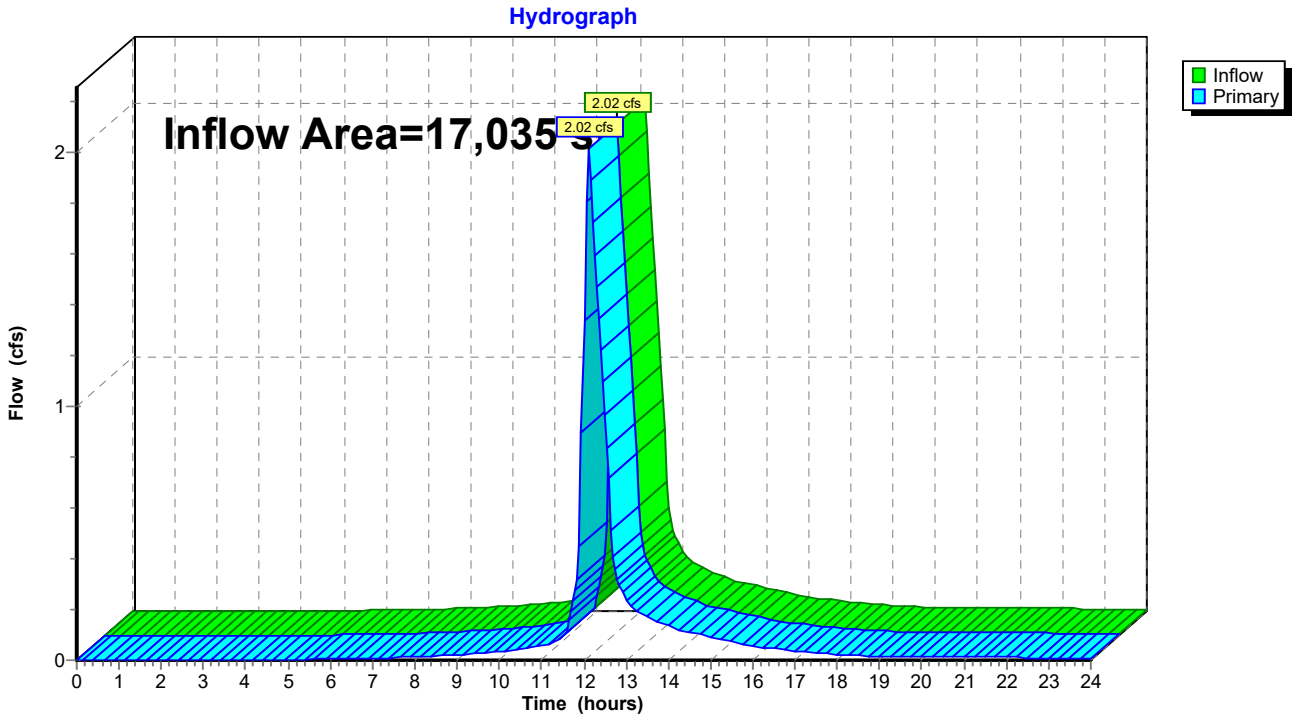


Summary for Link T-PR: Proposed Conditions Overall Discharge

Inflow Area = 17,035 sf, 64.68% Impervious, Inflow Depth > 4.63" for 100yr Storm event
Inflow = 2.02 cfs @ 12.11 hrs, Volume= 6,578 cf
Primary = 2.02 cfs @ 12.11 hrs, Volume= 6,578 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link T-PR: Proposed Conditions Overall Discharge



