Preliminary
Stormwater Pollution Prevention Plan

Dutchess Shepard, LLC

6 Mulberry Street
Village of Rhinebeck

April 4, 2023
Revised September 2, 2023

208 Creamery Road
Hopewell Junction, NY 12533

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1 Executive Summary

This Stormwater Pollution Prevention Plan (SWPPP) and accompanying project plans have been prepared for the construction activities associated with the Dutchess Shepard Redevelopment Project located in the Village of Rhineback, New York. The stormwater management, pollution prevention, and erosion and sediment control measures identified and detailed in this SWPPP and on the accompanying project plans have been designed in accordance with the requirements of the Town of Beekman and the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) Phase II technical standards.

The proposed project:

1. Maintains the existing drainage patterns, as much as possible.
2. Controls increases in the rate of stormwater runoff resulting from the proposed development without adversely affecting adjacent or downstream properties or receiving watercourses or bodies.
3. Reducing potential stormwater quality impacts and soil erosion resulting from stormwater runoff generated both during and after construction.

The pre- and post-development stormwater runoff conditions have been reviewed and evaluated. The proposed stormwater management facilities have been designed to provide both water quality and quantity controls. Stormwater runoff will be detained, treated, and released at a rate equal to or less than that which existed prior to development of the project site.

2 Project Description

Dutchess Shepard, LLC is the owner of 6 Mulberry Street in the Village of Rhineback The subject lot is 1.44 acres and located on the west side of Mulberry Street, south of East Market Street. The property is located in the RB-35 Zoning District. The project program includes the redevelopment of the existing site into single and multi-family residential units.

2.1 Pre-Development Conditions

The site is currently developed as a school which includes a 10,000 square foot building footprint, 10,000 square foot asphalt parking area, playground, and lawn areas. The building no longer functions as a school; however the gym is still used by local groups for sport activities. There building is fed by municipal water. Septic is treated with an on-site septic system.

The existing topography is generally flat. The existing drainage patterns of the project site generally drain in all directions towards the property lines. There are a few existing drainage structures that collect the parking lot and drain to the roadway drainage collection system.

There are no wetland, wetland buffers or watercourses in the vicinity of the project.

2.2 Post-Development Conditions

The proposed project includes the removal of the parking area, and partial demolition of the school building. The remaining portion of the building will be redeveloped into a multi-family residential

units. The remainder of the property will be subdivided to create four (4) single family lots. Each lot will have a driveway and septic system. Water service will be provided by the municipal water system. Underground infiltration system will be installed where feasible to collect and treat the runoff generated by the new rood and driveway areas.

The Multi-family building will have a parking lot to the rear. Water from the 17-bedroom will be treated in an on-site septic system. Underground infiltration systems will be installed to collect and treat the stormwater runoff from the roof area and parking lot.

2.3 Soil Survey Data

The United States Department of Agriculture (USDA) Soil Conservation Service Soil Survey for Dutchess County was reviewed. The surficial soil conditions for the study area are shown in Appendix B The soil data for each of the soil types is summarized in Table 1 below.

Table 1: USDA Soil Data

Map Symbol	Description	Depth to Groundwater (ft)	Depth to Bedrock (in)	Hydrologic Soil Group
DwC	Dutchess-Cardigan Complex	80"+	80"+	B
HF	Haven-Urban Land	80"+	20" to 40"	C

The Soil Conservation Service defines the hydrologic soil groups as follows:

- **Type A Soils**: Soils having a high infiltration rate and low runoff potential when thoroughly wet. These soils consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

- **Type B Soils**: Soils having a moderate infiltration rate when thoroughly wet and consists mainly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately course textures. These soils have a moderate rate of water transmission.

- **Type C Soils**: Soils having a low infiltration rate when thoroughly wet and consists chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine-to-fine texture. These soils have a low rate of water transmission.

- **Type D Soils**: Soils having a very low infiltration rate and high runoff potential when thoroughly wet. These soils consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a clay pan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very low rate of water transmission.

3 Construction Sequencing

The total disturbance of the proposed project is 1.4 acres. The proposed project will be completed in Multiple phases. The construction sequencing is outlined on the accompanying plans and is provided below. The construction sequencing is as follows:

1. The Contractor shall flag the limits of disturbance prior to the commencement of construction. Bright orange construction fencing shall be used to demarcate the limits of disturbance to ensure over clearing does not occur.

2. All temporary erosion and sediment control measures (e.g., stabilized construction entrances, silt fencing, storm drain inlet protection, etc.) shall be installed as shown on the project plans. Temporary erosion and sediment control measures shall be constructed, stabilized, and functional before site disturbance begins within their tributary areas.

3. Stake out the locations of the limits of disturbance, proposed stormwater management facilities, and improvements (e.g., roadways, etc.).

4. Demolition of existing features.

5. Construction of the multi-family building and parking on Lot #3.

6. Rough grade the site. Place surplus material in the temporary soil stockpile locations shown on the project plans.

7. Develop the single-family lots are dictated by the market.

8. Finish grading and stabilize all disturbed areas. All erosion and sediment control measures must be left in place to prevent sediment from entering the stormwater practices.

9. Remove all temporary erosion and sediment control measures. Immediately stabilize the areas disturbed during their removal. Establish permanent vegetative cover.

4 Erosion and Sediment Control Plan

This SWPPP and accompanying project plans identify both temporary and permanent erosion and sediment control measures, which have been designed in accordance with the *New York State Standards and Specifications for Erosion and Sediment Control*, latest revision. Temporary erosion and sediment control measures will be implemented during construction to minimize soil erosion and control sediment transport off-site. Permanent erosion and sediment control measures will be implemented after construction to control the quality and quantity of stormwater runoff from the developed site.

4.1 Erosion and Sediment Control Measures

Temporary erosion and sediment control measures to be utilized during construction generally include the following:

1. **Stabilized Construction Entrance** - Prior to construction, stabilized construction entrances shall be installed to reduce the tracking of sediment onto public roadways. Construction traffic must enter and exit the site at the stabilized construction entrance. The entrance shall be maintained in good condition, which will control tracking of sediment onto public rights-of-way or streets. When necessary, the placement of additional aggregate atop the filter fabric shall be done to assure the minimum thickness is maintained. All sediments and soils spilled, dropped, or washed onto the public rights-of-way must be removed immediately. Periodic inspection and needed maintenance shall be provided after each substantial rainfall event.

2. **Dust Control** - Water trucks shall be used, as needed, during construction to reduce dust generated on the site. Dust control must be provided by the general contractor to a degree that is acceptable to the owner/operator, and in compliance with the applicable local and state dust control requirements.

3. **Temporary Soil Stockpile** - Materials, such as topsoil, shall be temporarily stockpiled (if necessary) on the site during the construction process. Stockpiles shall be located in an area away from storm drainage, water bodies and/or courses, and shall be properly protected from erosion by a surrounding silt fence barrier or hay bales when located on paved areas.

4. **Silt Fencing** - Prior to the initiation of and during construction activities, silt fencing shall be established along the perimeter of all areas to be disturbed as a result of the construction which lie up gradient of water courses or adjacent properties. These barriers may extend into non-impact areas to ensure adequate protection of adjacent lands. Clearing and grubbing shall be performed only as necessary for the installation of the sediment control barrier. To ensure effectiveness of the silt fencing, daily inspections and inspections immediately after significant storm events shall be performed by site personnel. Maintenance of the fence shall be performed as needed.

5. **Temporary Seeding** - Within seven days after construction activity ceases on any particular area of the site, all disturbed areas where there shall not be construction for longer than 14 days shall be temporarily seeded and mulched to minimize erosion and sediment loss.

6. **Temporary Sediment Basin** – A temporary sediment basin shall be constructed to intercept sediment laden runoff, reduce the amount of sediment leaving the disturbed areas, and protect drainage ways, properties, and rights-of-way. Projects that have proposed stormwater ponds can be used as temporary sediment basins during construction. Temporary sediment basins shall be inspected at least every seven calendar days. All damages caused by soil erosion and construction equipment shall be repaired upon discovery. Accumulated sediment shall be removed from the sediment basin/trap when it reaches 50 percent of the design capacity and shall not exceed 50 percent. Sediment shall not be placed downstream from the embankment, adjacent to a stream, or floodplain.

7. **Dewatering** - Dewatering, if required, shall not be discharged directly into wetlands, water courses, water bodies, and storm sewer systems. Proper methods and devices shall be utilized to the extent permitted by law, such as pumping water into temporary sediment basins, providing surge protection at the inlet and outlet of pumps, floating the intake of the pump, or other methods to minimize and retain the suspended solids.

Permanent erosion and sediment control measures to be utilized after construction generally include the following:

1. **Establishment of Permanent Vegetation** - Disturbed areas that are not covered by impervious surfaces shall be seeded in accordance with the accompanying plans. The type of seed, mulch, and maintenance measures shall be followed. All areas at final grade shall be seeded and mulched within seven (7) days after completion of the major construction activity. All seeded areas shall be protected with mulch and/or hay. Final site stabilization is achieved when all soil-disturbing activities at the site has been completed and a uniform, perennial vegetative cover with a density of 80 percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

2. **Final Seeding and Planting** - Final seeding and planting shall be installed as shown on the accompanying plans. Final seeding and planting will help minimize erosion and sediment loss.

3. **Rock Outlet Protection** - Rock outlet protection shall be installed at the locations as shown on the accompanying plans. The installation of rock outlet protection will reduce the depth, velocity, and energy of water, such that the flow will not erode the receiving water course or water body.

Specific erosion and sediment control measures, inspection frequency, and remediation procedures are provided in the subsequent sections and on the accompanying project plans.

4.2 Pollution Prevention Controls

Good housekeeping practices are designed to maintain a clean and orderly work environment. Good housekeeping measures shall be maintained throughout the construction process by those parties involved with the direct care and development of the site. The following measures should be implemented to control the possible exposure of harmful substances and materials to stormwater runoff:

1. Material resulting from the clearing and grubbing operation shall be stockpiled away from storm drainage, water bodies and/or watercourses and surrounded with adequate erosion and sediment control measures. Soil stockpile locations shall be exposed no longer than 14 days before seeding.

2. Equipment maintenance areas shall be protected from stormwater flows and shall be supplied with appropriate waste receptacles for spent chemicals, solvents, oils, greases, gasoline, and any pollutants that might contaminate the surrounding habitat and/or water supply. Equipment wash-down zones shall be located within areas draining to sediment control devices.

3. The use of detergents for large-scale (i.e., vehicles, buildings, pavement surfaces, etc.) washing is prohibited.

4. Material storage locations and facilities (i.e., covered storage areas, storage sheds, etc.) shall be located onsite and shall be stored according to the manufacturer's standards in a dedicated staging area. Chemicals, paints, solvents, fertilizers, and other toxic material must be stored in waterproof containers. Runoff containing such materials must be collected, removed from the site, treated and disposed at an approved solid waste or chemical disposal facility.

5. Hazardous spills shall be immediately contained to prevent pollutants from entering the surrounding habitat and/or water supply. Spill Kits shall be provided onsite and shall be displayed in a prominent location for ease of access and use. Spills greater than five (5) gallons shall be reported to the NYSDEC Response Unit at 1-800-457-7362. In addition, a record of the incident(s) and/or notifications shall be documented and attached to the SWPPP.

6. Portable sanitary waste facilities shall be provided onsite for workers and shall be properly maintained.

7. Dumpsters and/or debris containers shall be located onsite and shall be of adequate size to manage respective materials. Regular collection and disposal of wastes shall occur as required.

8. Temporary concrete washout facilities should be located a minimum of 50 feet from storm drain inlets, open drainage facilities, and watercourses. Each facility should be located away from construction traffic or access areas to prevent disturbance or tracking. A sign should be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities. When temporary concrete washout facilities are no longer required for the work, the hardened concrete shall be removed and disposed of. Materials used to construct the temporary concrete washout facilities shall be removed and disposed of. Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities shall be backfilled and/or repaired, seeded, and mulched for final stabilization.

9. Non-stormwater components of site discharge must be clean water. Water used for construction, which discharges from the site, must originate from a public water supply or private well approved by the Health Department. Water used for construction that does not originate from an approved public supply must not discharge from the site. It can be retained in the ponds until it infiltrates and evaporates.

4.3 Soil Restoration

The soils within in the limits of disturbance are Type A soils. In accordance with Table 5.3 of the *New York State Stormwater Management Design Manual*, the soils shall be restored as outlined in Table 2 below:

Table 2: Soil Restoration

Type of Soil Disturbance	Soil Restoration Requirement	Comment
No soil disturbance (preservation of natural features)	Restoration not permitted	Protect from any ongoing construction activity
Minimal soil disturbance	Restoration not permitted	Clearing and grubbing activities
Areas where topsoil is stripped only (no change in grade)	Apply 6" of topsoil	Protect from any ongoing construction activity
Areas of cut or fill	Aerate and apply 6" of topsoil	Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soils, a roller with many spikes making indentations in the soil, or prongs with function like a mini-subsoiler.
Heavy traffic areas on site (especially in a zone 5-25' around buildings but not within a 5' perimeter around foundation walls)	Apply full soil restoration (de-compaction and compost enhancement)	Deep rip the affected thickness of the exposed subsoil material, aggressively fracturing it before the protected topsoil is reapplied on site. De-compact simultaneously through the restored topsoil layer and the upper half of the affected subsoil.
Areas where runoff reduction and/or infiltration practices are applied	Restoration not required, but may be applied to enhance the reduction specified for appropriate practices.	Protect from any ongoing construction activity

During periods of relatively low to moderate subsoil moisture, the disturbed soils are returned to rough grade and the following soil restoration steps are applied:

1. Apply 3-inches of compost over subsoil.
2. Till compost into subsoil to a depth of at least 12" using a cat-mounted ripper, tractor-mounted disc, or tiller, mixing and circulating air and compost into subsoils.
3. Rock-pick until uplifted stone/rock materials of 4-inches and larger size are cleaned off the site.
4. Apply topsoil to a depth of 6-inches.
5. Vegetate as required by the project plans.

5 Stormwater Management Plan

The goals of this Stormwater Management Plan are to:

1. Analyze the peak rate of runoff under pre- and post-development conditions.
2. Maintain the pre-development rate of runoff in order to minimize impacts to adjacent or downstream properties.

3. Minimize the impact of the quality of runoff exiting the site.

These objectives will be met by applying Green Infrastructure Practices and Best Management Practices (BMPs). Stormwater runoff from the proposed project will be collected and conveyed to the proposed stormwater management facilities. Stormwater runoff will be detained, treated, and released at a rate equal to or less than that which existed prior to development of the project site.

5.1 Redevelopment

Per NYSDEC guidelines, the proposed stormwater will be designed using the redevelopment standards (Chapter 9). Credit for the redeveloped existing impervious will be taken in the Water Quality (WQv) Calculations.

5.2 Hydrologic Analysis

The study area was made up of one subcatchment for pre-development conditions and post-development conditions. This was dictated by watershed conditions, methods of collection, conveyance, and points of discharge. Watershed delineations were defined using the surveyed site topography.

HydroCAD, a Computer-Aided-Design (CAD) program, was used to analyze the hydrologic characteristics of the pre-development watershed conditions, post-development watershed conditions, and proposed stormwater management systems. HydroCAD has the capability of computing hydrographs (which represents discharge rates characteristic of specified watershed conditions, precipitation, and geologic factors), combining hydrographs, and routing flows though pipes, streams, channels, and ponds.

5.2.1 Rainfall Data

Rainfall data utilized in the modeling and analysis was obtained from National Weather Service (NWS) Technical Paper 40 (TP-40), Rainfall Frequency Atlas of the U.S. Weather Bureau, published by the U.S. Department of Commerce. A Type III rainfall distribution was used to evaluate the pre- and post-development stormwater runoff conditions for the 1-, 10-, and 100-year 24-hour storm events for Dutchess County. Rainfall data specific to the portion of Dutchess County under consideration is provided in Table 3 below.

Table 3: Rainfall Data

Storm Event	24-Hour Rainfall
1-year	2.59 inches
10-year	4.66 inches
100-year	8.26 inches

5.2.2 Unified Stormwater Sizing Criteria

5.2.2.1 Water Quantity Control

5.2.3 Comparison of Peak Discharge Rates

A comparison of the pre- and post-development peak discharge rates is provided in Table 9 below.

Table 6: Comparison of Pre- & Post-Development Peak Discharge Rates

Storm Event	Pre (cfs)	Post (cfs)	Difference
1-year	2.18	0.5	-73%
10-year	5.16	2.69	-48%
100-year	10.41	7.42	-28%

Infiltration systems will mitigate peak flows. The on-site soils are very suitable for infiltration.

Comparison of the peak discharge rates for pre- and post-development watershed conditions demonstrates that the peak rate of runoff from the proposed development will remain the nearly the same or not be increased. Therefore, the proposed development will not adversely impact the downstream or adjacent properties, receiving water bodies or courses, or wetlands. The results of the computer modeling used to analyze the pre- and post-development watershed conditions are presented in Appendix A.

5.2.3.1 Water Quality Treatment

The Water Quality Objective will be met by designing the infiltration and pretreatment based in the Redevelopment Criteria set forth by the NYSDEC.

6 Post Construction Requirements

6.1 Inspection and Maintenance

Post-construction inspections and maintenance shall be performed by the homeowners. Inspections and maintenance for the various site components and stormwater management facilities shall be performed in accordance with the accompanying project plans and this SWPPP.

A summary of the general site inspection and maintenance parameters is provided in the table below

Table 7: General Site Post-Construction Inspection and Maintenance

Maintenance Item	Frequency	Description of Inspection Parameters	Description of Remedy Procedures
Site Structures	Annual & After Major Storms	-Accumulated sediment in catch basin sumps -Accumulated debris and litter -Damage or fatigue of storm structures or associated components -Accumulation of pollutants, including oils or grease, in catch basin sumps	-Remove -Remove -Replace and/or repair, as necessary -Remove pollutants from catch basins. Replace and/or repair pollutant source.
Pavement	Biannual/ Annual	-Accumulated sediment in paved areas -Accumulated debris and litter	-Remove (sweep min. 2 times/year) -Remove
Embankments	Annual	-Differential settlement of embankments -Embankment erosion -Animal burrows -Cracking, bulging, or sliding of embankment	-Stabilize and restore to original specs - Stabilize and restore to original specs -Remove - Stabilize and restore to original specs
Grass and Landscaped areas	Annual	-Vegetation: 80% coverage + less than 15% invasive plant species -Unauthorized plantings -Undesirable vegetative growth -Accumulated debris and litter	-Restore original specs -Remove -Mow a min. of 3 times/year. May increase for aesthetic reasons. -Remove
Winter Maintenance	Monthly	-Accumulation of snow and ice on catch basins, inlet and outlet structures, and end sections -Stock piled snow near inlets and outlets -Remaining deicing materials	-Remove -Remove -Remove in early spring by sweeping
Swales	Monthly	-Erosion of side slopes -Formation of rills or gullies -Excess grass growth -Undesirable vegetative growth -Accumulated debris, litter, or sediment -Residual deicing materials (sand)	- Stabilize and restore to original specs -Repair and restore to original specs -Mow -Remove -Remove -Remove & replace any damaged vegetation

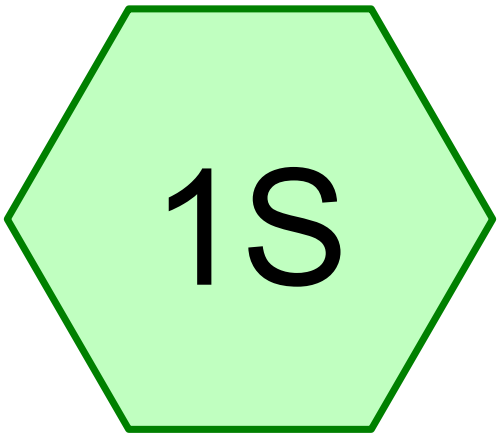
7 Conclusion

This Stormwater Pollution Prevention Plan for the for Dutchess Shepard incorporates an Erosion and Sediment Control Plan and Stormwater Management Plan. The SWPPP identifies the measures to be implemented during construction to minimize soil erosion and control sediment transport off-site, and after construction to control the water quality and quantity of stormwater runoff from the developed site to minimize adverse effects to downstream conditions.

This Stormwater Pollution Prevention Plan has been developed in accordance with the requirements of the Town of Beekman and the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) Phase II technical standards. It is our opinion that the proposed project will not adversely impact adjacent or downstream properties, or receiving surface waters or wetlands, if the erosion and sediment control measures and stormwater management facilities are properly constructed, and maintained in accordance with the requirements outlined herein.