Appendix C

NRCS Custom Soils Report

United States Department of Agriculture

NRCS

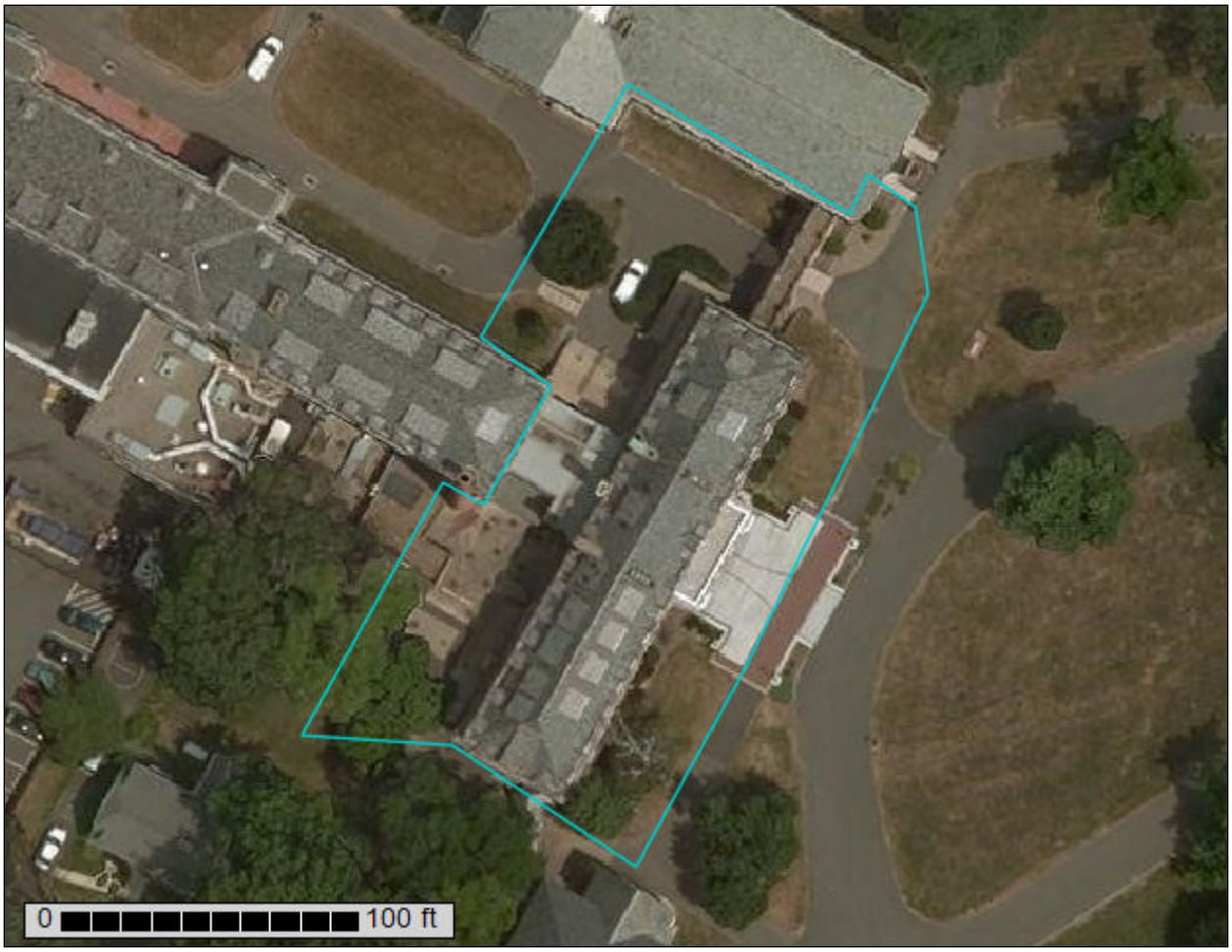
Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