Appendix A

HydroCAD Analysis



Existing

Subcat Reach Pond Link

Routing Diagram for Mulberry Subdivision
Prepared by Hildenbrand Engineering, PLLC, Printed 5/1/2023

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type III 24-hr		Default	24.00	1	2.59	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.66	2
3	100-Year	Type III 24-hr		Default	24.00	1	8.26	2

Summary for Subcatchment 1S: Existing

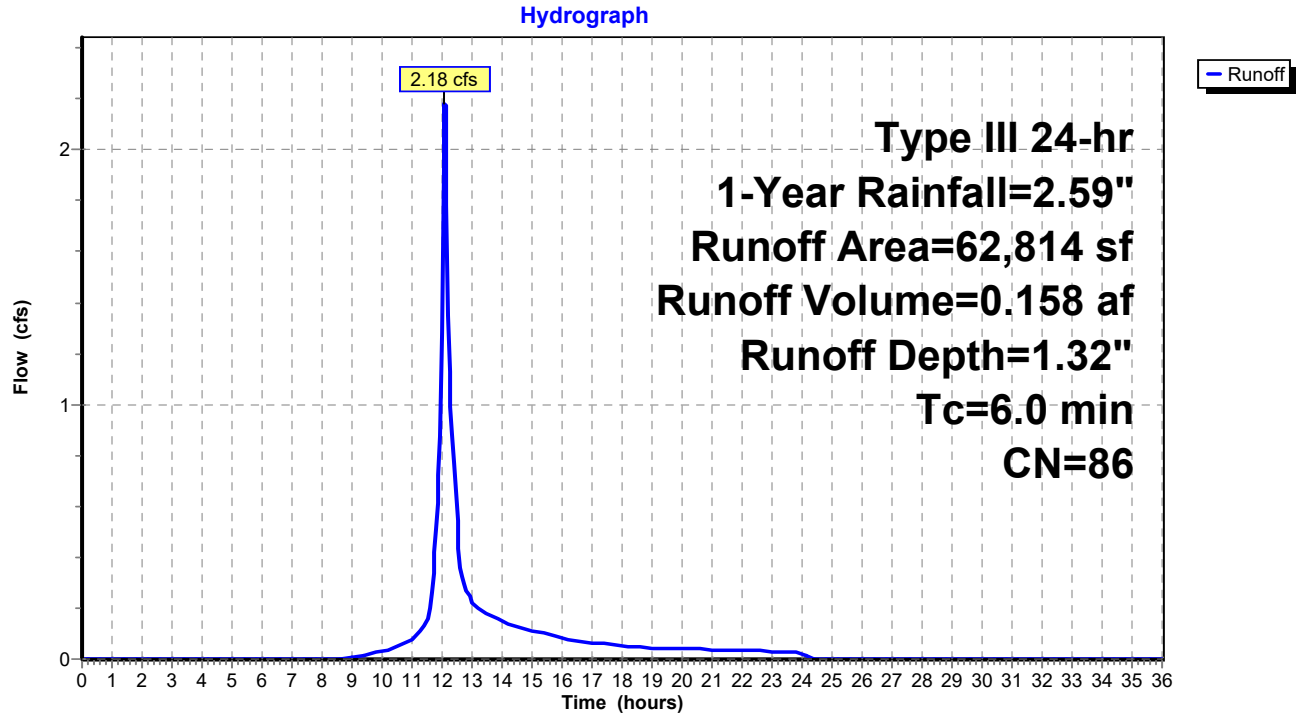
Runoff = 2.18 cfs @ 12.09 hrs, Volume= 0.158 af, Depth= 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.59"

	Area (sf)	CN	Description
*	11,705	98	Building
*	10,920	98	Parking
	40,189	79	<50% Grass cover, Poor, HSG B
	62,814	86	Weighted Average
	40,189		63.98% Pervious Area
	22,625		36.02% Impervious Area

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

Subcatchment 1S: Existing



Summary for Subcatchment 1S: Existing

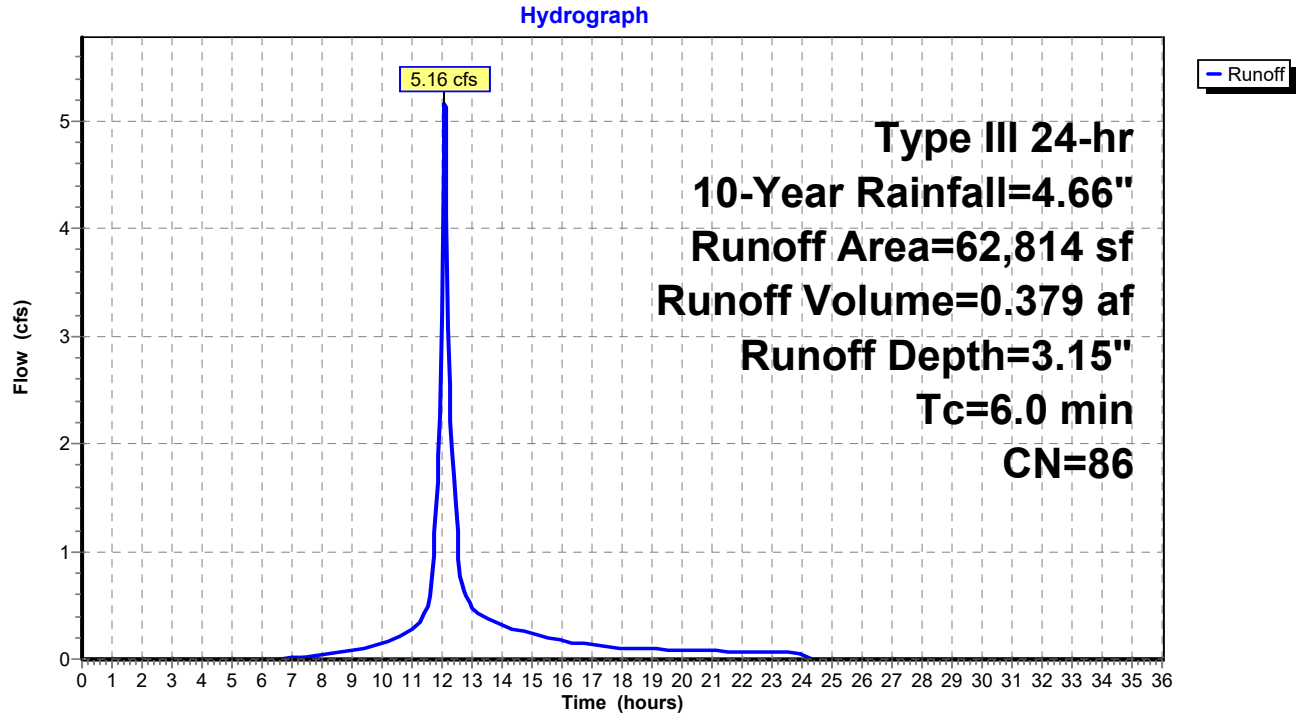
Runoff = 5.16 cfs @ 12.09 hrs, Volume= 0.379 af, Depth= 3.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.66"

	Area (sf)	CN	Description
*	11,705	98	Building
*	10,920	98	Parking
	40,189	79	<50% Grass cover, Poor, HSG B
	62,814	86	Weighted Average
	40,189		63.98% Pervious Area
	22,625		36.02% Impervious Area

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

Subcatchment 1S: Existing



Summary for Subcatchment 1S: Existing

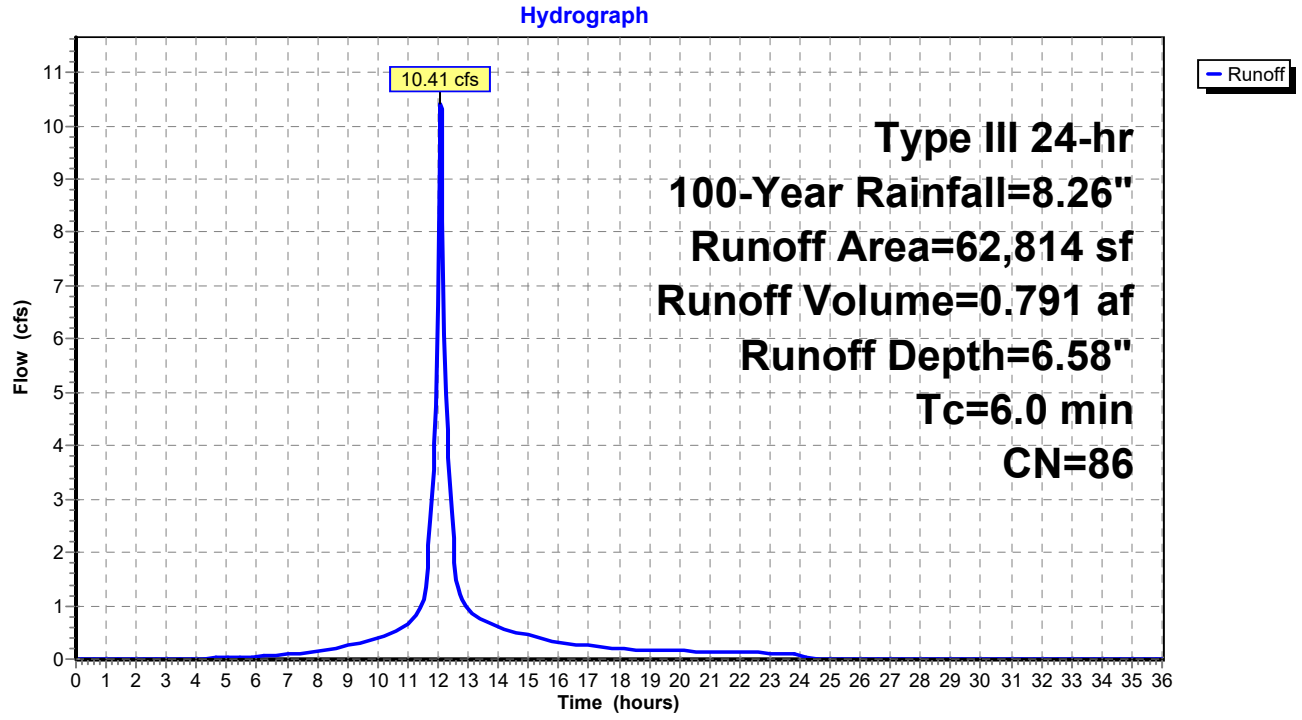
Runoff = 10.41 cfs @ 12.09 hrs, Volume= 0.791 af, Depth= 6.58"

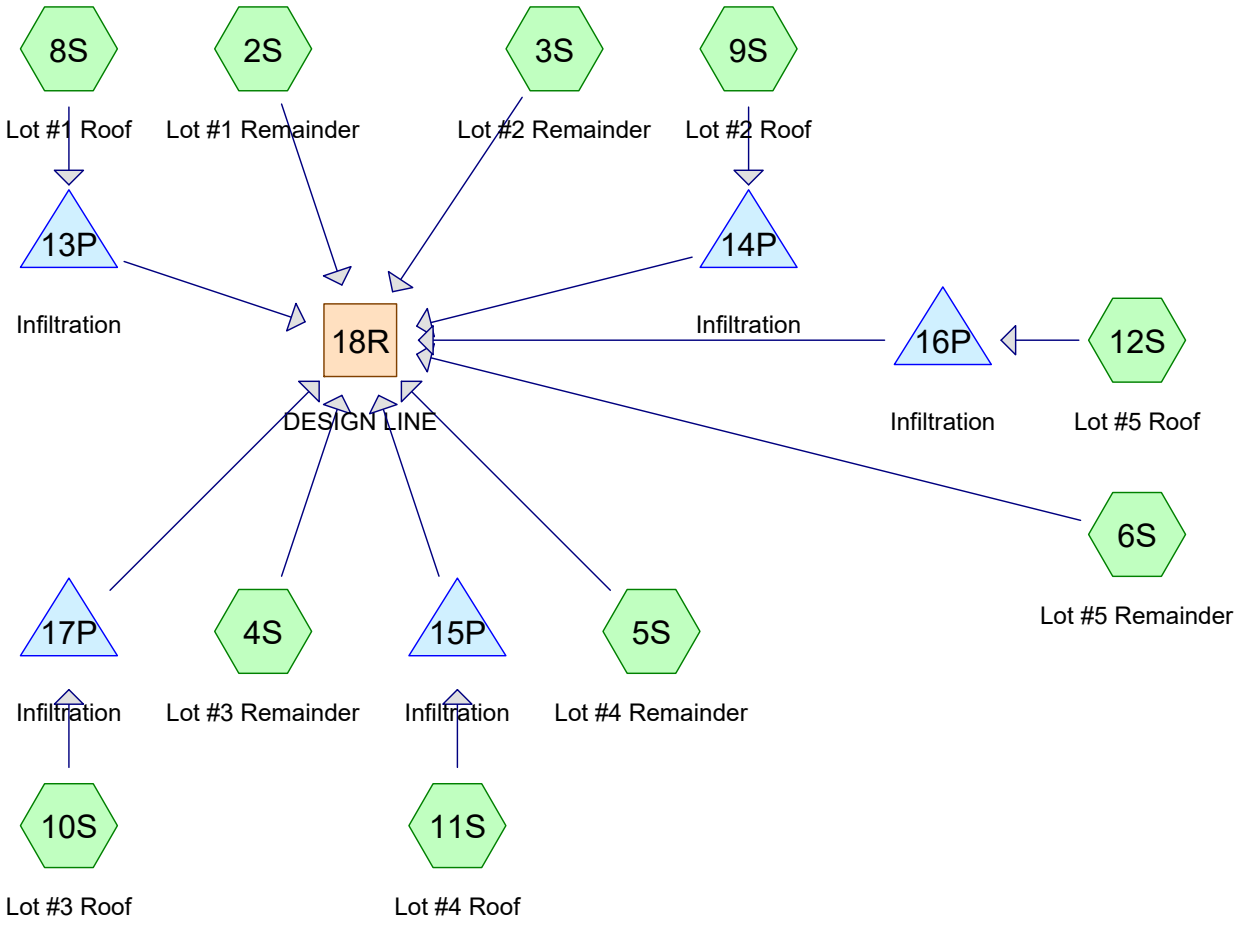
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.26"

	Area (sf)	CN	Description
*	11,705	98	Building
*	10,920	98	Parking
	40,189	79	<50% Grass cover, Poor, HSG B
	62,814	86	Weighted Average
	40,189		63.98% Pervious Area
	22,625		36.02% Impervious Area

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

Subcatchment 1S: Existing





Subcat Reach Pond Link

Routing Diagram for Mulberry Subdivision
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Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type III 24-hr		Default	24.00	1	2.59	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.66	2
3	100-Year	Type III 24-hr		Default	24.00	1	8.26	2

Summary for Subcatchment 2S: Lot #1 Remainder

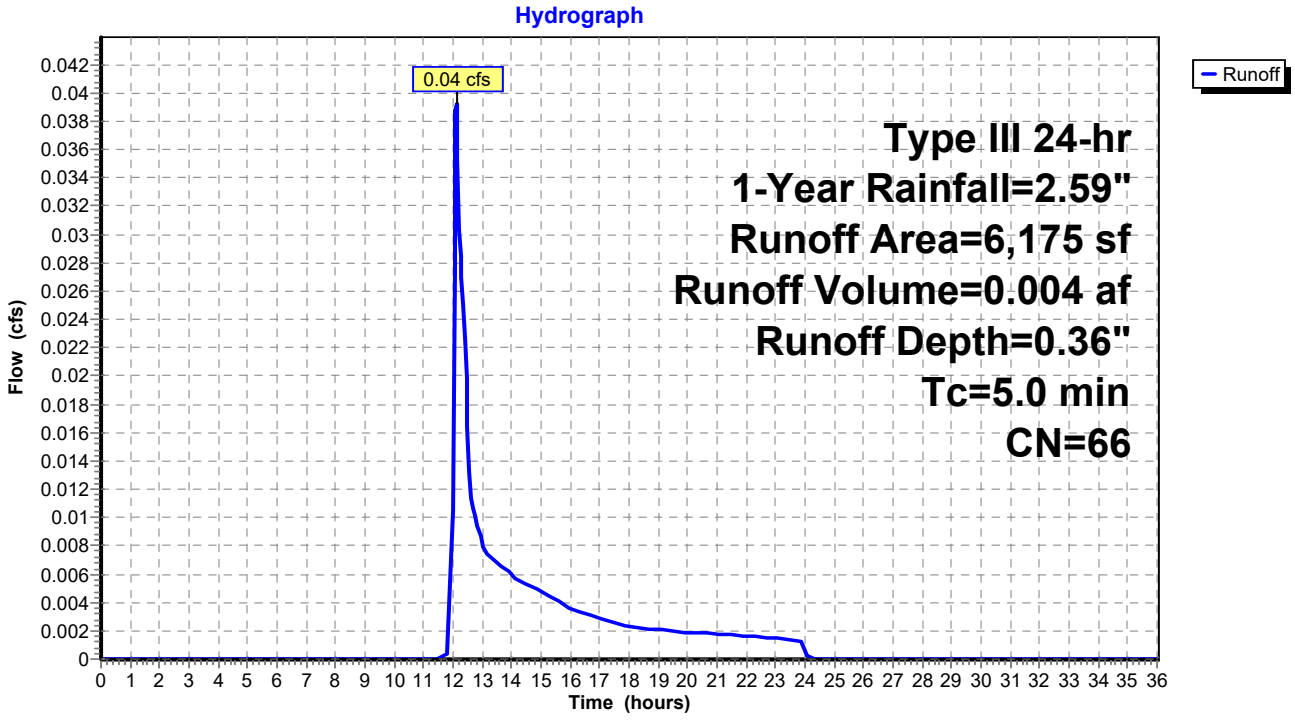
Runoff = 0.04 cfs @ 12.11 hrs, Volume= 0.004 af, Depth= 0.36"
Routed to Reach 18R : DESIGN LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.59"

	Area (sf)	CN	Description
*	815	98	Driveway
	5,360	61	>75% Grass cover, Good, HSG B
	6,175	66	Weighted Average
	5,360		86.80% Pervious Area
	815		13.20% Impervious Area

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

Subcatchment 2S: Lot #1 Remainder



Summary for Subcatchment 3S: Lot #2 Remainder

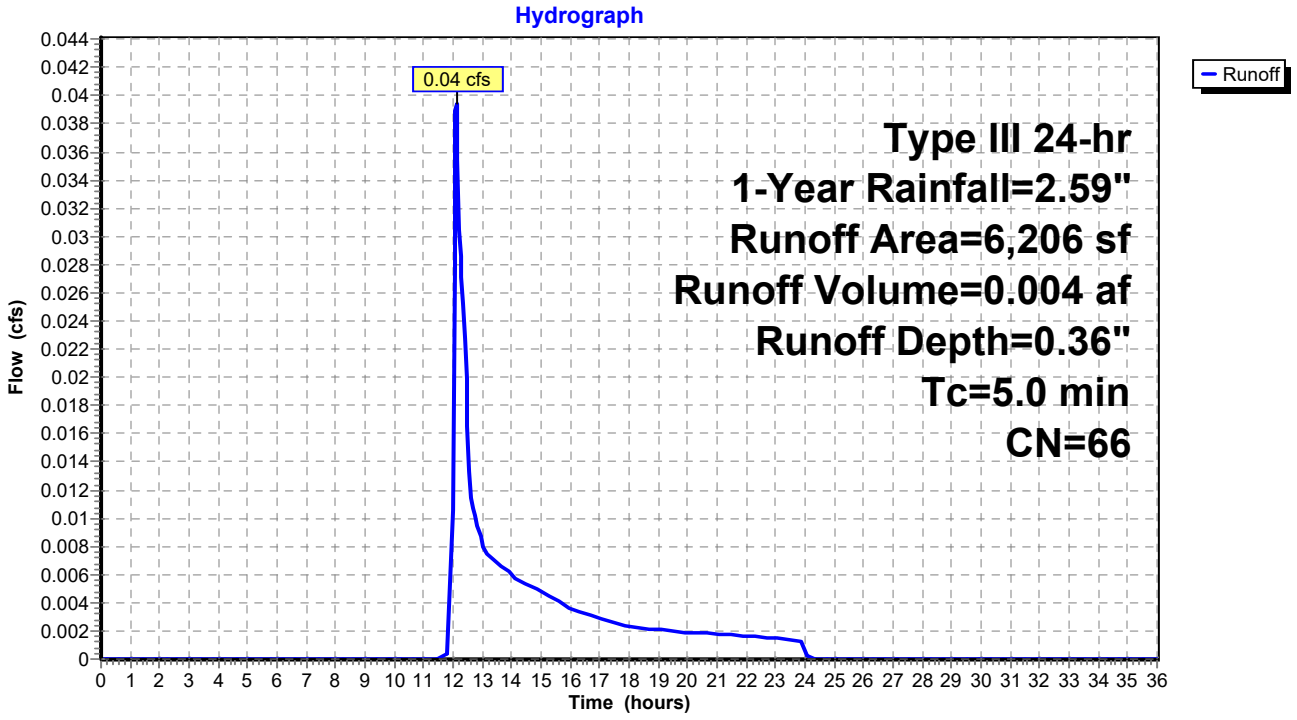
Runoff = 0.04 cfs @ 12.11 hrs, Volume= 0.004 af, Depth= 0.36"
Routed to Reach 18R : DESIGN LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.59"

	Area (sf)	CN	Description
*	815	98	Driveway
	5,391	61	>75% Grass cover, Good, HSG B
	6,206	66	Weighted Average
	5,391		86.87% Pervious Area
	815		13.13% Impervious Area

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

Subcatchment 3S: Lot #2 Remainder



Summary for Subcatchment 4S: Lot #3 Remainder

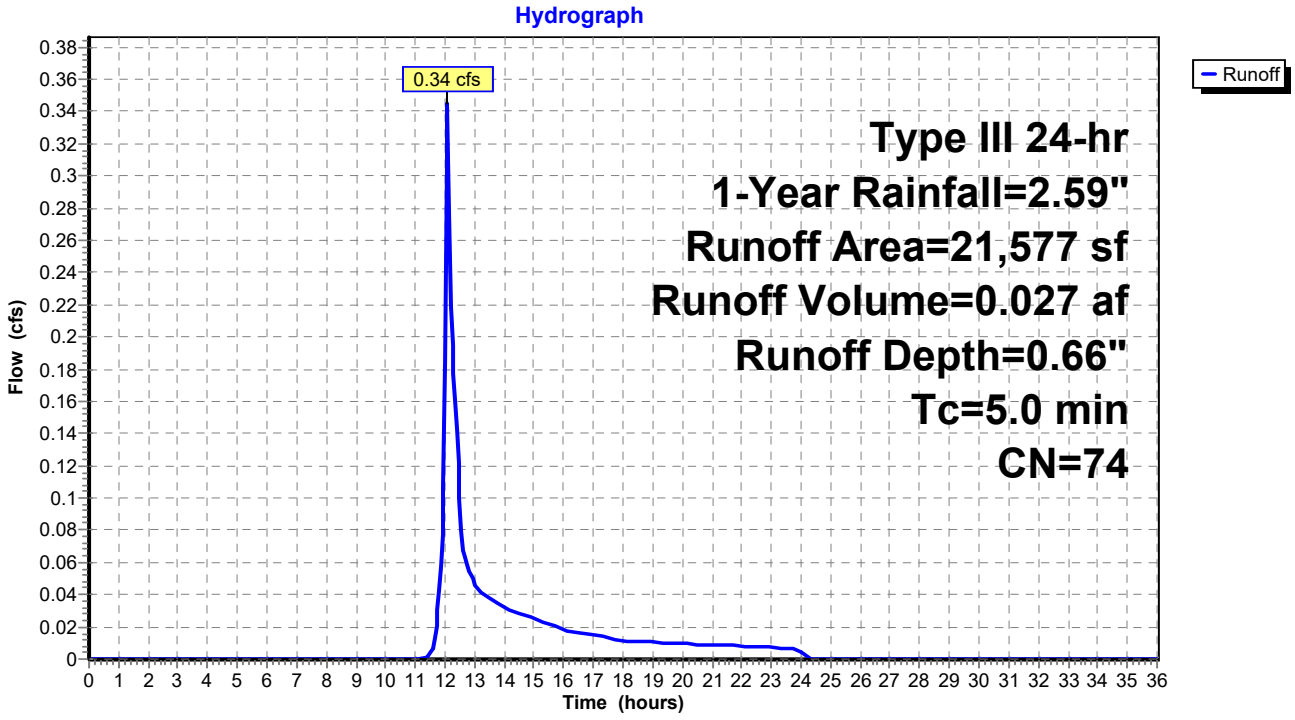
Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.027 af, Depth= 0.66"
Routed to Reach 18R : DESIGN LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.59"

	Area (sf)	CN	Description
*	7,583	98	Driveway
	13,994	61	>75% Grass cover, Good, HSG B
	21,577	74	Weighted Average
	13,994		64.86% Pervious Area
	7,583		35.14% Impervious Area

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

Subcatchment 4S: Lot #3 Remainder



Summary for Subcatchment 5S: Lot #4 Remainder

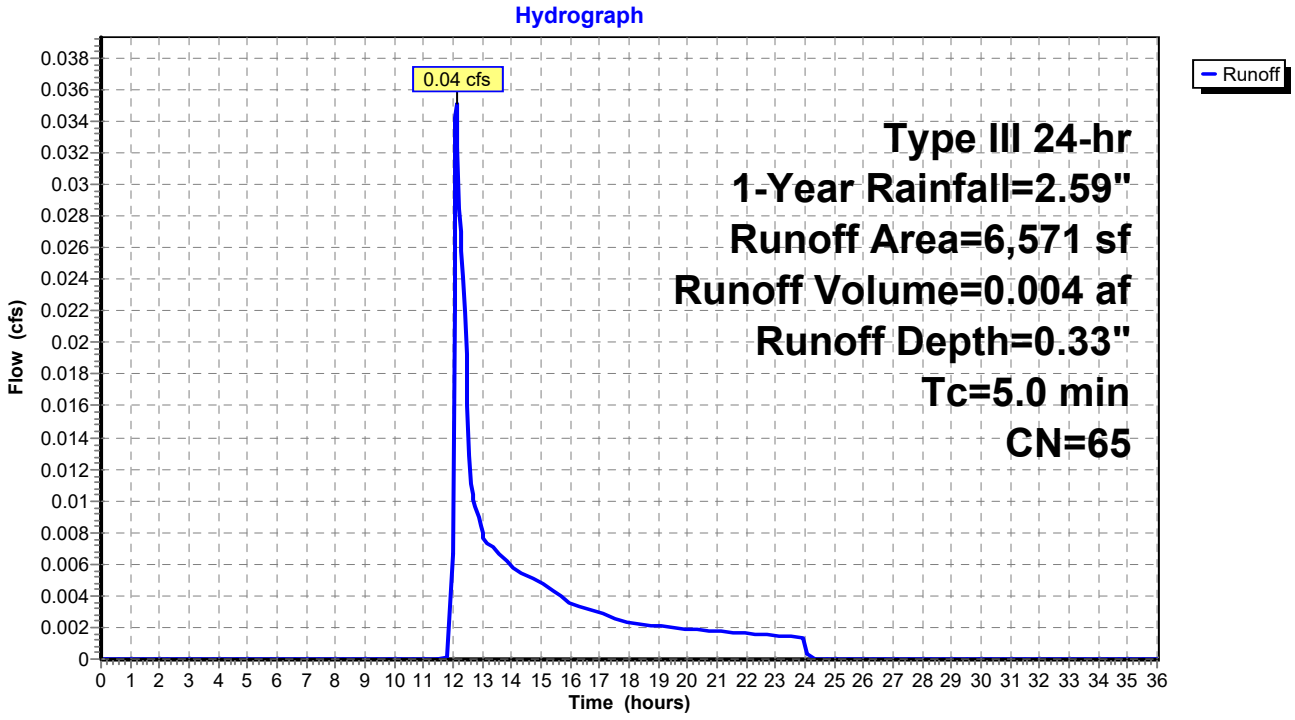
Runoff = 0.04 cfs @ 12.12 hrs, Volume= 0.004 af, Depth= 0.33"
Routed to Reach 18R : DESIGN LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.59"

	Area (sf)	CN	Description
*	709	98	Driveway
	5,862	61	>75% Grass cover, Good, HSG B
	6,571	65	Weighted Average
	5,862		89.21% Pervious Area
	709		10.79% Impervious Area

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

Subcatchment 5S: Lot #4 Remainder



Summary for Subcatchment 6S: Lot #5 Remainder

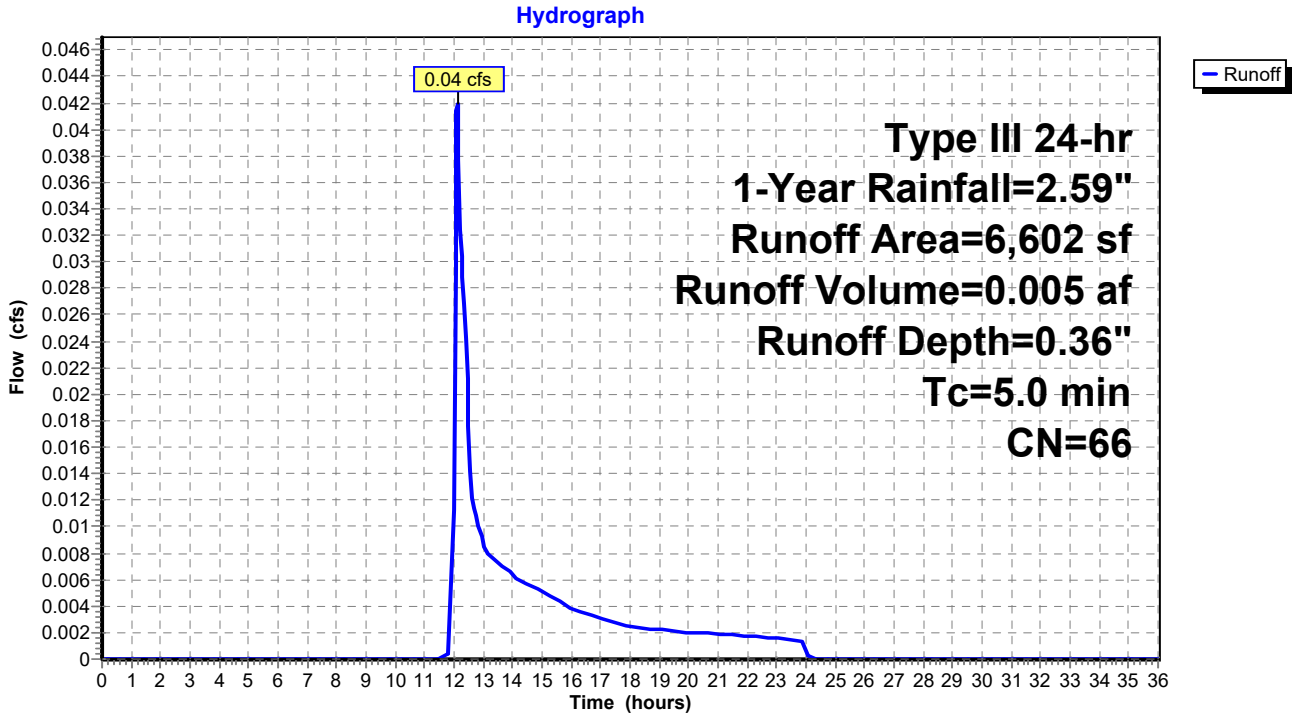
Runoff = 0.04 cfs @ 12.11 hrs, Volume= 0.005 af, Depth= 0.36"
Routed to Reach 18R : DESIGN LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.59"

	Area (sf)	CN	Description
*	974	98	Driveway
	5,628	61	>75% Grass cover, Good, HSG B
	6,602	66	Weighted Average
	5,628		85.25% Pervious Area
	974		14.75% Impervious Area

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

Subcatchment 6S: Lot #5 Remainder



Summary for Subcatchment 8S: Lot #1 Roof

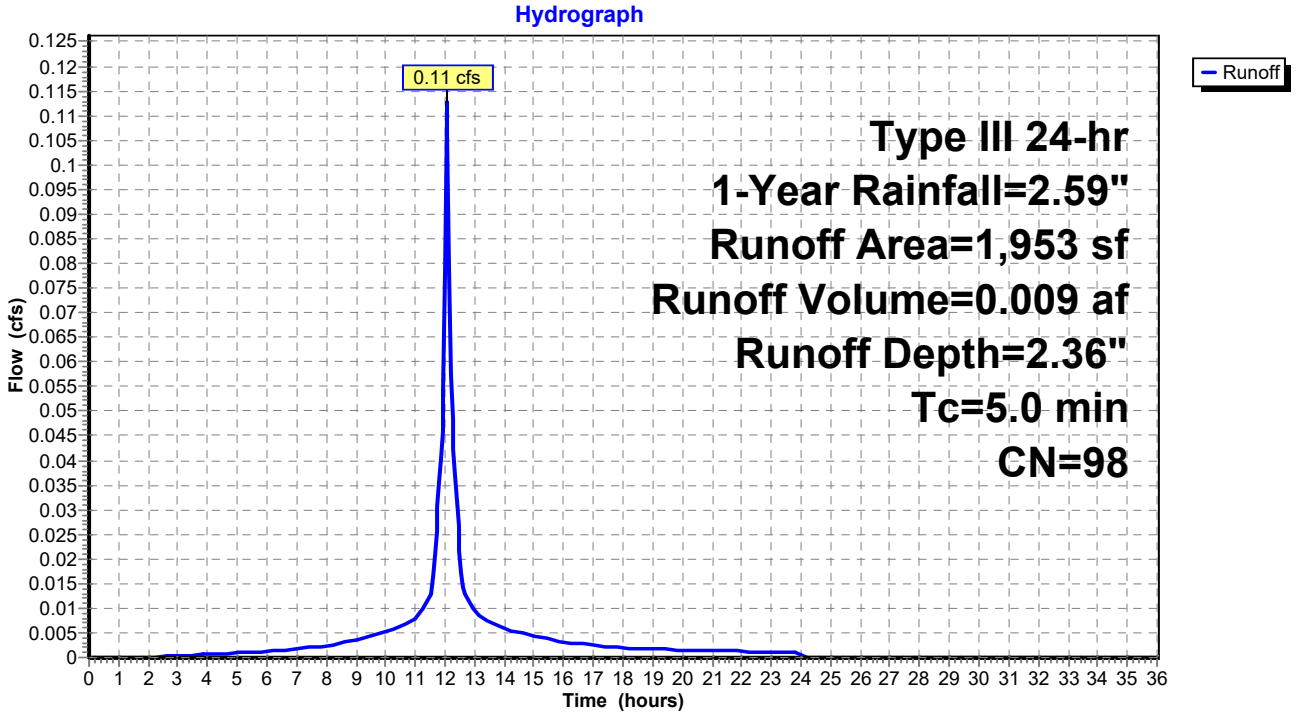
Runoff = 0.11 cfs @ 12.07 hrs, Volume= 0.009 af, Depth= 2.36"
Routed to Pond 13P : Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.59"

	Area (sf)	CN	Description
*	1,953	98	Roof Area
	1,953		100.00% Impervious Area

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

Subcatchment 8S: Lot #1 Roof



Summary for Subcatchment 9S: Lot #2 Roof

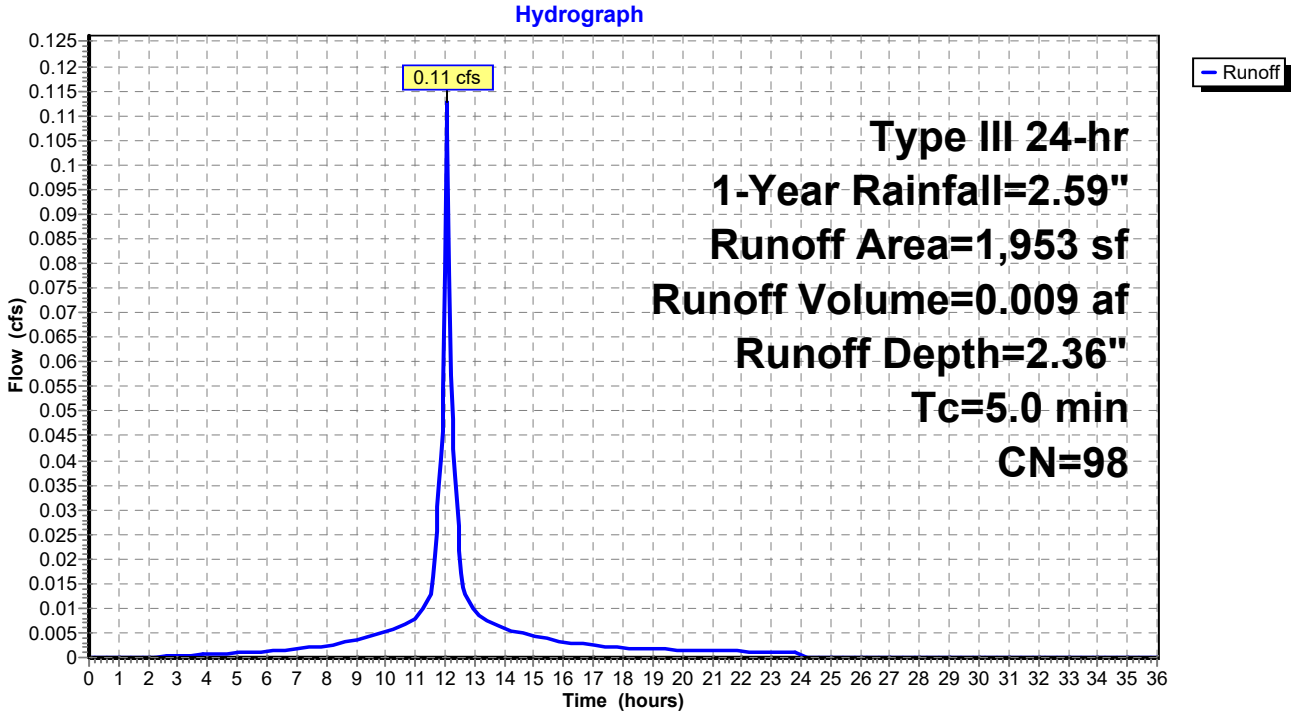
Runoff = 0.11 cfs @ 12.07 hrs, Volume= 0.009 af, Depth= 2.36"
Routed to Pond 14P : Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.59"

	Area (sf)	CN	Description
*	1,953	98	Roof Area
	1,953		100.00% Impervious Area

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

Subcatchment 9S: Lot #2 Roof



Summary for Subcatchment 10S: Lot #3 Roof

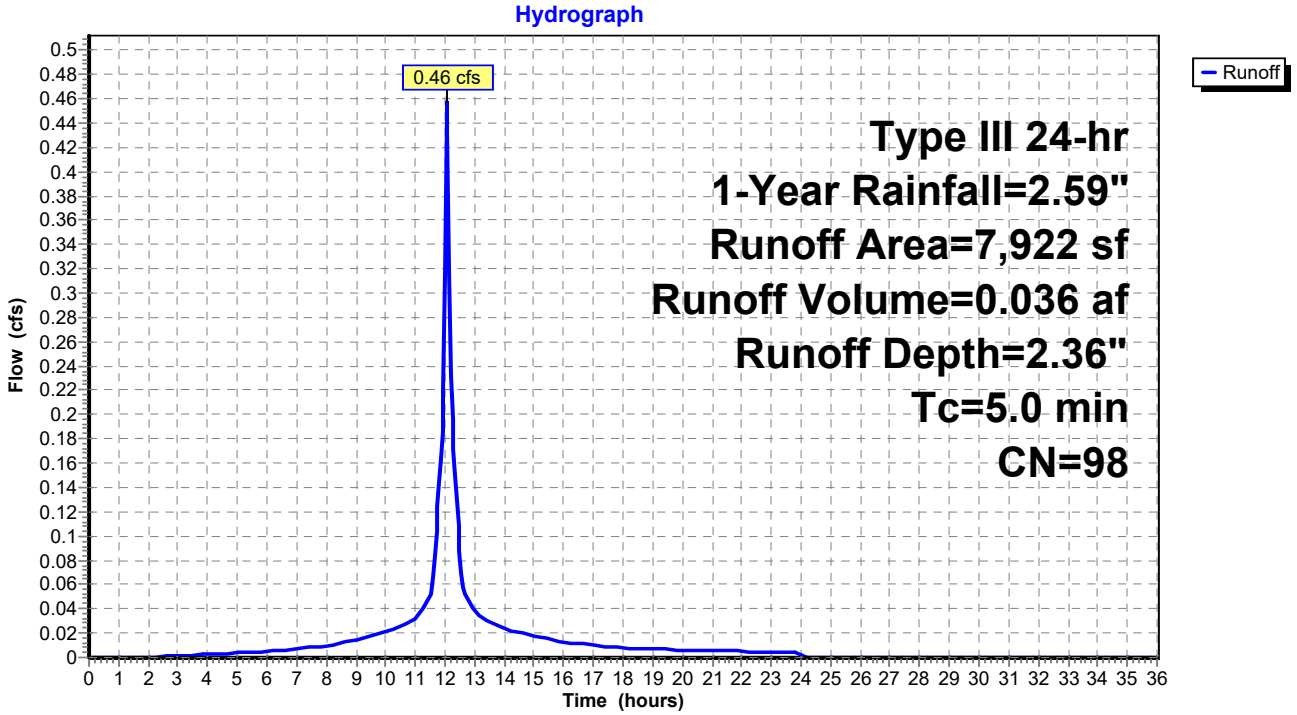
Runoff = 0.46 cfs @ 12.07 hrs, Volume= 0.036 af, Depth= 2.36"
Routed to Pond 17P : Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.59"

	Area (sf)	CN	Description
*	7,922	98	Roof Area
	7,922		100.00% Impervious Area

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

Subcatchment 10S: Lot #3 Roof



Summary for Subcatchment 11S: Lot #4 Roof

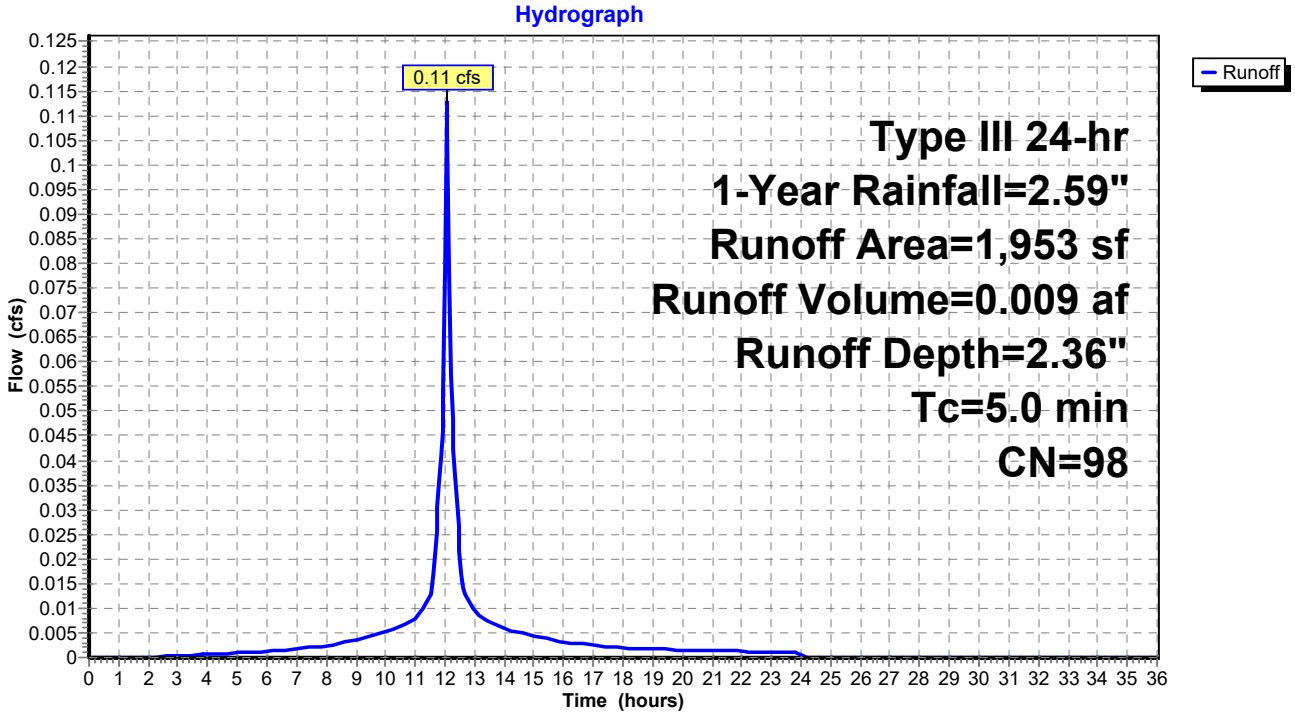
Runoff = 0.11 cfs @ 12.07 hrs, Volume= 0.009 af, Depth= 2.36"
Routed to Pond 15P : Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.59"

	Area (sf)	CN	Description
*	1,953	98	Roof Area
	1,953		100.00% Impervious Area

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

Subcatchment 11S: Lot #4 Roof



Summary for Subcatchment 12S: Lot #5 Roof

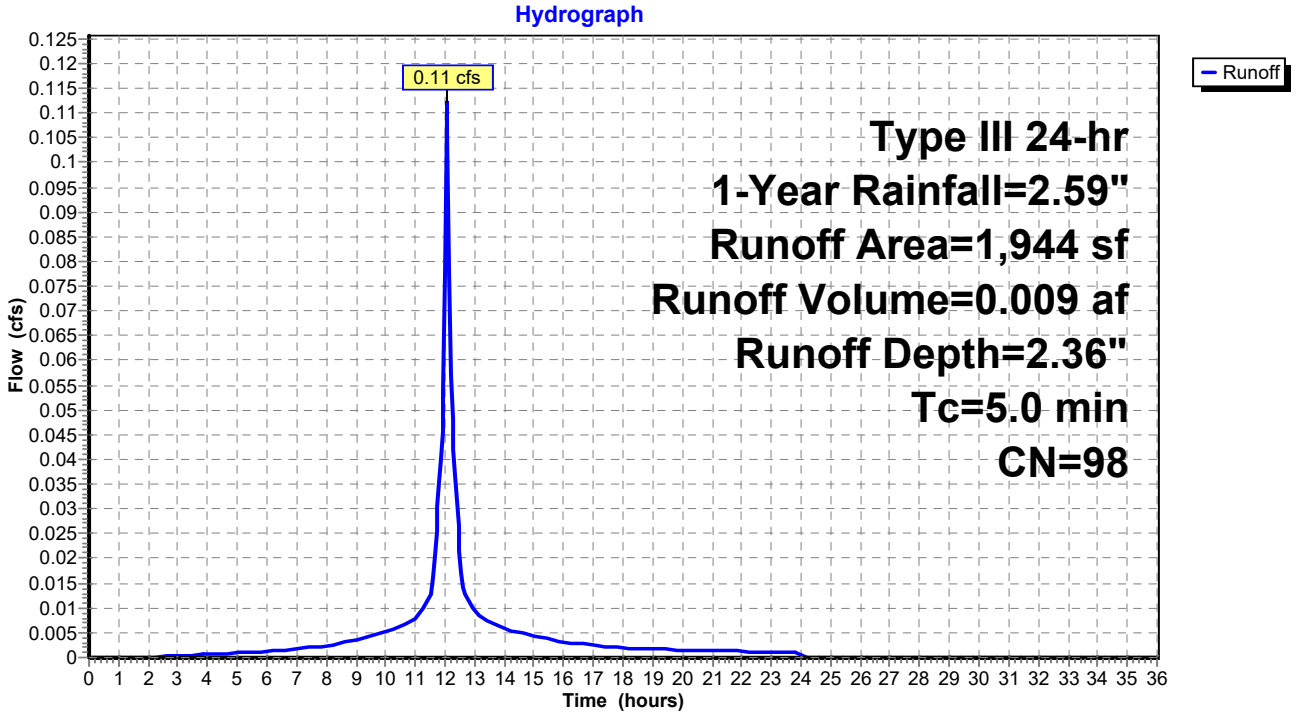
Runoff = 0.11 cfs @ 12.07 hrs, Volume= 0.009 af, Depth= 2.36"
Routed to Pond 16P : Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-Year Rainfall=2.59"