State of Connecticut

Choate Rosemary Hall - Hill House



January 24, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

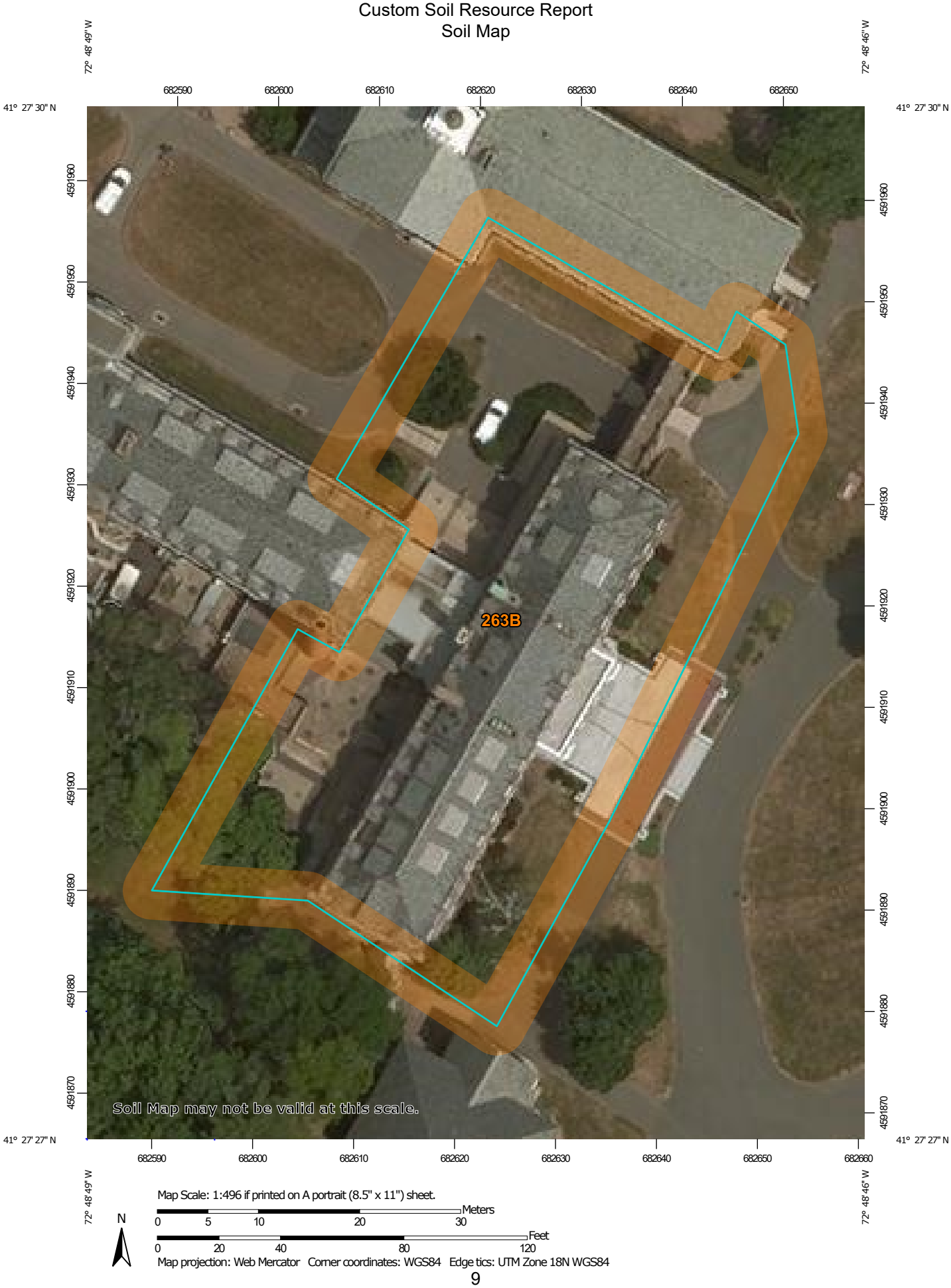
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 19, Sep 13, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 27, 2014—Jul 22, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
263B	Cheshire-Urban land complex, 3 to 8 percent slopes	0.6	100.0%
Totals for Area of Interest		**0.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

State of Connecticut

263B—Cheshire-Urban land complex, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9lld
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Cheshire and similar soils: 40 percent
Urban land: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cheshire

Setting

Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from basalt and/or sandstone and shale