	Area (sf)	CN	Description
*	1,944	98	Roof Area
	1,944		100.00% Impervious Area

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

Subcatchment 12S: Lot #5 Roof

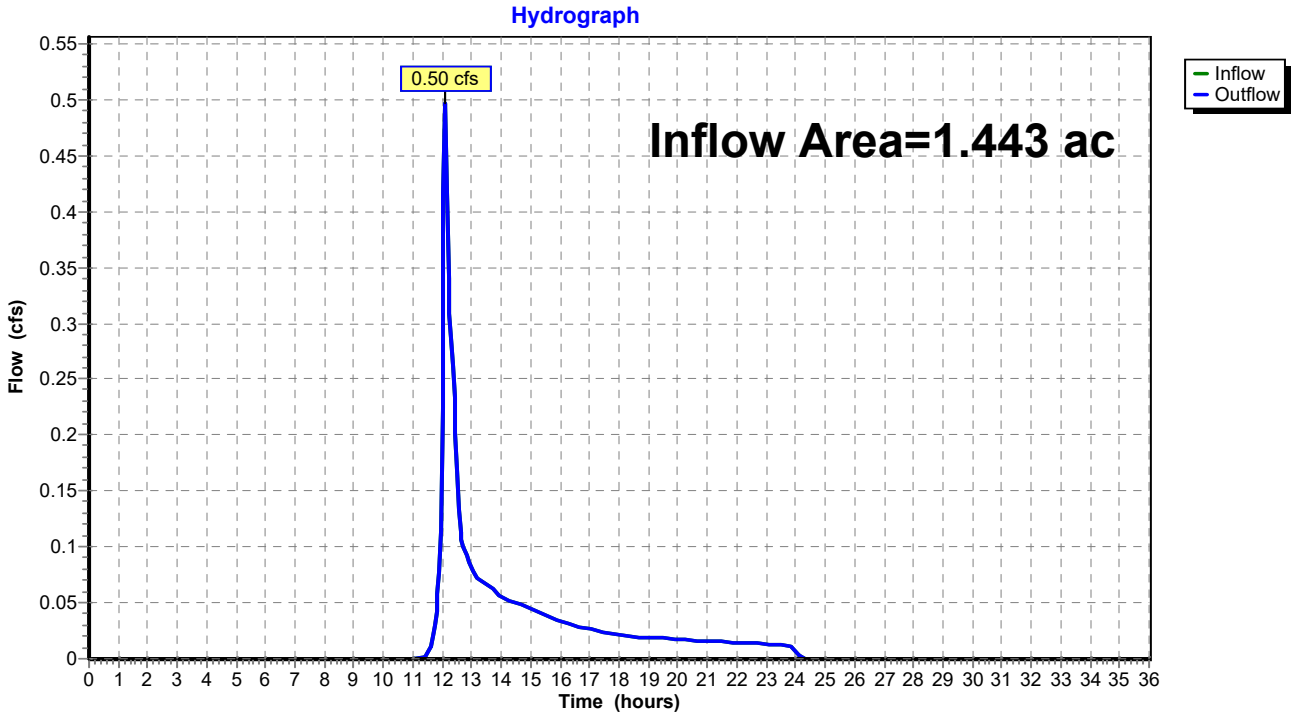


Summary for Reach 18R: DESIGN LINE

Inflow Area = 1.443 ac, 42.35% Impervious, Inflow Depth = 0.37" for 1-Year event
Inflow = 0.50 cfs @ 12.10 hrs, Volume= 0.045 af
Outflow = 0.50 cfs @ 12.10 hrs, Volume= 0.045 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Reach 18R: DESIGN LINE



Summary for Pond 13P: Infiltration

Inflow Area = 0.045 ac,100.00% Impervious, Inflow Depth = 2.36" for 1-Year event
Inflow = 0.11 cfs @ 12.07 hrs, Volume= 0.009 af
Outflow = 0.02 cfs @ 11.65 hrs, Volume= 0.009 af, Atten= 84%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.65 hrs, Volume= 0.009 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 18R : DESIGN LINE

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 2.50' @ 12.54 hrs Surf.Area= 0.002 ac Storage= 0.002 af

Plug-Flow detention time= 30.3 min calculated for 0.009 af (100% of inflow)
Center-of-Mass det. time= 30.3 min (790.4 - 760.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**6.33'W x 10.50'L x 3.54'H Field A** 0.005 af Overall - 0.001 af Embedded = 0.004 af x 40.0% Voids
#2A	0.50'	0.001 af	**Cultec R-330XLHD** 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
		0.003 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**12.000 in/hr Exfiltration over Surface area**
#2	Primary	5.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 11.65 hrs HW=0.05' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

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

Pond 13P: Infiltration - 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

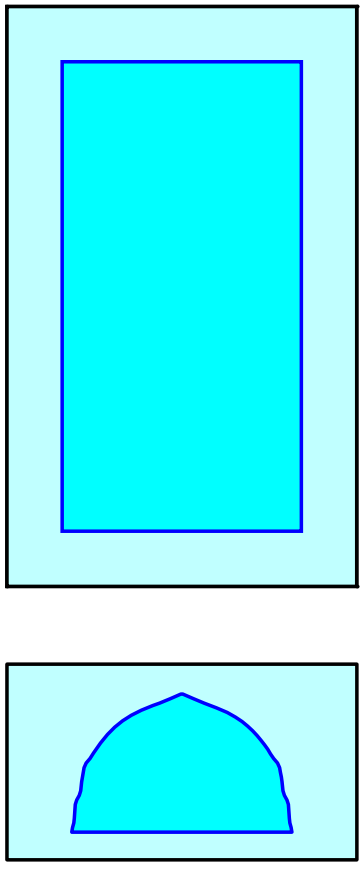
1 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 8.50' Row Length +12.0" End Stone x 2 = 10.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

1 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 63.3 cf Chamber Storage

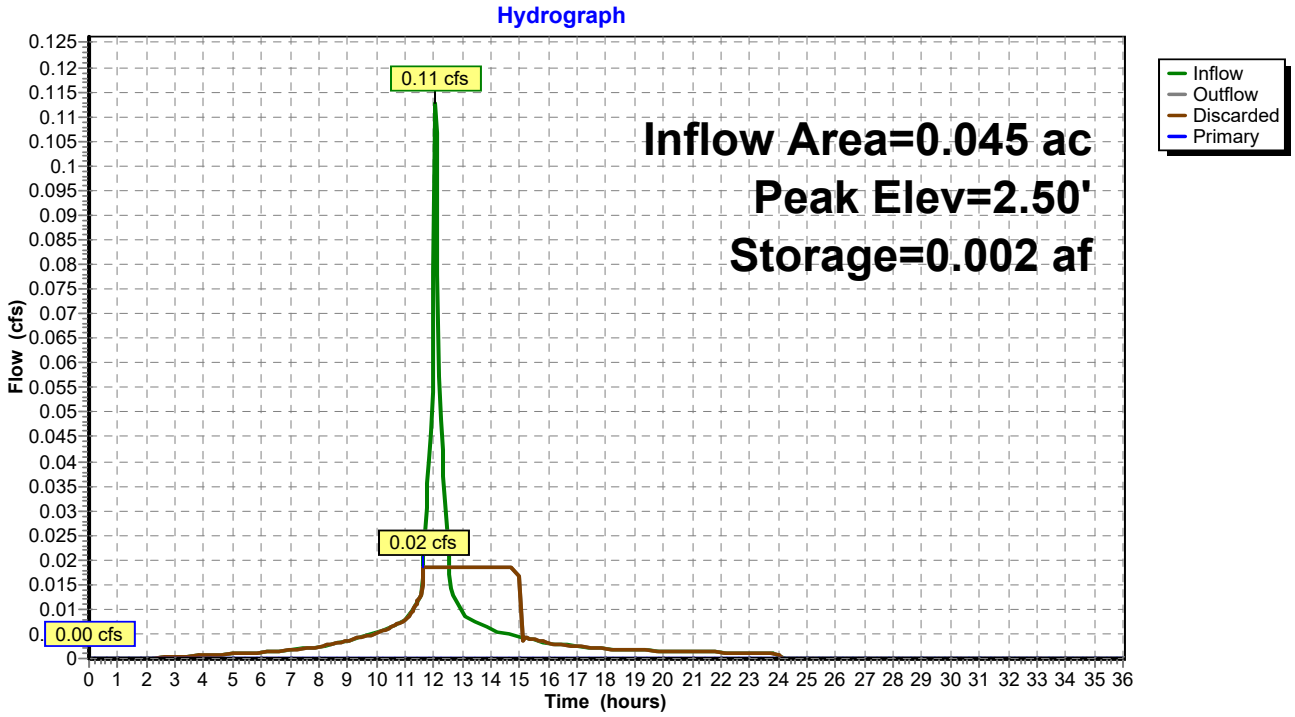
235.5 cf Field - 63.3 cf Chambers = 172.2 cf Stone x 40.0% Voids = 68.9 cf Stone Storage

Chamber Storage + Stone Storage = 132.2 cf = 0.003 af
Overall Storage Efficiency = 56.1%
Overall System Size = 10.50' x 6.33' x 3.54'

1 Chambers
8.7 cy Field
6.4 cy Stone



Pond 13P: Infiltration



Summary for Pond 14P: Infiltration

Inflow Area = 0.045 ac,100.00% Impervious, Inflow Depth = 2.36" for 1-Year event
Inflow = 0.11 cfs @ 12.07 hrs, Volume= 0.009 af
Outflow = 0.02 cfs @ 11.65 hrs, Volume= 0.009 af, Atten= 84%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.65 hrs, Volume= 0.009 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 18R : DESIGN LINE

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 2.50' @ 12.54 hrs Surf.Area= 0.002 ac Storage= 0.002 af

Plug-Flow detention time= 30.3 min calculated for 0.009 af (100% of inflow)
Center-of-Mass det. time= 30.3 min (790.4 - 760.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**6.33'W x 10.50'L x 3.54'H Field A** 0.005 af Overall - 0.001 af Embedded = 0.004 af x 40.0% Voids
#2A	0.50'	0.001 af	**Cultec R-330XLHD** 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
		0.003 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**12.000 in/hr Exfiltration over Surface area**
#2	Primary	5.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 11.65 hrs HW=0.05' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

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

Pond 14P: Infiltration - 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

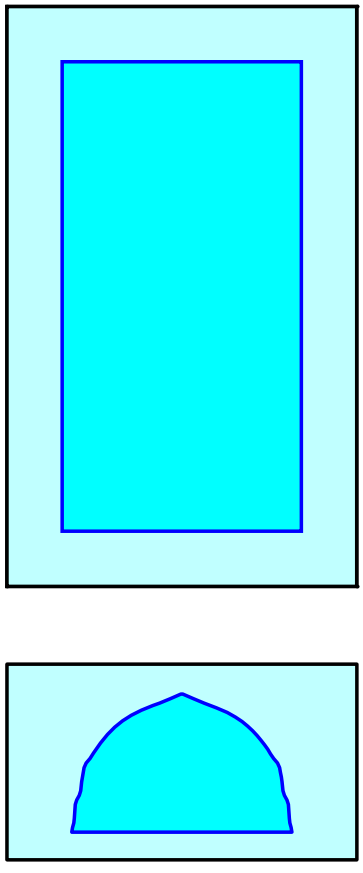
1 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 8.50' Row Length +12.0" End Stone x 2 = 10.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

1 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 63.3 cf Chamber Storage

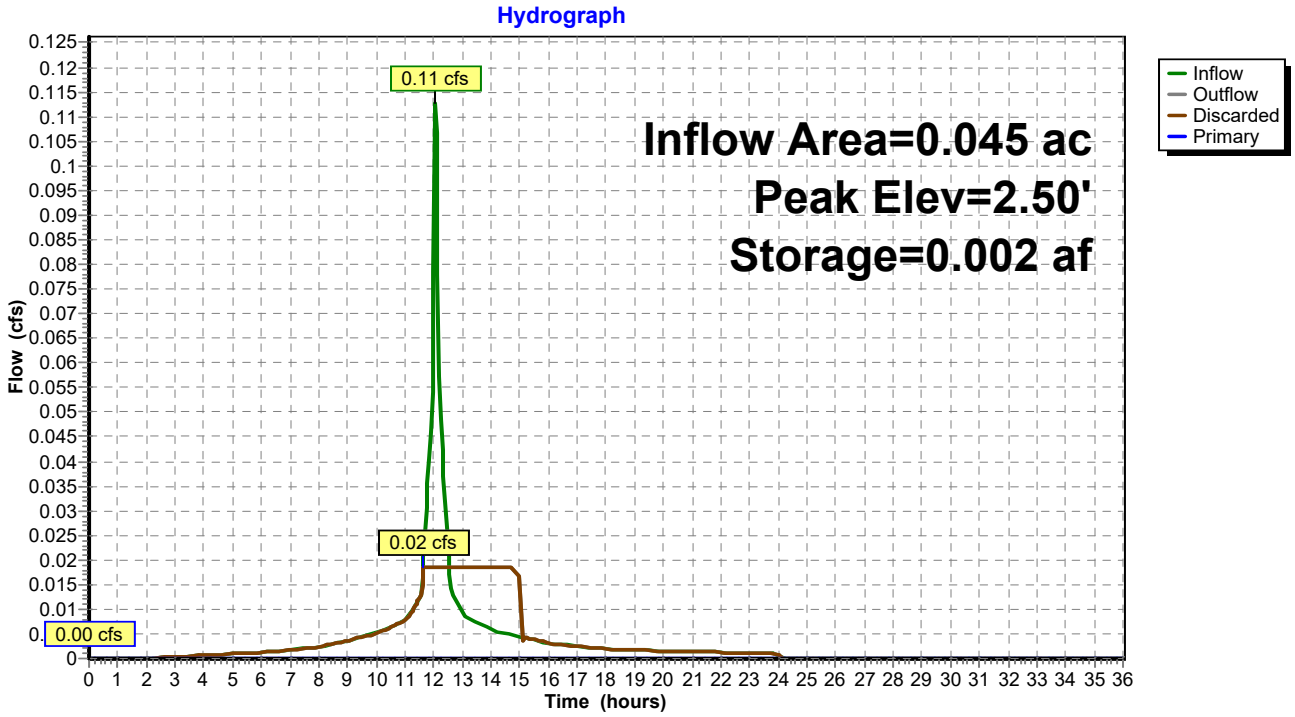
235.5 cf Field - 63.3 cf Chambers = 172.2 cf Stone x 40.0% Voids = 68.9 cf Stone Storage

Chamber Storage + Stone Storage = 132.2 cf = 0.003 af
Overall Storage Efficiency = 56.1%
Overall System Size = 10.50' x 6.33' x 3.54'

1 Chambers
8.7 cy Field
6.4 cy Stone



Pond 14P: Infiltration



Summary for Pond 15P: Infiltration

Inflow Area = 0.045 ac,100.00% Impervious, Inflow Depth = 2.36" for 1-Year event
Inflow = 0.11 cfs @ 12.07 hrs, Volume= 0.009 af
Outflow = 0.02 cfs @ 11.65 hrs, Volume= 0.009 af, Atten= 84%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.65 hrs, Volume= 0.009 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 18R : DESIGN LINE

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 2.50' @ 12.54 hrs Surf.Area= 0.002 ac Storage= 0.002 af

Plug-Flow detention time= 30.3 min calculated for 0.009 af (100% of inflow)
Center-of-Mass det. time= 30.3 min (790.4 - 760.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**6.33'W x 10.50'L x 3.54'H Field A** 0.005 af Overall - 0.001 af Embedded = 0.004 af x 40.0% Voids
#2A	0.50'	0.001 af	**Cultec R-330XLHD** 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
		0.003 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**12.000 in/hr Exfiltration over Surface area**
#2	Primary	5.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 11.65 hrs HW=0.05' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

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

Pond 15P: Infiltration - 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

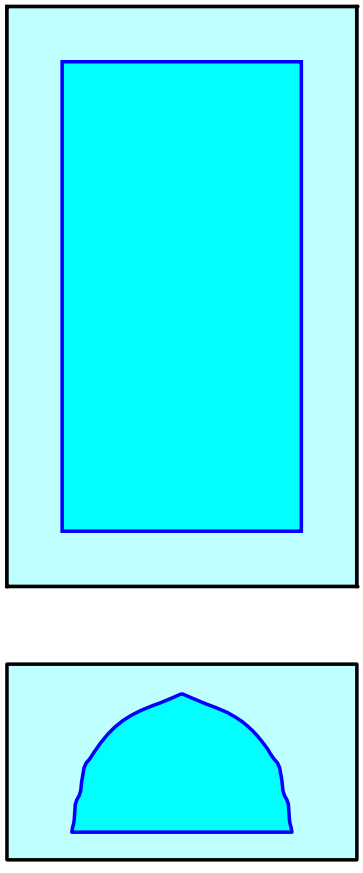
1 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 8.50' Row Length +12.0" End Stone x 2 = 10.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

1 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 63.3 cf Chamber Storage

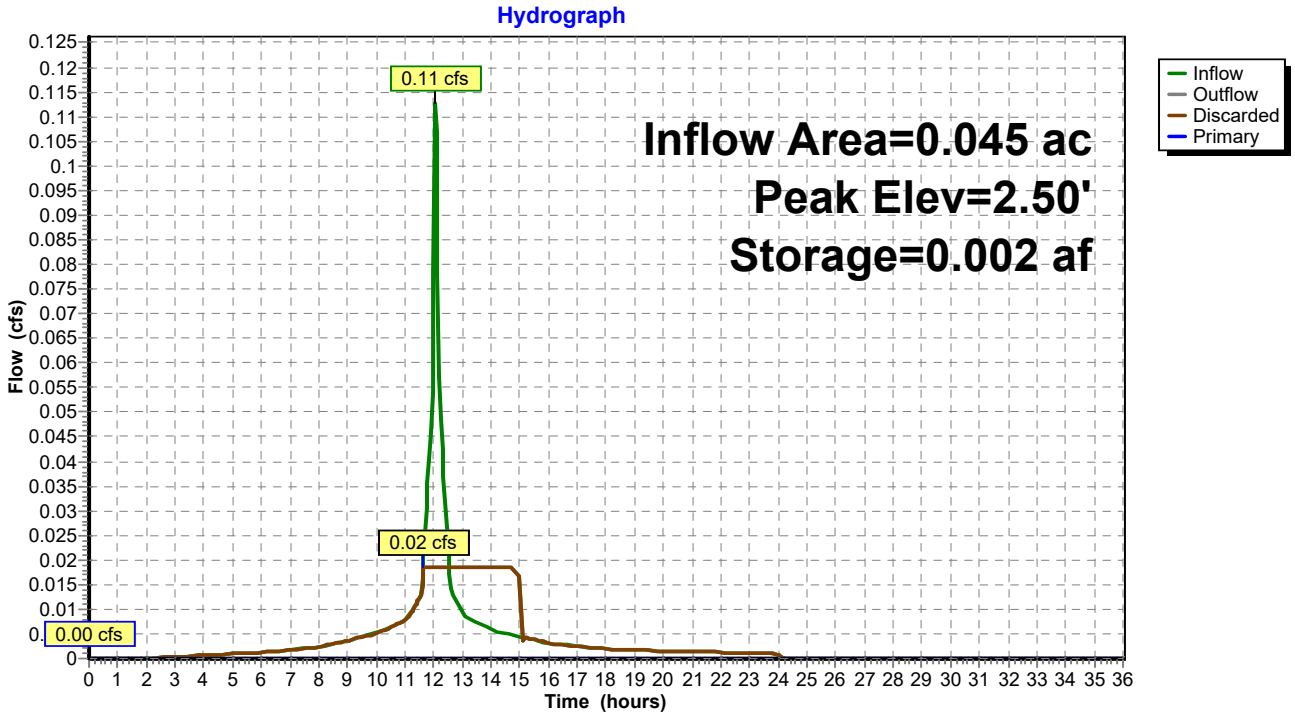
235.5 cf Field - 63.3 cf Chambers = 172.2 cf Stone x 40.0% Voids = 68.9 cf Stone Storage

Chamber Storage + Stone Storage = 132.2 cf = 0.003 af
Overall Storage Efficiency = 56.1%
Overall System Size = 10.50' x 6.33' x 3.54'

1 Chambers
8.7 cy Field
6.4 cy Stone



Pond 15P: Infiltration



Summary for Pond 16P: Infiltration

Inflow Area = 0.045 ac,100.00% Impervious, Inflow Depth = 2.36" for 1-Year event
Inflow = 0.11 cfs @ 12.07 hrs, Volume= 0.009 af
Outflow = 0.02 cfs @ 11.65 hrs, Volume= 0.009 af, Atten= 84%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.65 hrs, Volume= 0.009 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 18R : DESIGN LINE

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 2.48' @ 12.53 hrs Surf.Area= 0.002 ac Storage= 0.002 af

Plug-Flow detention time= 30.0 min calculated for 0.009 af (100% of inflow)
Center-of-Mass det. time= 30.0 min (790.2 - 760.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**6.33'W x 10.50'L x 3.54'H Field A** 0.005 af Overall - 0.001 af Embedded = 0.004 af x 40.0% Voids
#2A	0.50'	0.001 af	**Cultec R-330XLHD** 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
		0.003 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**12.000 in/hr Exfiltration over Surface area**
#2	Primary	5.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 11.65 hrs HW=0.05' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

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

Pond 16P: Infiltration - 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

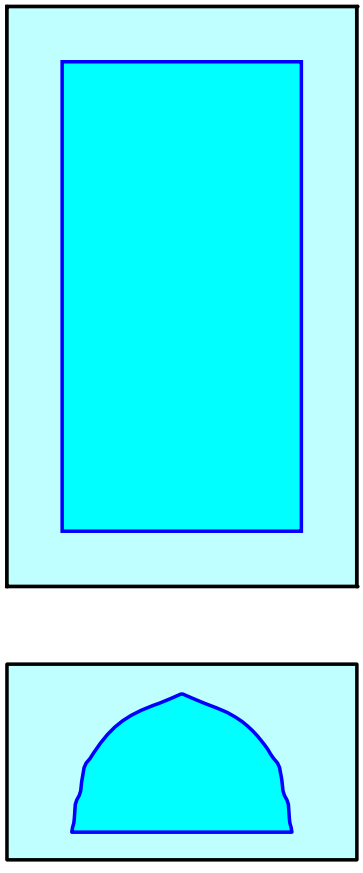
1 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 8.50' Row Length +12.0" End Stone x 2 = 10.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

1 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 63.3 cf Chamber Storage

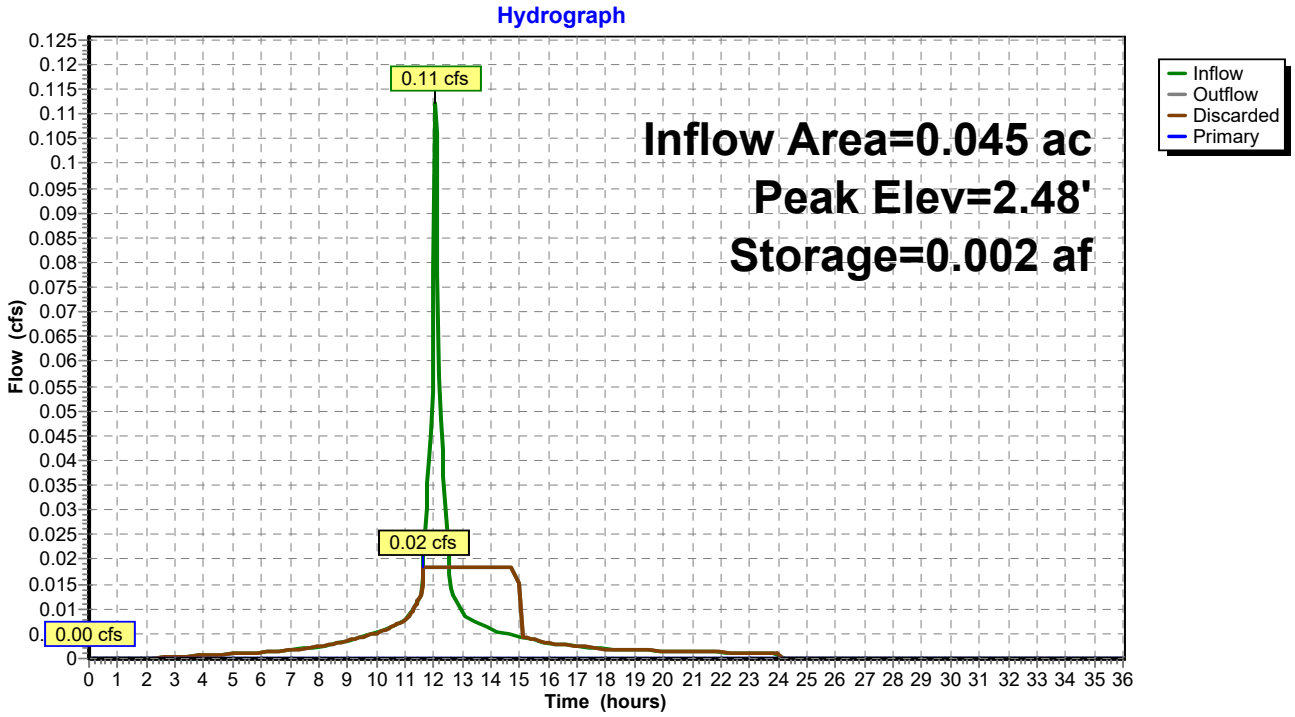
235.5 cf Field - 63.3 cf Chambers = 172.2 cf Stone x 40.0% Voids = 68.9 cf Stone Storage

Chamber Storage + Stone Storage = 132.2 cf = 0.003 af
Overall Storage Efficiency = 56.1%
Overall System Size = 10.50' x 6.33' x 3.54'

1 Chambers
8.7 cy Field
6.4 cy Stone



Pond 16P: Infiltration



Summary for Pond 17P: Infiltration

Inflow Area = 0.182 ac,100.00% Impervious, Inflow Depth = 2.36" for 1-Year event
Inflow = 0.46 cfs @ 12.07 hrs, Volume= 0.036 af
Outflow = 0.17 cfs @ 11.90 hrs, Volume= 0.036 af, Atten= 63%, Lag= 0.0 min
Discarded = 0.17 cfs @ 11.90 hrs, Volume= 0.036 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 18R : DESIGN LINE

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 0.63' @ 12.30 hrs Surf.Area= 0.014 ac Storage= 0.004 af

Plug-Flow detention time= 5.0 min calculated for 0.036 af (100% of inflow)
Center-of-Mass det. time= 5.0 min (765.1 - 760.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.013 af	**16.00'W x 38.50'L x 3.54'H Field A** 0.050 af Overall - 0.019 af Embedded = 0.031 af x 40.0% Voids
#2A	0.50'	0.019 af	**Cultec R-330XLHD** x 15 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 3 rows
		0.031 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**12.000 in/hr Exfiltration over Surface area**
#2	Primary	5.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.17 cfs @ 11.90 hrs HW=0.05' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

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

Pond 17P: Infiltration - 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 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

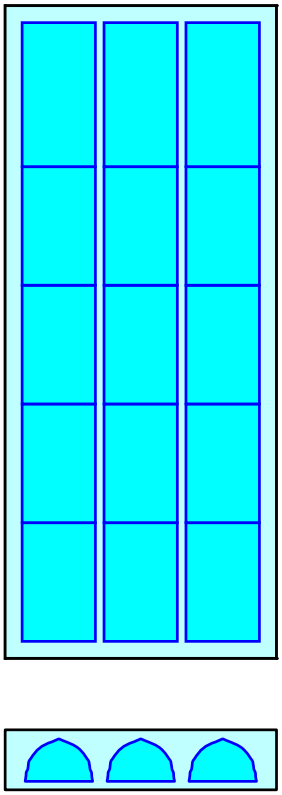
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 16.00' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

15 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 815.9 cf Chamber Storage

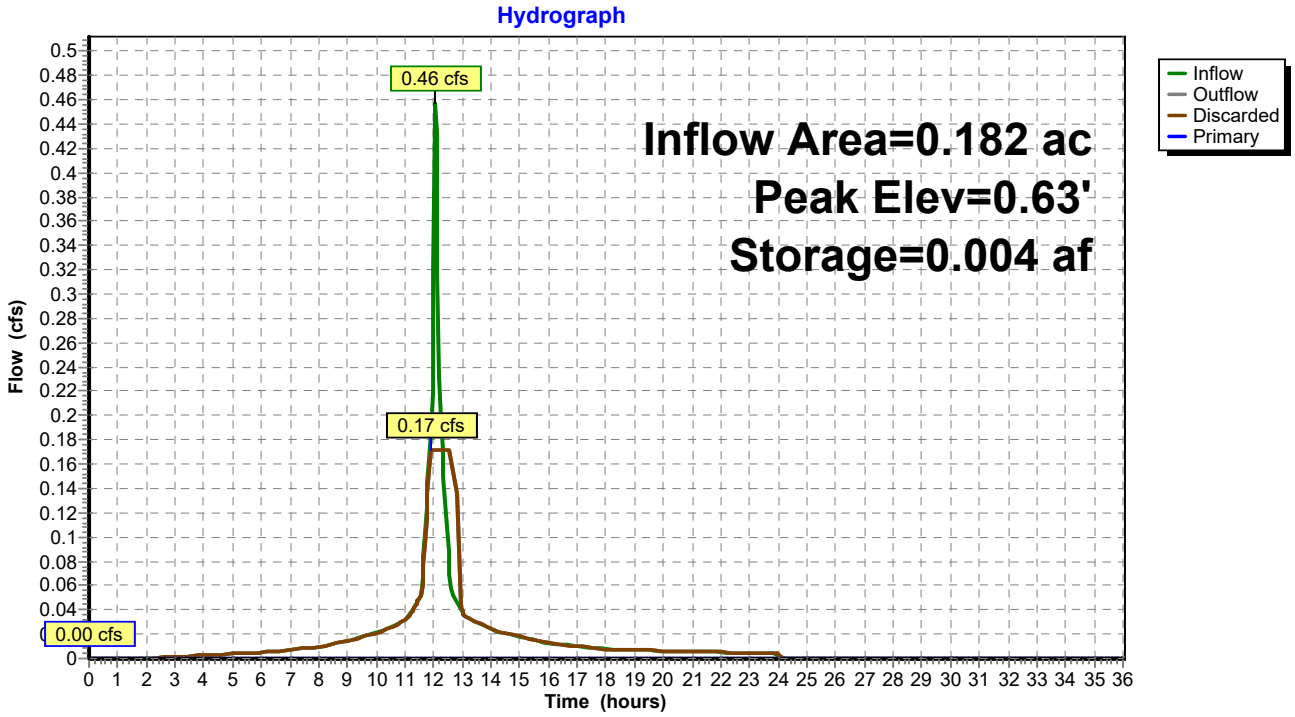
2,181.7 cf Field - 815.9 cf Chambers = 1,365.8 cf Stone x 40.0% Voids = 546.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,362.2 cf = 0.031 af
Overall Storage Efficiency = 62.4%
Overall System Size = 38.50' x 16.00' x 3.54'

15 Chambers
80.8 cy Field
50.6 cy Stone



Pond 17P: Infiltration



Summary for Subcatchment 2S: Lot #1 Remainder

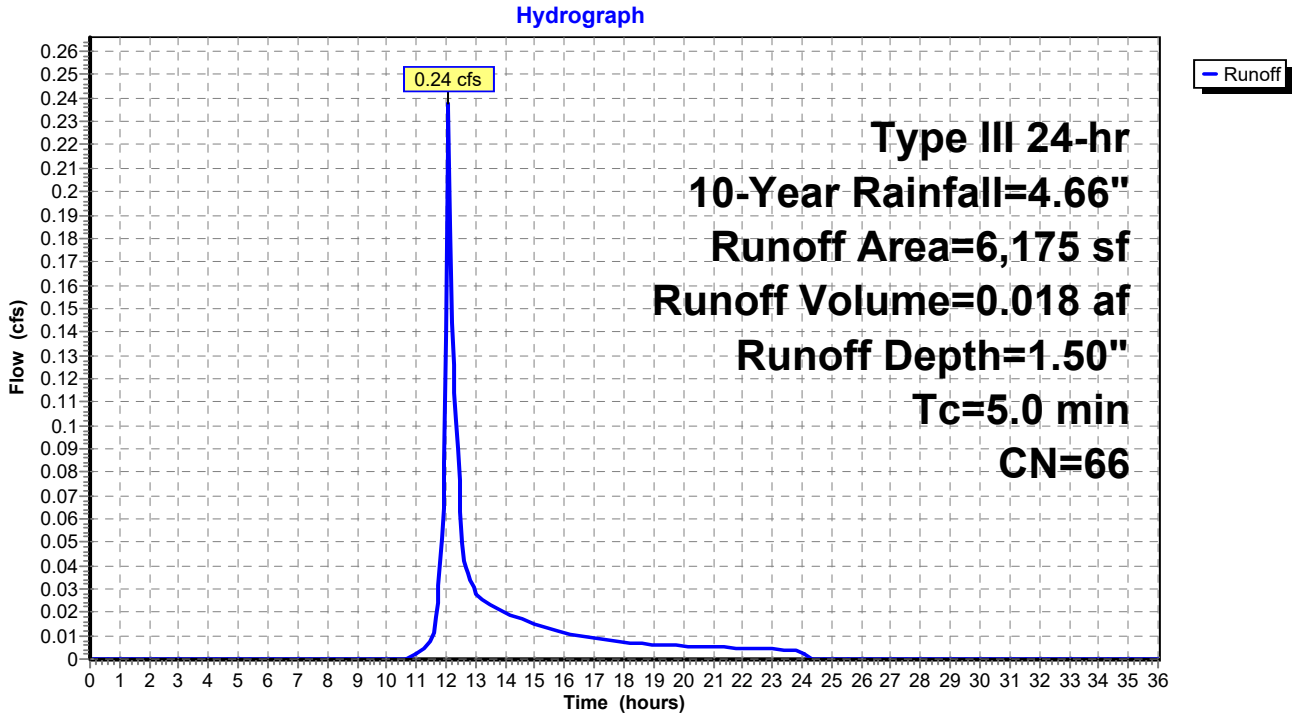
Runoff = 0.24 cfs @ 12.09 hrs, Volume= 0.018 af, Depth= 1.50"
Routed to Reach 18R : DESIGN LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.66"

	Area (sf)	CN	Description
*	815	98	Driveway
	5,360	61	>75% Grass cover, Good, HSG B
	6,175	66	Weighted Average
	5,360		86.80% Pervious Area
	815		13.20% Impervious Area

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

Subcatchment 2S: Lot #1 Remainder



Summary for Subcatchment 3S: Lot #2 Remainder

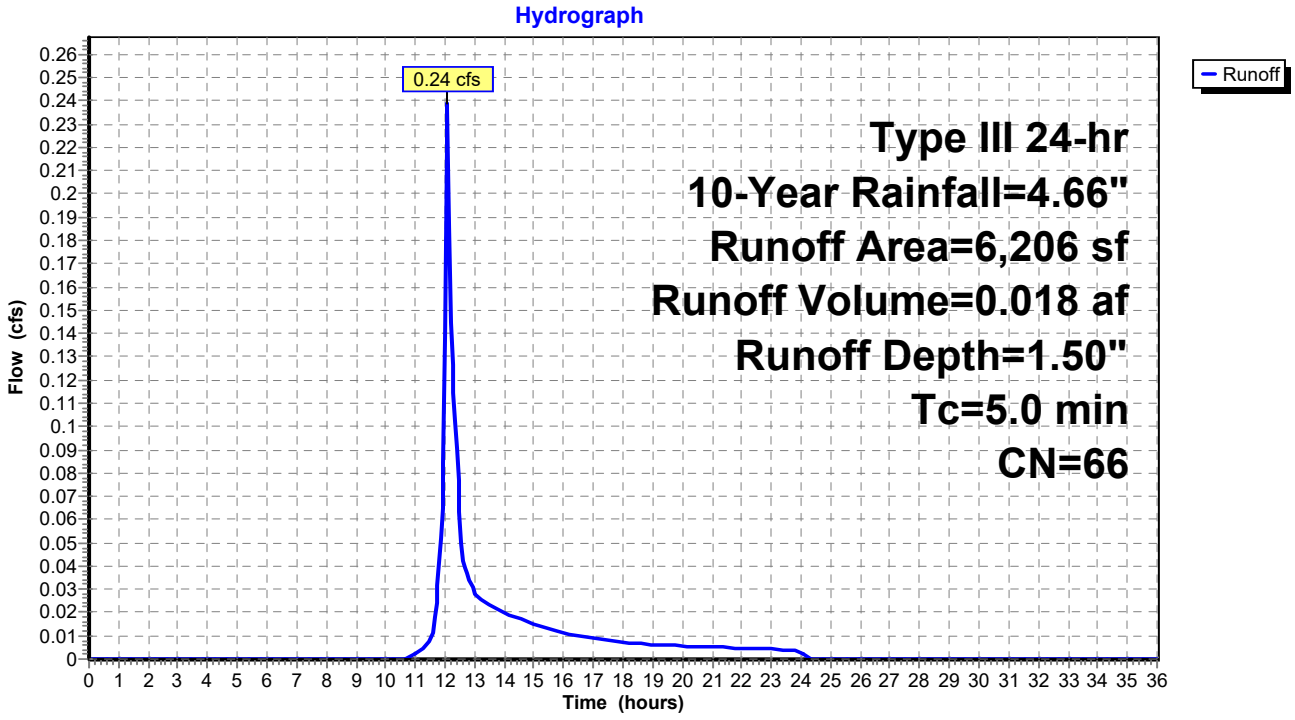
Runoff = 0.24 cfs @ 12.09 hrs, Volume= 0.018 af, Depth= 1.50"
Routed to Reach 18R : DESIGN LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.66"

	Area (sf)	CN	Description
*	815	98	Driveway
	5,391	61	>75% Grass cover, Good, HSG B
	6,206	66	Weighted Average
	5,391		86.87% Pervious Area
	815		13.13% Impervious Area

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

Subcatchment 3S: Lot #2 Remainder



Summary for Subcatchment 4S: Lot #3 Remainder

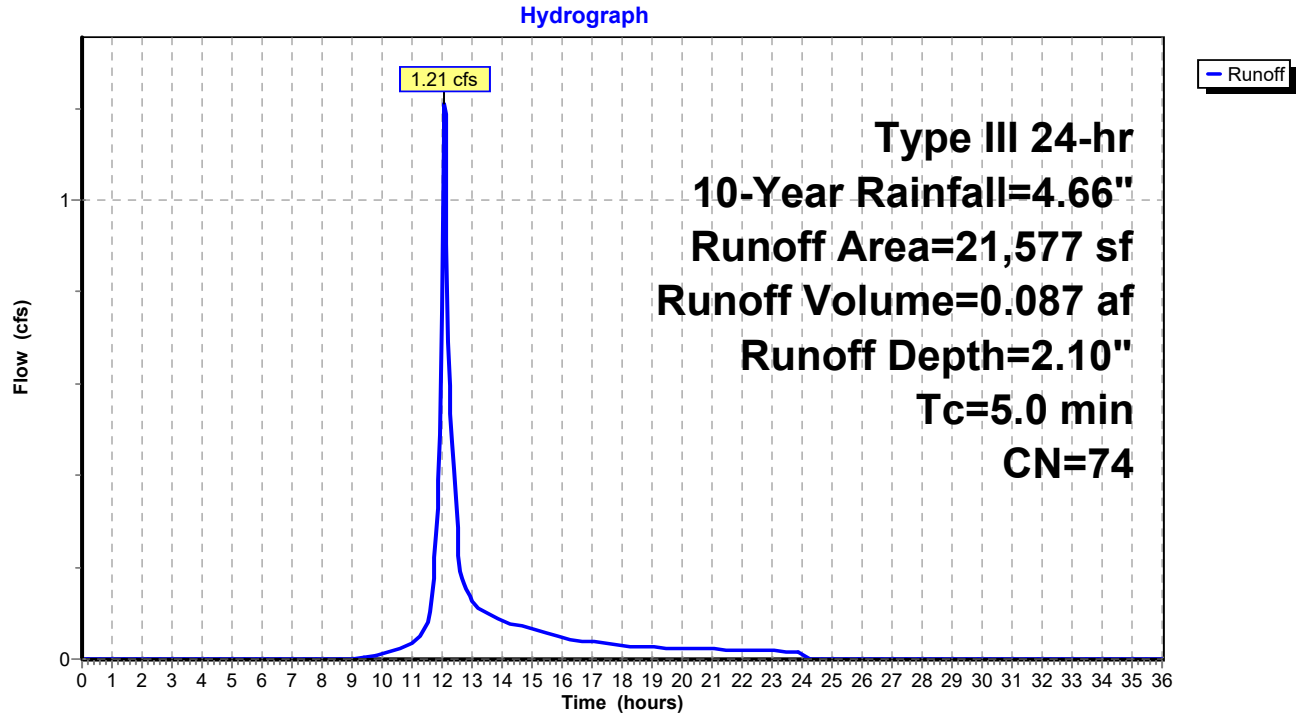
Runoff = 1.21 cfs @ 12.08 hrs, Volume= 0.087 af, Depth= 2.10"
Routed to Reach 18R : DESIGN LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.66"

	Area (sf)	CN	Description
*	7,583	98	Driveway
	13,994	61	>75% Grass cover, Good, HSG B
	21,577	74	Weighted Average
	13,994		64.86% Pervious Area
	7,583		35.14% Impervious Area

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

Subcatchment 4S: Lot #3 Remainder



Summary for Subcatchment 5S: Lot #4 Remainder

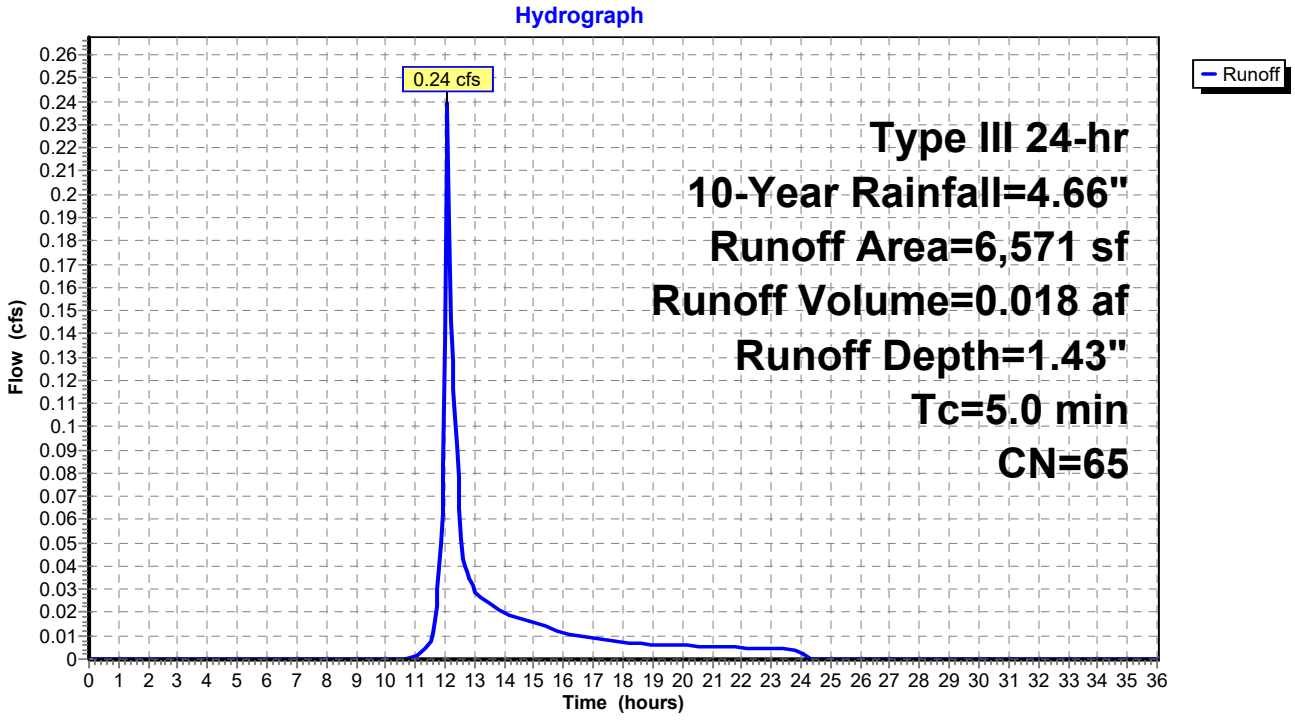
Runoff = 0.24 cfs @ 12.09 hrs, Volume= 0.018 af, Depth= 1.43"
Routed to Reach 18R : DESIGN LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.66"

	Area (sf)	CN	Description
*	709	98	Driveway
	5,862	61	>75% Grass cover, Good, HSG B
	6,571	65	Weighted Average
	5,862		89.21% Pervious Area
	709		10.79% Impervious Area

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

Subcatchment 5S: Lot #4 Remainder



Summary for Subcatchment 6S: Lot #5 Remainder

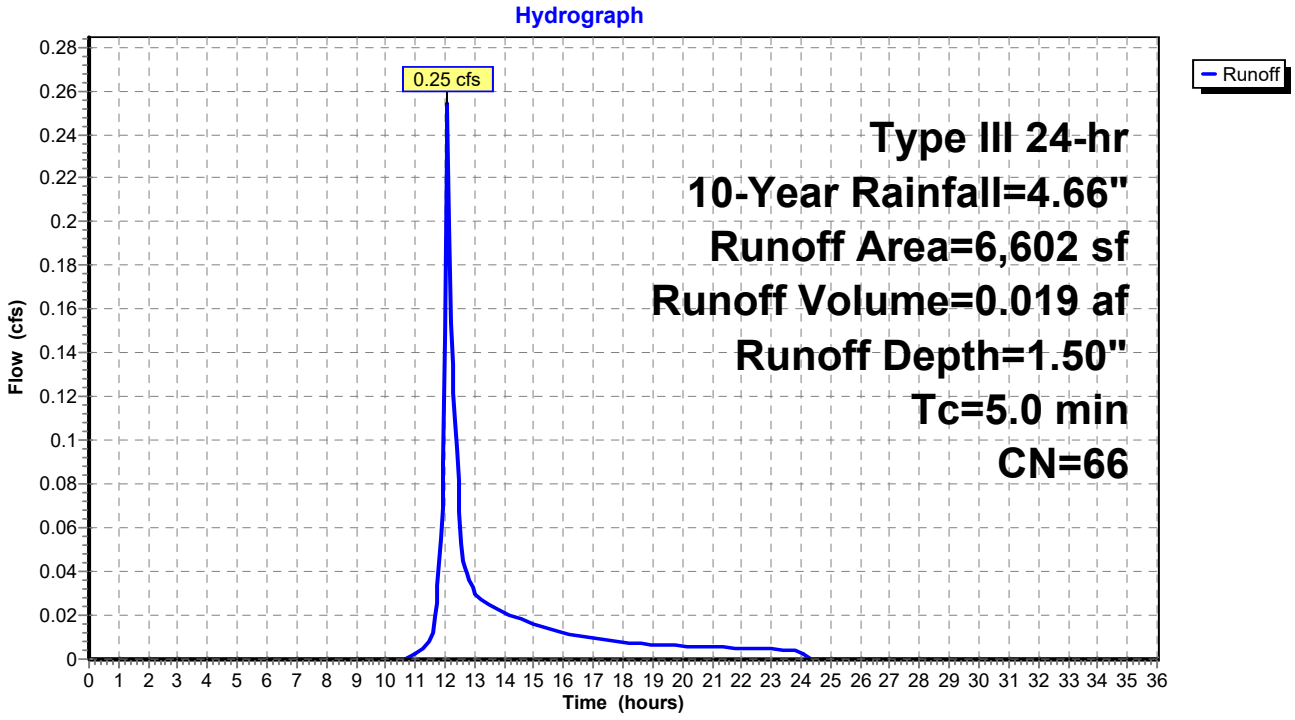
Runoff = 0.25 cfs @ 12.09 hrs, Volume= 0.019 af, Depth= 1.50"
Routed to Reach 18R : DESIGN LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.66"