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 16 inches: fine sandy loam
Bw2 - 16 to 26 inches: fine sandy loam
C - 26 to 65 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Urban Land

Typical profile

H - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Minor Components

Wilbraham

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Udorthents

Percent of map unit: 5 percent
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Watchaug

Percent of map unit: 5 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Wethersfield

Percent of map unit: 5 percent
Landform: Hills, drumlins
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Yalesville

Percent of map unit: 3 percent
Landform: Ridges, hills
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Menlo

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

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Appendix D

Field Soil Testing Results

TEST HOLE DATA

SOIL TESTS CONDUCTED ON FEBRUARY 3, 2020

TEST HOLE 1

0 - 7"	TOPSOIL
7 - 31"	BROWN SANDY LOAM
31 - 55"	LIGHT BROWN FINE SAND
55 - 96"	BROWN SAND & GRAVEL WITH SOME FINES
	NO MOTTLING, NO GROUNDWATER, NO LEDGE
	NO RESTRICTIVE LAYER

TUBE 5A @ 48"

TEST HOLE 2

0 - 6"	TOPSOIL
6 - 22"	BROWN SANDY LOAM
22 - 98"	RED BROWN SANDY LOAMS W/. ANGULAR STONES
	NO MOTTLING, NO GROUNDWATER, NO LEDGE
	NO RESTRICTIVE LAYER

TUBE 1A @ 50"

TEST HOLE 3

0 - 22"	TOPSOIL
22 - 38"	RED BROWN SANDY LOAM
38 - 102"	BROWN MODERATELY COMPACT SANDY LOAM
	ROOTS TO 40"
	NO MOTTLING, NO GROUNDWATER, NO LEDGE
	NO RESTRICTIVE LAYER

TUBE 2A @ 60"

TEST HOLE 4

0 - 10"	TOPSOIL
10 - 28"	MISC. FILL / BURIED TOPSOIL
28 - 98"	LIGHT BROWN SANDY LOAM W/ SMALL PEBBLES
	ROOTS TO 54"
	NO MOTTLING, NO GROUNDWATER, NO LEDG
	NO RESTRICTIVE LAYER

TUBE 6A @ 52"

Falling Head Permeability Tests

Client: Choate Rosemary Hall
Location: Williams House

Soil Collected: 2/3/2020
Test Run: 2/5/2020
By: CPA

Tube #	Tube Length, T (in.)	Top of Tube Soil, T-L (in.)	Sample Length, L (in.)	Top of Tube to Pan Water, H1 (in.)	Location, Depth, Texture	K (ft/day)	K (in/hour)
1A	7 7/8	3 1/2	4 3/8	6 5/8	TH #2, 50", Sandy Loam	1.88	0.94
2A	7 7/8	3 1/4	4 5/8	6 1/2	TH #3, 60", Sandy Loam	28.47	14.23
5A	7 7/8	3 3/4	4 1/8	6 1/2	TH #1, 48", Fine Sand	2.20	1.10
6A	7 7/8	2 3/4	5 1/8	6 1/2	TH #4, 52" Sandy Loam	10.45	5.22

Time	Depth, in. (H1-H2)	H2 (in.)	Time, t (mins)	K (ft/day)	K (in/hour)
Tube 1A					
11:26:00 AM	0	6 5/8			
12:51:00 PM	1 3/4	4 7/8	85.0	1.88	0.94
Tube 2A					
11:26:00 AM	0	6 1/2			
11:35:00 AM	2 1/2	4	9.0	29.37	14.68
11:38:00 AM	0	6 1/2			
11:47:00 AM	2 3/8	4 1/8	9.0	27.57	13.78
			Avg.	**28.47**	**14.23**
Tube 5A					
11:26:00 AM	0	6 1/2			
12:51:00 PM	1 7/8	4 5/8	85.0	2.20	1.10
Tube 6A					
11:26:00 AM	0	6 1/2			
11:48:00 AM	2 1/4	4 1/4	22.0	10.56	5.28
11:49:00 AM	0	6 1/2			