	Area (sf)	CN	Description
*	974	98	Driveway
	5,628	61	>75% Grass cover, Good, HSG B
	6,602	66	Weighted Average
	5,628		85.25% Pervious Area
	974		14.75% Impervious Area

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

Subcatchment 6S: Lot #5 Remainder



Summary for Subcatchment 8S: Lot #1 Roof

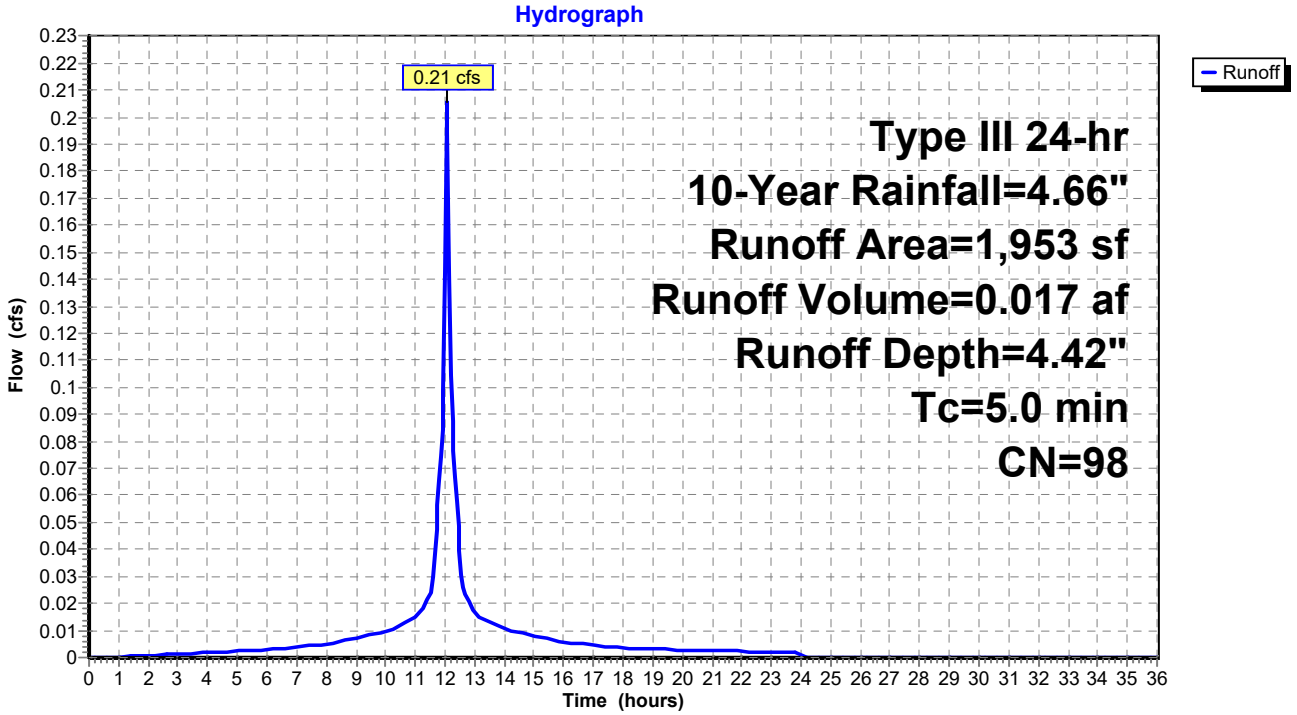
Runoff = 0.21 cfs @ 12.07 hrs, Volume= 0.017 af, Depth= 4.42"
Routed to Pond 13P : Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.66"

	Area (sf)	CN	Description
*	1,953	98	Roof Area
	1,953		100.00% Impervious Area

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

Subcatchment 8S: Lot #1 Roof



Summary for Subcatchment 9S: Lot #2 Roof

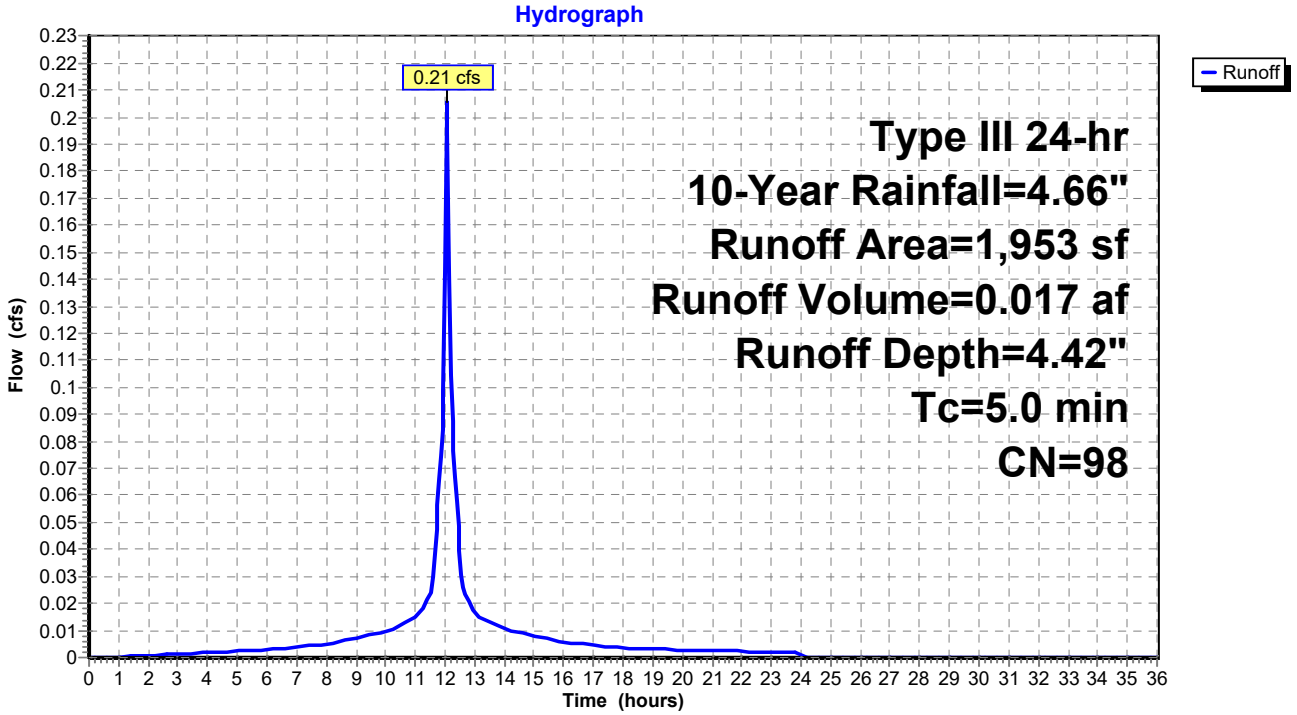
Runoff = 0.21 cfs @ 12.07 hrs, Volume= 0.017 af, Depth= 4.42"
Routed to Pond 14P : Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.66"

	Area (sf)	CN	Description
*	1,953	98	Roof Area
	1,953		100.00% Impervious Area

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

Subcatchment 9S: Lot #2 Roof



Summary for Subcatchment 10S: Lot #3 Roof

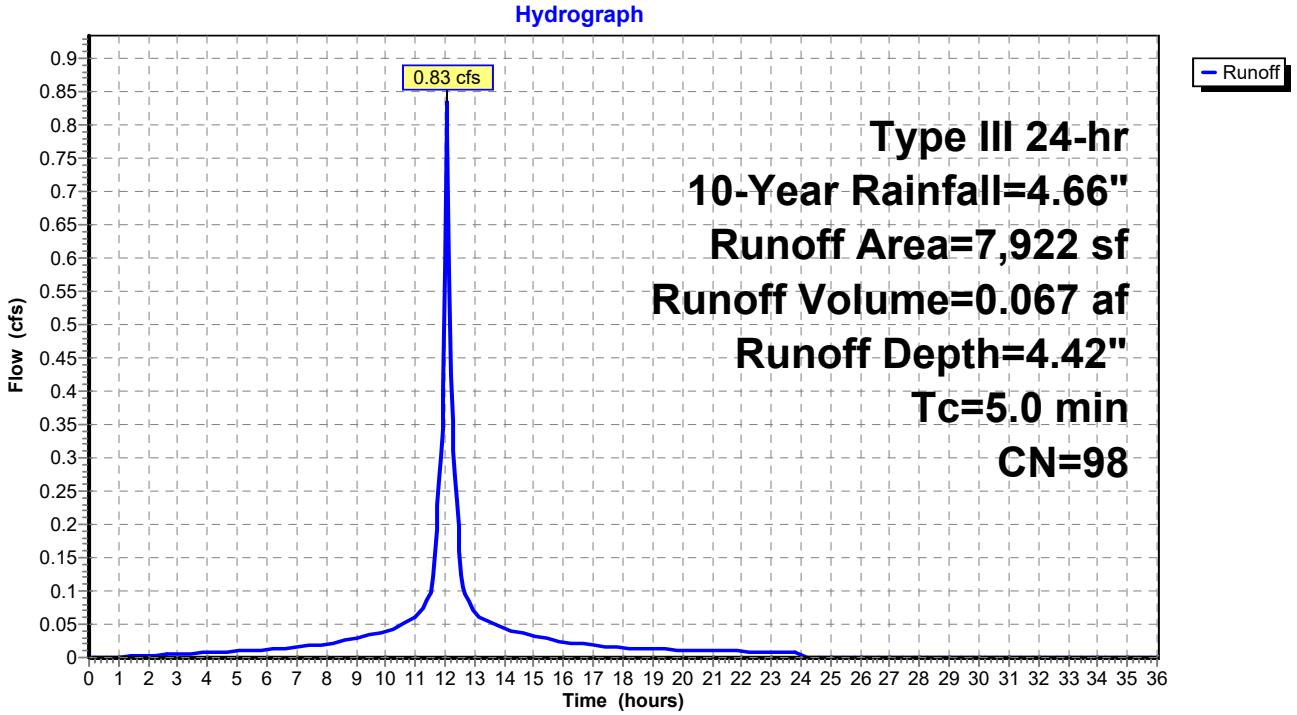
Runoff = 0.83 cfs @ 12.07 hrs, Volume= 0.067 af, Depth= 4.42"
Routed to Pond 17P : Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.66"

	Area (sf)	CN	Description
*	7,922	98	Roof Area
	7,922		100.00% Impervious Area

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

Subcatchment 10S: Lot #3 Roof



Summary for Subcatchment 11S: Lot #4 Roof

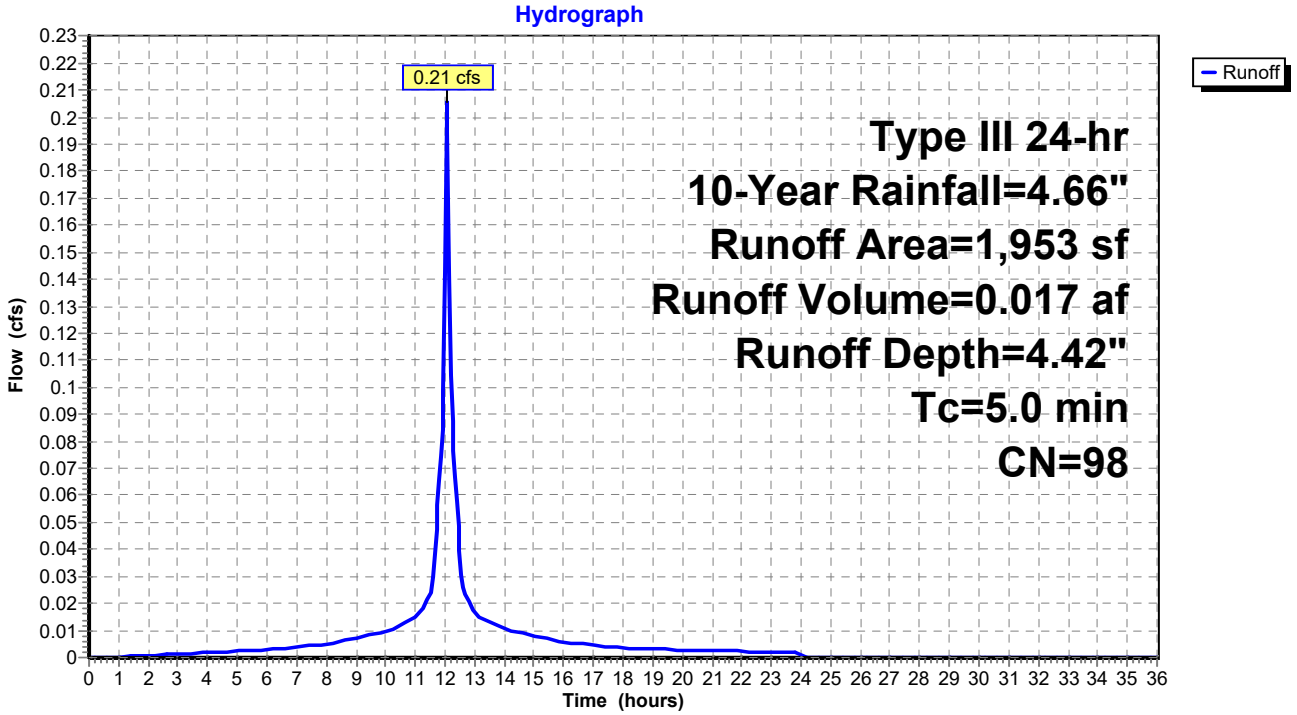
Runoff = 0.21 cfs @ 12.07 hrs, Volume= 0.017 af, Depth= 4.42"
Routed to Pond 15P : Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.66"

	Area (sf)	CN	Description
*	1,953	98	Roof Area
	1,953		100.00% Impervious Area

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

Subcatchment 11S: Lot #4 Roof



Summary for Subcatchment 12S: Lot #5 Roof

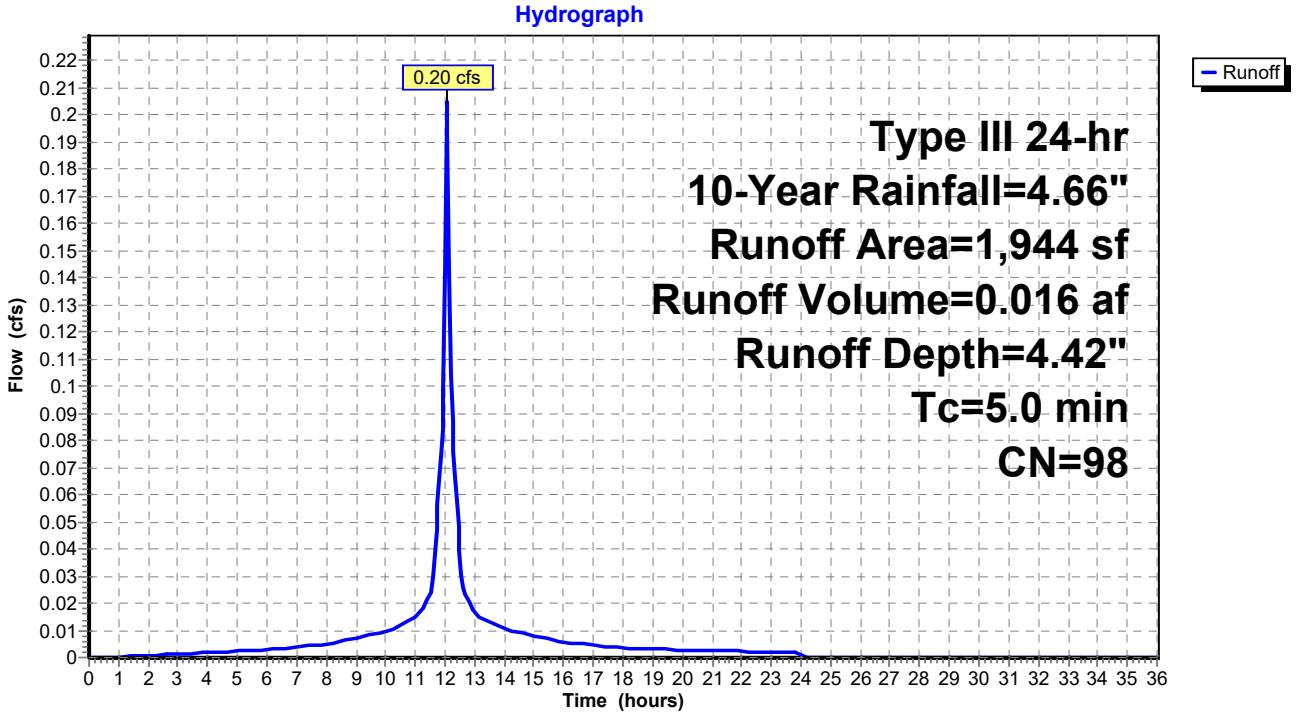
Runoff = 0.20 cfs @ 12.07 hrs, Volume= 0.016 af, Depth= 4.42"
Routed to Pond 16P : Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.66"

	Area (sf)	CN	Description
*	1,944	98	Roof Area
	1,944		100.00% Impervious Area

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

Subcatchment 12S: Lot #5 Roof

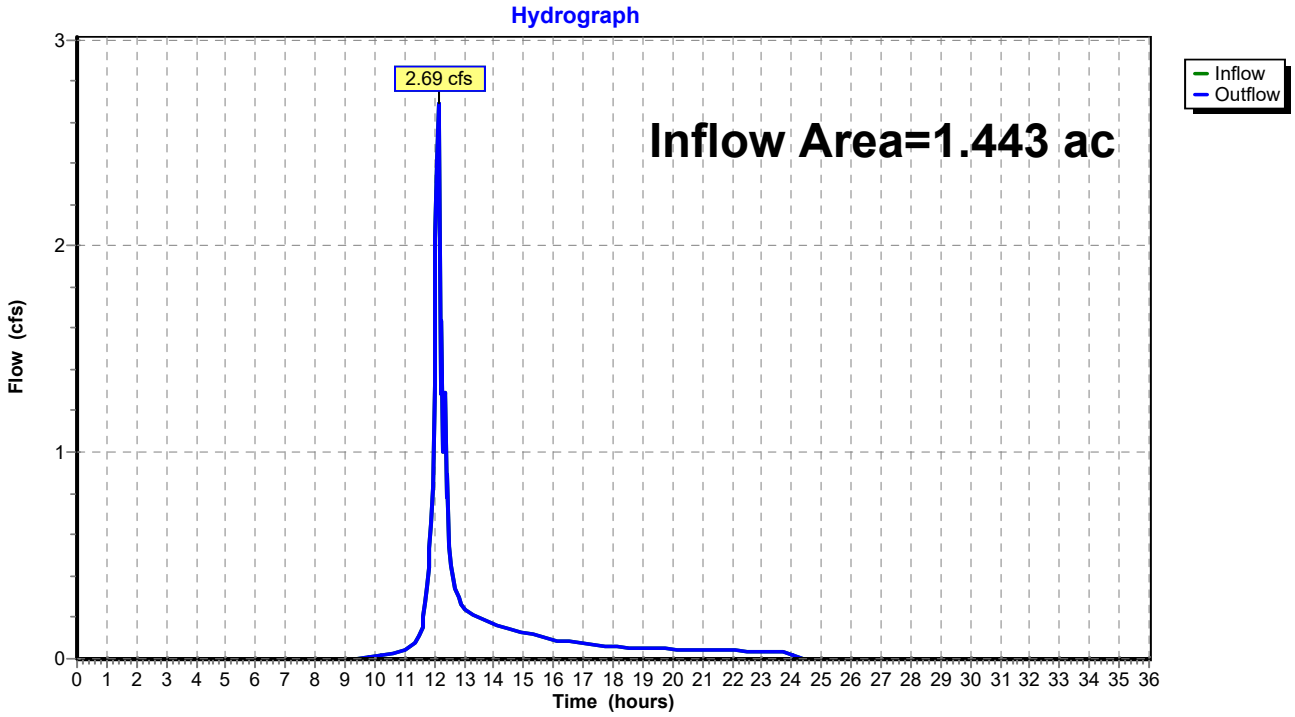


Summary for Reach 18R: DESIGN LINE

Inflow Area = 1.443 ac, 42.35% Impervious, Inflow Depth = 1.41" for 10-Year event
Inflow = 2.69 cfs @ 12.13 hrs, Volume= 0.169 af
Outflow = 2.69 cfs @ 12.13 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Reach 18R: DESIGN LINE



Summary for Pond 13P: Infiltration

Inflow Area = 0.045 ac,100.00% Impervious, Inflow Depth = 4.42" for 10-Year event
Inflow = 0.21 cfs @ 12.07 hrs, Volume= 0.017 af
Outflow = 0.25 cfs @ 12.15 hrs, Volume= 0.017 af, Atten= 0%, Lag= 4.5 min
Discarded = 0.02 cfs @ 11.30 hrs, Volume= 0.014 af
Primary = 0.23 cfs @ 12.15 hrs, Volume= 0.003 af
Routed to Reach 18R : DESIGN LINE

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 5.04' @ 12.15 hrs Surf.Area= 0.002 ac Storage= 0.003 af

Plug-Flow detention time= 37.1 min calculated for 0.017 af (100% of inflow)
Center-of-Mass det. time= 37.0 min (785.3 - 748.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**6.33'W x 10.50'L x 3.54'H Field A** 0.005 af Overall - 0.001 af Embedded = 0.004 af x 40.0% Voids
#2A	0.50'	0.001 af	**Cultec R-330XLHD** 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
		0.003 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**12.000 in/hr Exfiltration over Surface area**
#2	Primary	5.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 11.30 hrs HW=0.05' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.18 cfs @ 12.15 hrs HW=5.04' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 0.18 cfs @ 0.63 fps)

Pond 13P: Infiltration - 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

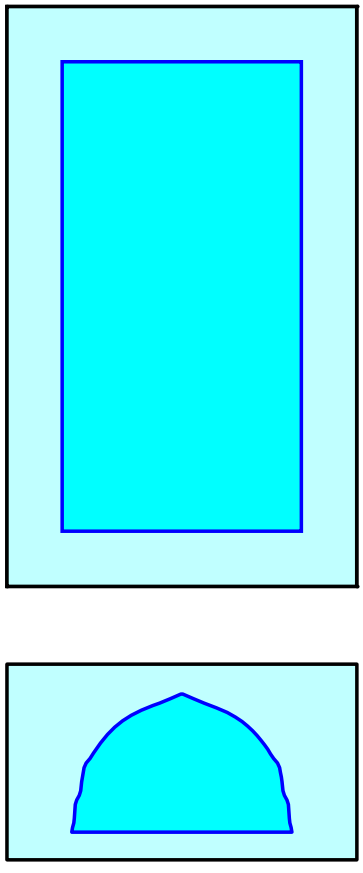
1 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 8.50' Row Length +12.0" End Stone x 2 = 10.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

1 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 63.3 cf Chamber Storage

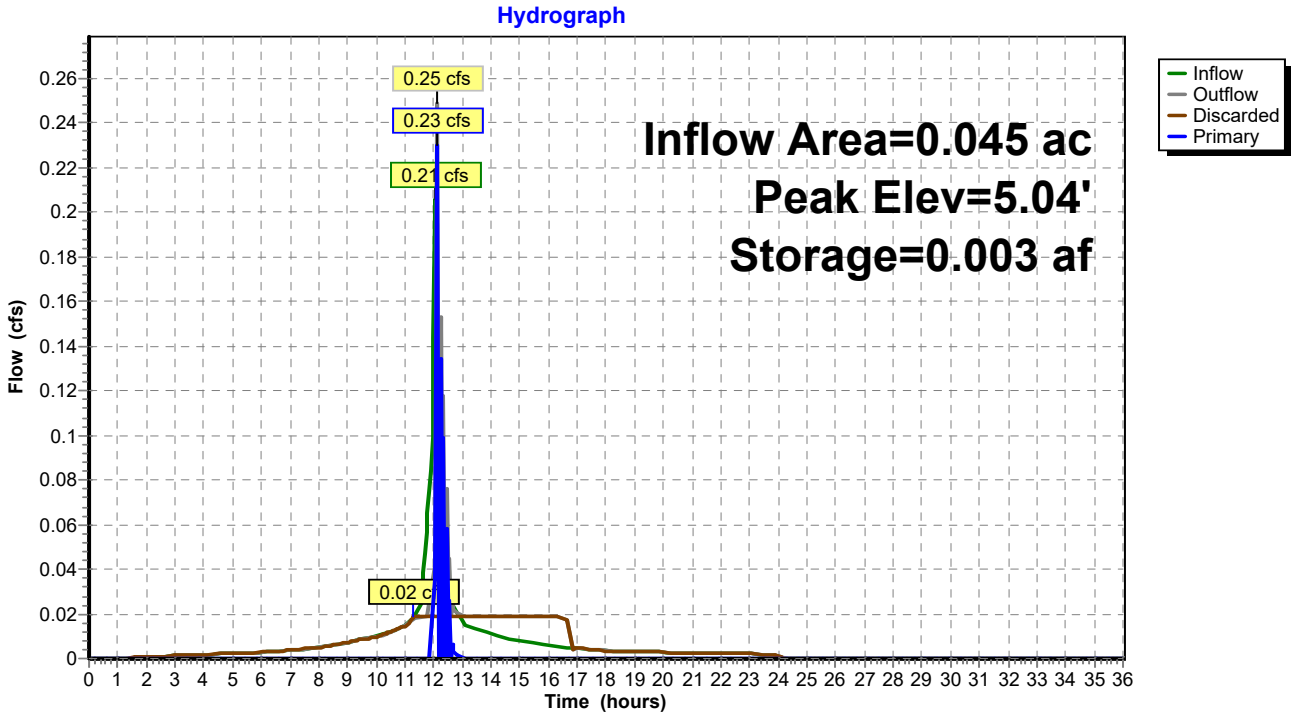
235.5 cf Field - 63.3 cf Chambers = 172.2 cf Stone x 40.0% Voids = 68.9 cf Stone Storage

Chamber Storage + Stone Storage = 132.2 cf = 0.003 af
Overall Storage Efficiency = 56.1%
Overall System Size = 10.50' x 6.33' x 3.54'

1 Chambers
8.7 cy Field
6.4 cy Stone



Pond 13P: Infiltration



Summary for Pond 14P: Infiltration

Inflow Area = 0.045 ac,100.00% Impervious, Inflow Depth = 4.42" for 10-Year event
Inflow = 0.21 cfs @ 12.07 hrs, Volume= 0.017 af
Outflow = 0.25 cfs @ 12.15 hrs, Volume= 0.017 af, Atten= 0%, Lag= 4.5 min
Discarded = 0.02 cfs @ 11.30 hrs, Volume= 0.014 af
Primary = 0.23 cfs @ 12.15 hrs, Volume= 0.003 af
Routed to Reach 18R : DESIGN LINE

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 5.04' @ 12.15 hrs Surf.Area= 0.002 ac Storage= 0.003 af

Plug-Flow detention time= 37.1 min calculated for 0.017 af (100% of inflow)
Center-of-Mass det. time= 37.0 min (785.3 - 748.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**6.33'W x 10.50'L x 3.54'H Field A** 0.005 af Overall - 0.001 af Embedded = 0.004 af x 40.0% Voids
#2A	0.50'	0.001 af	**Cultec R-330XLHD** 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
		0.003 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**12.000 in/hr Exfiltration over Surface area**
#2	Primary	5.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 11.30 hrs HW=0.05' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.18 cfs @ 12.15 hrs HW=5.04' (Free Discharge)
↑**2=Orifice/Grate** (Weir Controls 0.18 cfs @ 0.63 fps)

Pond 14P: Infiltration - 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

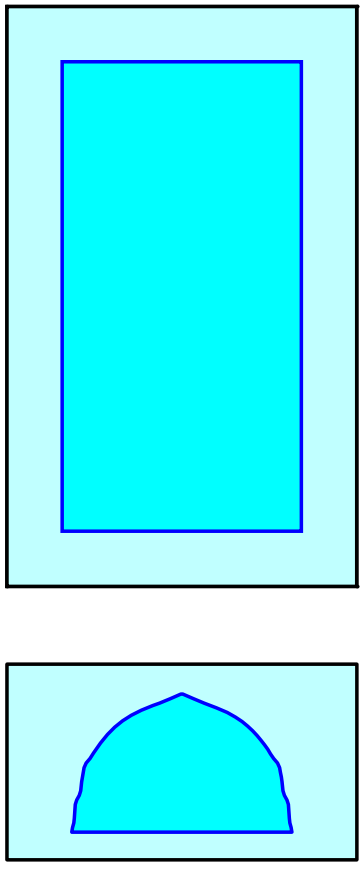
1 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 8.50' Row Length +12.0" End Stone x 2 = 10.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

1 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 63.3 cf Chamber Storage

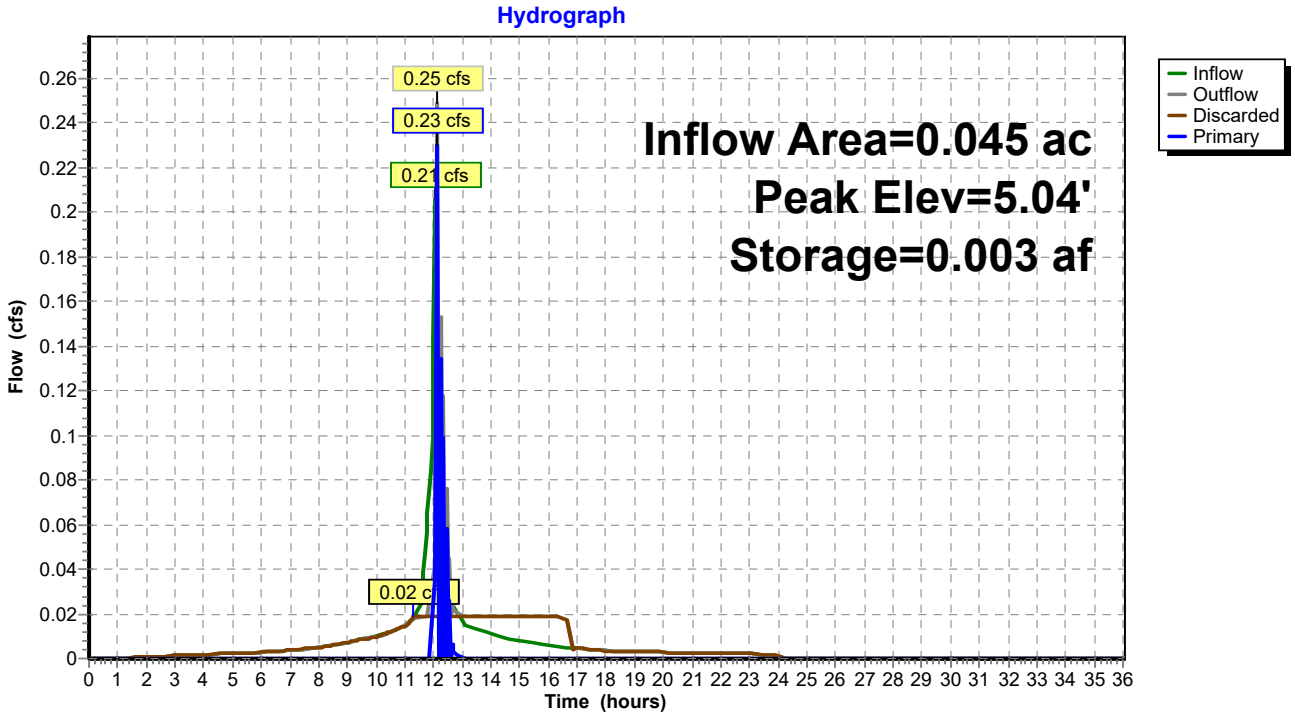
235.5 cf Field - 63.3 cf Chambers = 172.2 cf Stone x 40.0% Voids = 68.9 cf Stone Storage

Chamber Storage + Stone Storage = 132.2 cf = 0.003 af
Overall Storage Efficiency = 56.1%
Overall System Size = 10.50' x 6.33' x 3.54'

1 Chambers
8.7 cy Field
6.4 cy Stone



Pond 14P: Infiltration



Summary for Pond 15P: Infiltration

Inflow Area = 0.045 ac,100.00% Impervious, Inflow Depth = 4.42" for 10-Year event
Inflow = 0.21 cfs @ 12.07 hrs, Volume= 0.017 af
Outflow = 0.25 cfs @ 12.15 hrs, Volume= 0.017 af, Atten= 0%, Lag= 4.5 min
Discarded = 0.02 cfs @ 11.30 hrs, Volume= 0.014 af
Primary = 0.23 cfs @ 12.15 hrs, Volume= 0.003 af
Routed to Reach 18R : DESIGN LINE

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 5.04' @ 12.15 hrs Surf.Area= 0.002 ac Storage= 0.003 af

Plug-Flow detention time= 37.1 min calculated for 0.017 af (100% of inflow)
Center-of-Mass det. time= 37.0 min (785.3 - 748.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**6.33'W x 10.50'L x 3.54'H Field A** 0.005 af Overall - 0.001 af Embedded = 0.004 af x 40.0% Voids
#2A	0.50'	0.001 af	**Cultec R-330XLHD** 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
		0.003 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**12.000 in/hr Exfiltration over Surface area**
#2	Primary	5.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 11.30 hrs HW=0.05' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.18 cfs @ 12.15 hrs HW=5.04' (Free Discharge)
↑**2=Orifice/Grate** (Weir Controls 0.18 cfs @ 0.63 fps)

Pond 15P: Infiltration - 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

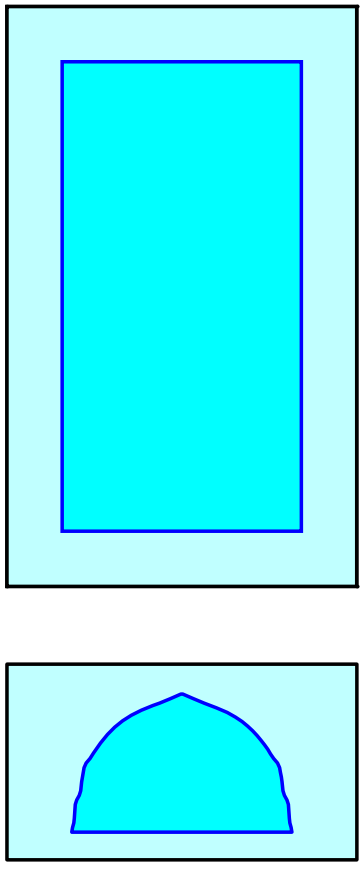
1 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 8.50' Row Length +12.0" End Stone x 2 = 10.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

1 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 63.3 cf Chamber Storage

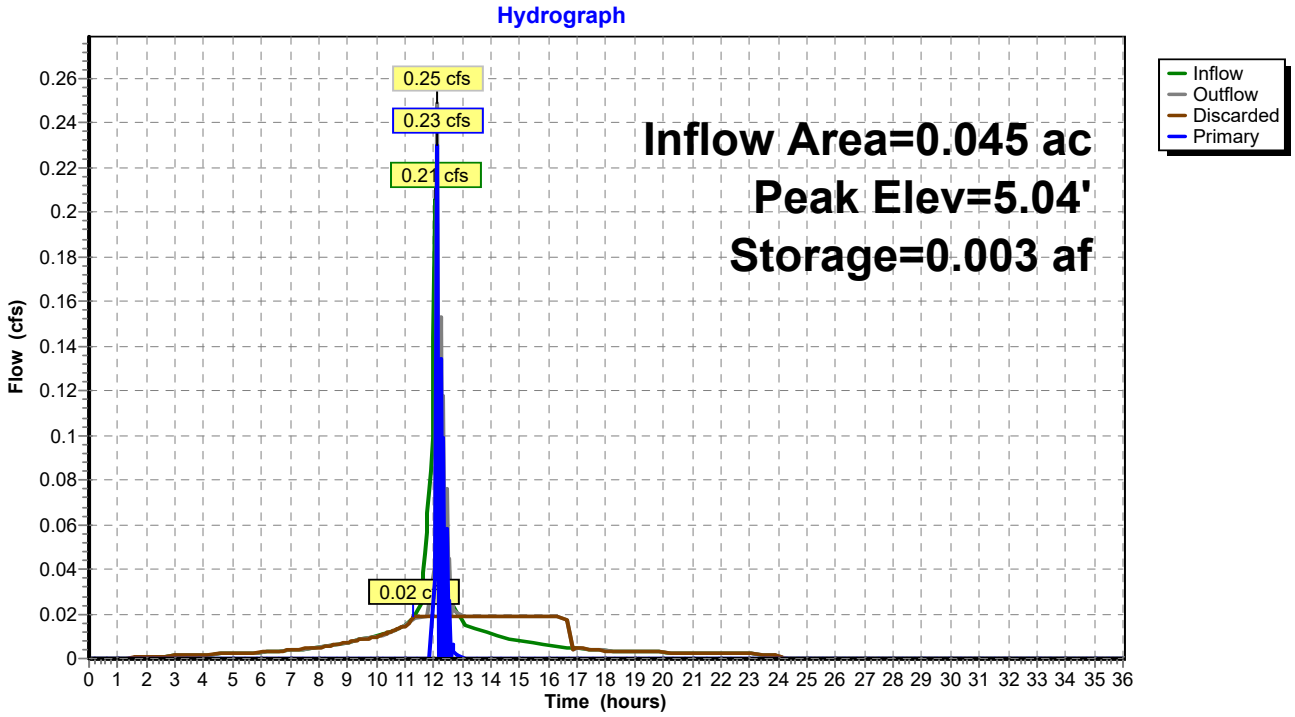
235.5 cf Field - 63.3 cf Chambers = 172.2 cf Stone x 40.0% Voids = 68.9 cf Stone Storage

Chamber Storage + Stone Storage = 132.2 cf = 0.003 af
Overall Storage Efficiency = 56.1%
Overall System Size = 10.50' x 6.33' x 3.54'

1 Chambers
8.7 cy Field
6.4 cy Stone



Pond 15P: Infiltration



Summary for Pond 16P: Infiltration

Inflow Area = 0.045 ac,100.00% Impervious, Inflow Depth = 4.42" for 10-Year event
Inflow = 0.20 cfs @ 12.07 hrs, Volume= 0.016 af
Outflow = 0.26 cfs @ 12.15 hrs, Volume= 0.016 af, Atten= 0%, Lag= 4.6 min
Discarded = 0.02 cfs @ 11.30 hrs, Volume= 0.014 af
Primary = 0.24 cfs @ 12.15 hrs, Volume= 0.003 af
Routed to Reach 18R : DESIGN LINE

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 5.04' @ 12.15 hrs Surf.Area= 0.002 ac Storage= 0.003 af

Plug-Flow detention time= 37.1 min calculated for 0.016 af (100% of inflow)
Center-of-Mass det. time= 37.1 min (785.4 - 748.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**6.33'W x 10.50'L x 3.54'H Field A** 0.005 af Overall - 0.001 af Embedded = 0.004 af x 40.0% Voids
#2A	0.50'	0.001 af	**Cultec R-330XLHD** 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
		0.003 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**12.000 in/hr Exfiltration over Surface area**
#2	Primary	5.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 11.30 hrs HW=0.05' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.20 cfs @ 12.15 hrs HW=5.04' (Free Discharge)
↑**2=Orifice/Grate** (Weir Controls 0.20 cfs @ 0.64 fps)

Pond 16P: Infiltration - 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

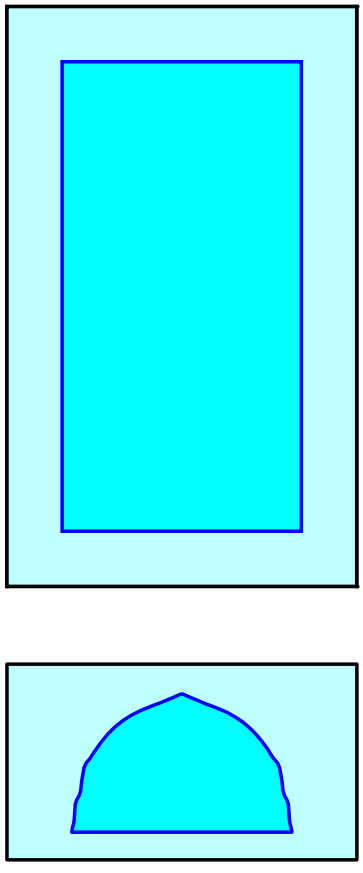
1 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 8.50' Row Length +12.0" End Stone x 2 = 10.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

1 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 63.3 cf Chamber Storage

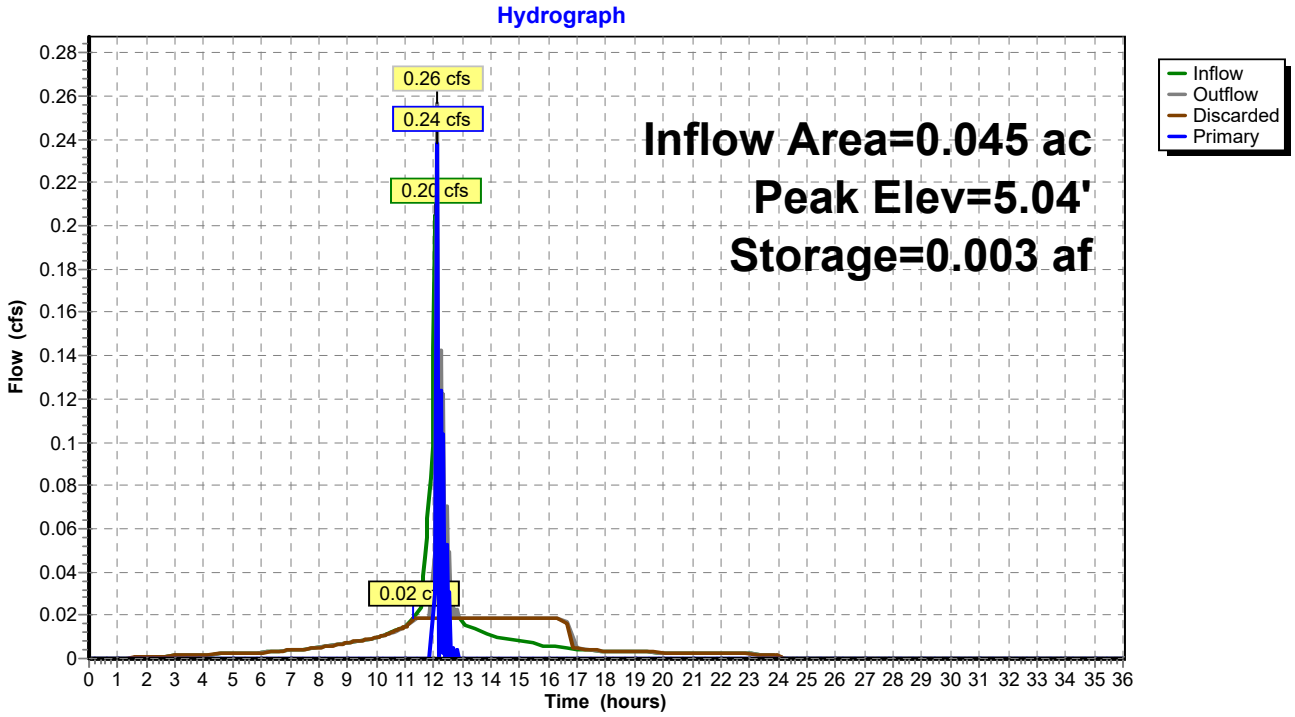
235.5 cf Field - 63.3 cf Chambers = 172.2 cf Stone x 40.0% Voids = 68.9 cf Stone Storage

Chamber Storage + Stone Storage = 132.2 cf = 0.003 af
Overall Storage Efficiency = 56.1%
Overall System Size = 10.50' x 6.33' x 3.54'

1 Chambers
8.7 cy Field
6.4 cy Stone



Pond 16P: Infiltration



Summary for Pond 17P: Infiltration

Inflow Area = 0.182 ac,100.00% Impervious, Inflow Depth = 4.42" for 10-Year event
Inflow = 0.83 cfs @ 12.07 hrs, Volume= 0.067 af
Outflow = 0.17 cfs @ 11.70 hrs, Volume= 0.067 af, Atten= 79%, Lag= 0.0 min
Discarded = 0.17 cfs @ 11.70 hrs, Volume= 0.067 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 18R : DESIGN LINE

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 1.56' @ 12.48 hrs Surf.Area= 0.014 ac Storage= 0.015 af

Plug-Flow detention time= 18.7 min calculated for 0.067 af (100% of inflow)
Center-of-Mass det. time= 18.7 min (767.0 - 748.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.013 af	**16.00'W x 38.50'L x 3.54'H Field A** 0.050 af Overall - 0.019 af Embedded = 0.031 af x 40.0% Voids
#2A	0.50'	0.019 af	**Cultec R-330XLHD** x 15 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 3 rows
		0.031 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**12.000 in/hr Exfiltration over Surface area**
#2	Primary	5.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.17 cfs @ 11.70 hrs HW=0.05' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

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

Pond 17P: Infiltration - 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 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

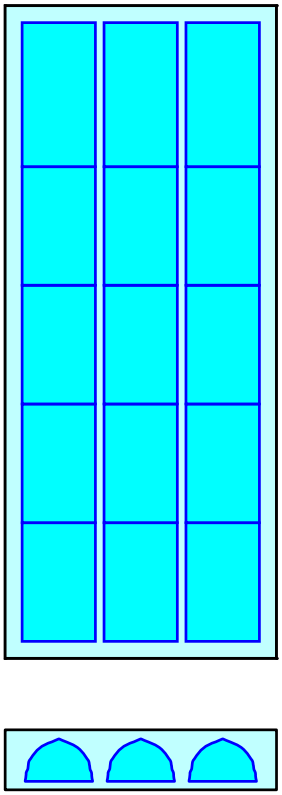
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 16.00' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

15 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 815.9 cf Chamber Storage

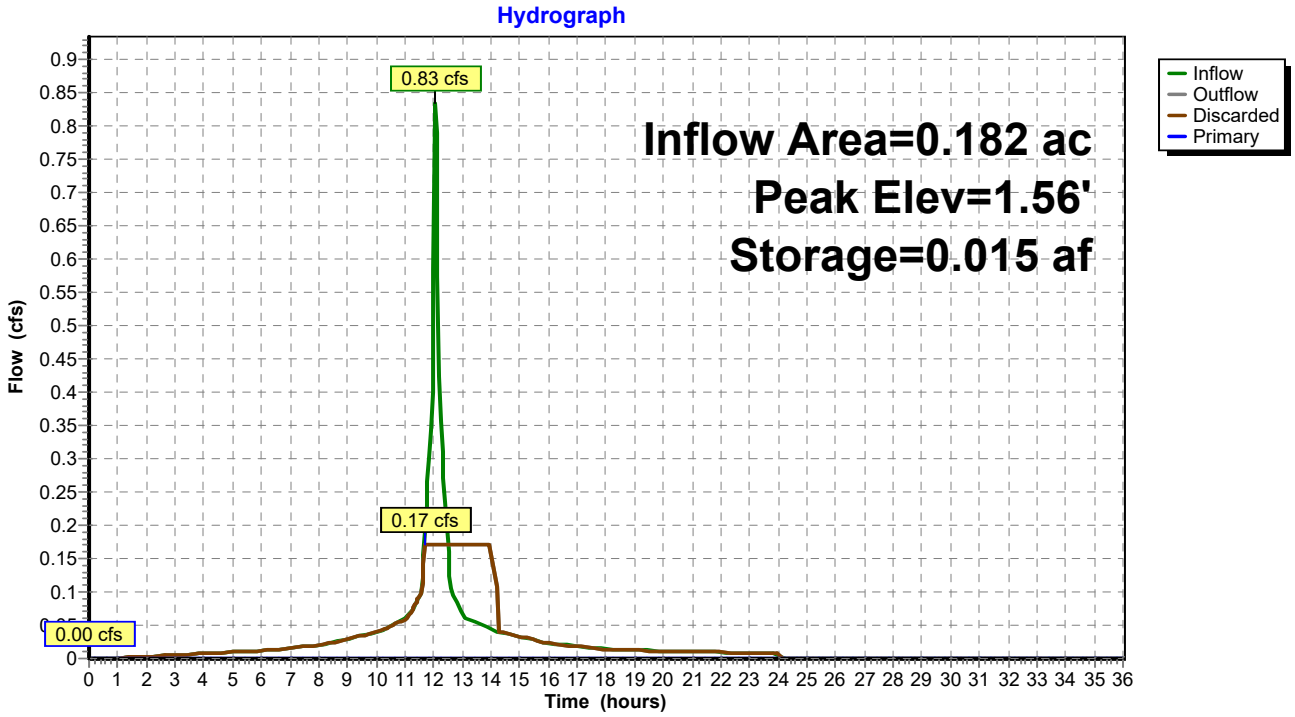
2,181.7 cf Field - 815.9 cf Chambers = 1,365.8 cf Stone x 40.0% Voids = 546.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,362.2 cf = 0.031 af
Overall Storage Efficiency = 62.4%
Overall System Size = 38.50' x 16.00' x 3.54'

15 Chambers
80.8 cy Field
50.6 cy Stone



Pond 17P: Infiltration



Summary for Subcatchment 2S: Lot #1 Remainder

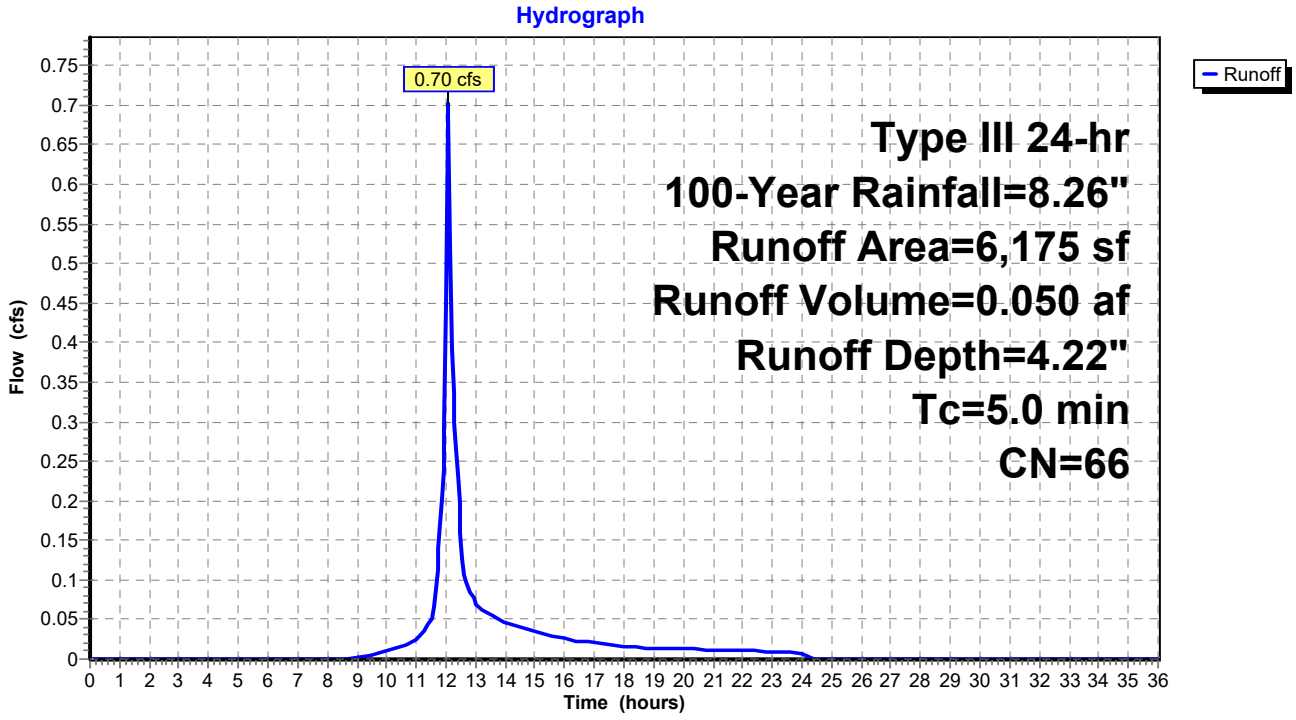
Runoff = 0.70 cfs @ 12.08 hrs, Volume= 0.050 af, Depth= 4.22"
Routed to Reach 18R : DESIGN LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.26"

	Area (sf)	CN	Description
*	815	98	Driveway
	5,360	61	>75% Grass cover, Good, HSG B
	6,175	66	Weighted Average
	5,360		86.80% Pervious Area
	815		13.20% Impervious Area

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

Subcatchment 2S: Lot #1 Remainder



Summary for Subcatchment 3S: Lot #2 Remainder

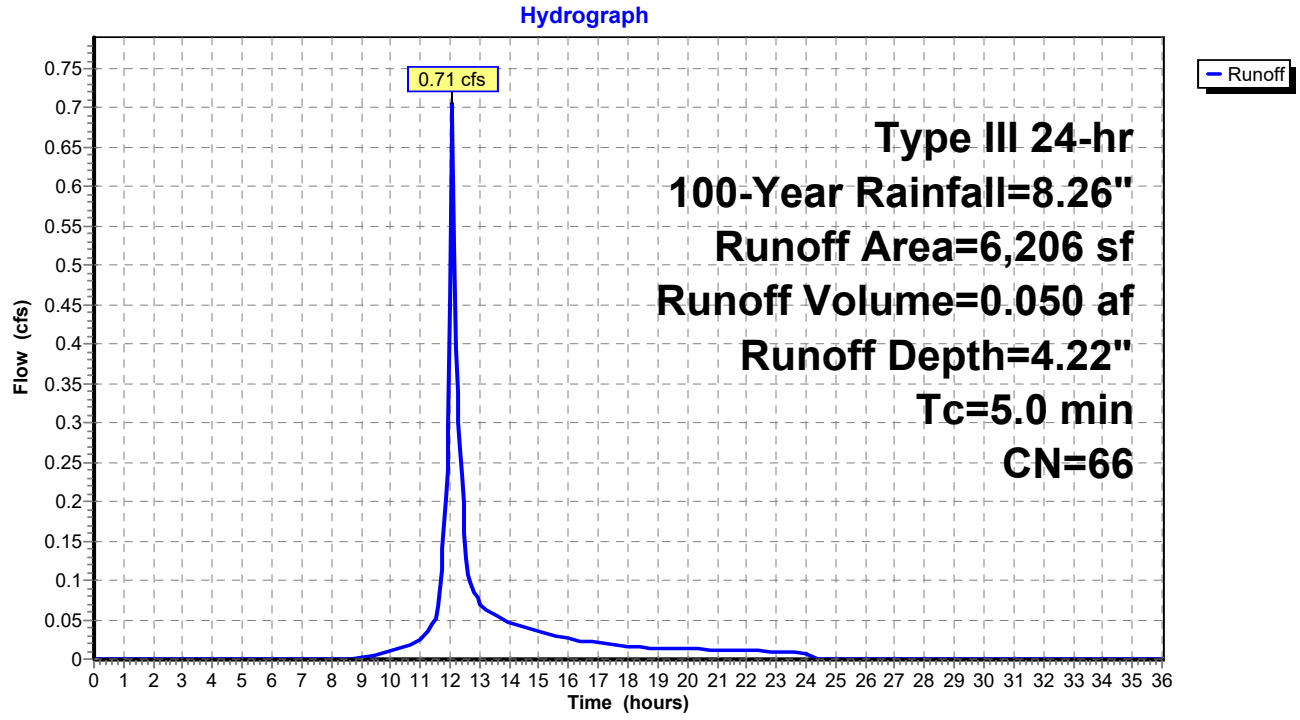
Runoff = 0.71 cfs @ 12.08 hrs, Volume= 0.050 af, Depth= 4.22"
Routed to Reach 18R : DESIGN LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.26"

	Area (sf)	CN	Description
*	815	98	Driveway
	5,391	61	>75% Grass cover, Good, HSG B
	6,206	66	Weighted Average
	5,391		86.87% Pervious Area
	815		13.13% Impervious Area

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

Subcatchment 3S: Lot #2 Remainder



Summary for Subcatchment 4S: Lot #3 Remainder

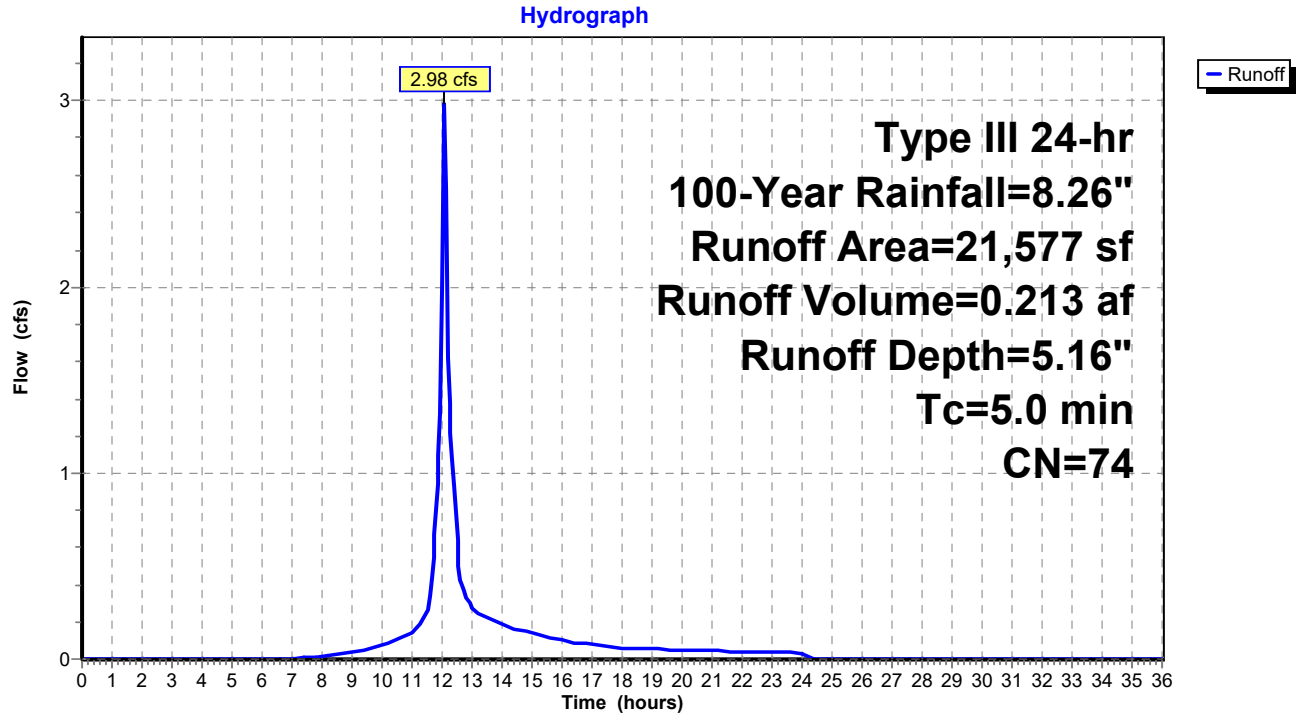
Runoff = 2.98 cfs @ 12.08 hrs, Volume= 0.213 af, Depth= 5.16"
Routed to Reach 18R : DESIGN LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.26"

	Area (sf)	CN	Description
*	7,583	98	Driveway
	13,994	61	>75% Grass cover, Good, HSG B
	21,577	74	Weighted Average
	13,994		64.86% Pervious Area
	7,583		35.14% Impervious Area

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

Subcatchment 4S: Lot #3 Remainder



Summary for Subcatchment 5S: Lot #4 Remainder

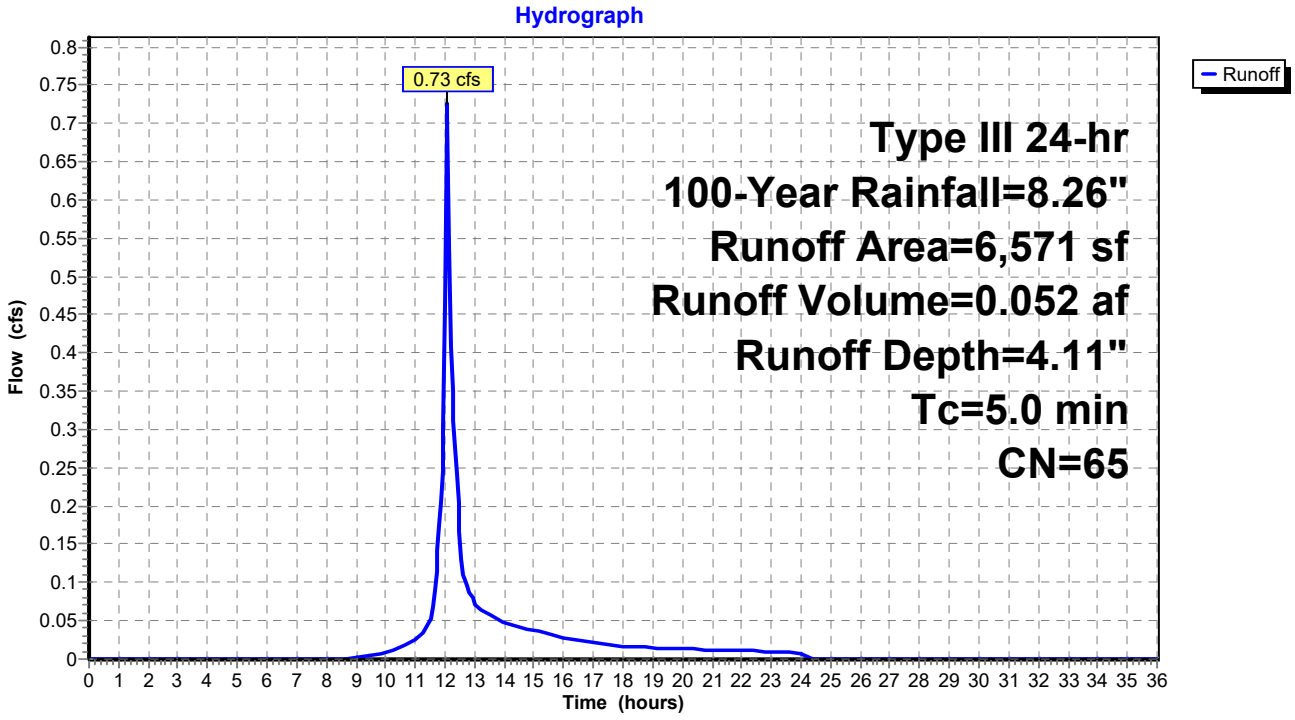
Runoff = 0.73 cfs @ 12.08 hrs, Volume= 0.052 af, Depth= 4.11"
Routed to Reach 18R : DESIGN LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.26"

	Area (sf)	CN	Description
*	709	98	Driveway
	5,862	61	>75% Grass cover, Good, HSG B
	6,571	65	Weighted Average
	5,862		89.21% Pervious Area
	709		10.79% Impervious Area

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

Subcatchment 5S: Lot #4 Remainder



Summary for Subcatchment 6S: Lot #5 Remainder

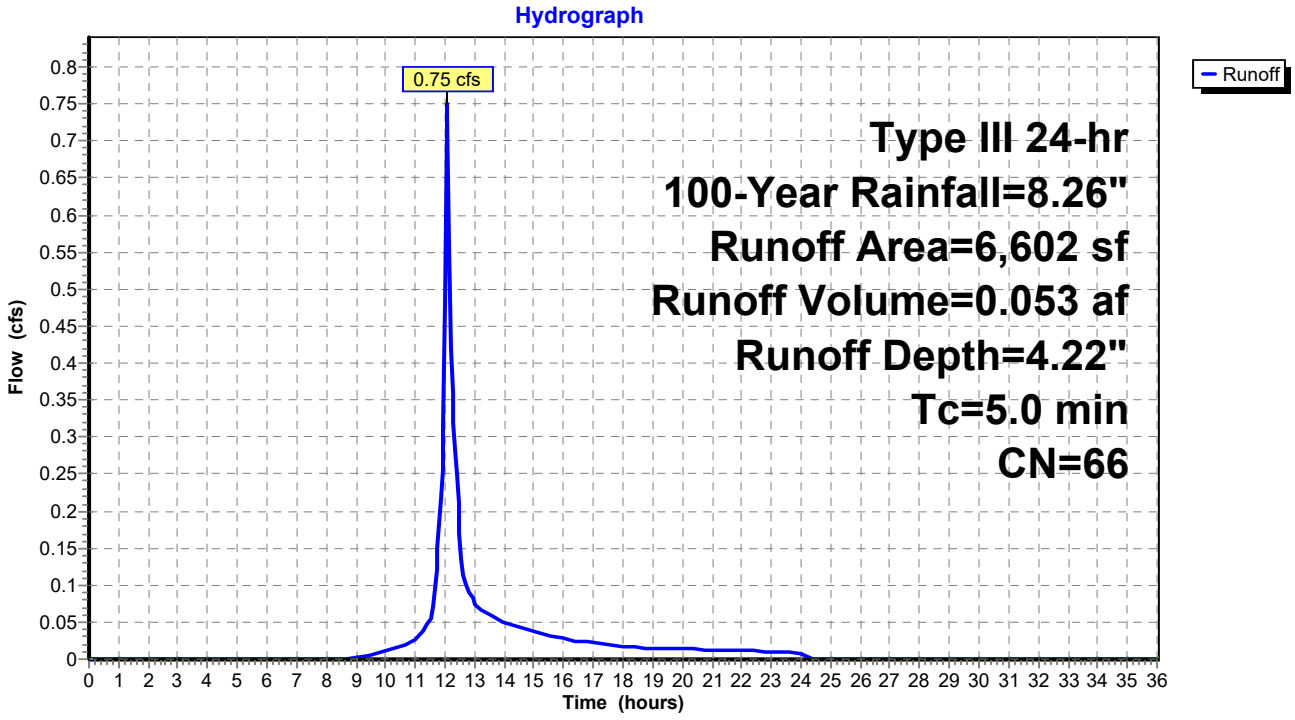
Runoff = 0.75 cfs @ 12.08 hrs, Volume= 0.053 af, Depth= 4.22"
Routed to Reach 18R : DESIGN LINE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.26"

	Area (sf)	CN	Description
*	974	98	Driveway
	5,628	61	>75% Grass cover, Good, HSG B
	6,602	66	Weighted Average
	5,628		85.25% Pervious Area
	974		14.75% Impervious Area

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

Subcatchment 6S: Lot #5 Remainder



Summary for Subcatchment 8S: Lot #1 Roof

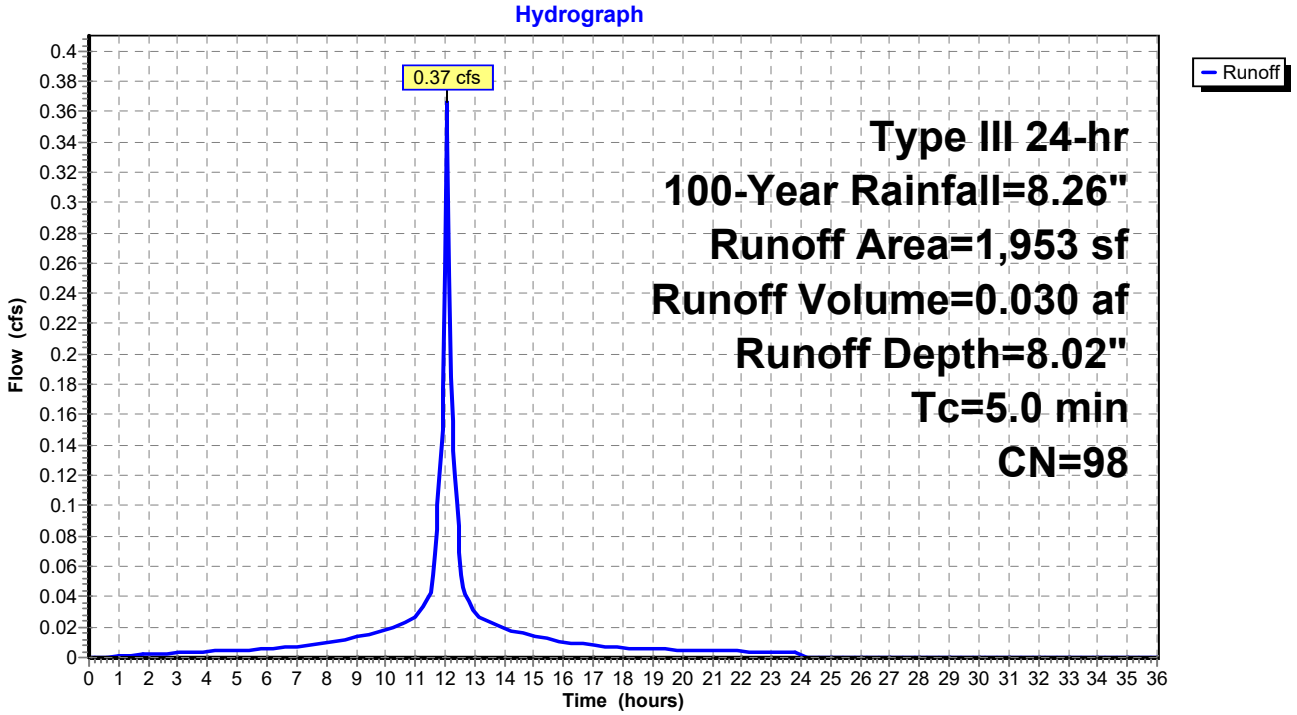
Runoff = 0.37 cfs @ 12.07 hrs, Volume= 0.030 af, Depth= 8.02"
Routed to Pond 13P : Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.26"

	Area (sf)	CN	Description
*	1,953	98	Roof Area
	1,953		100.00% Impervious Area

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

Subcatchment 8S: Lot #1 Roof



Summary for Subcatchment 9S: Lot #2 Roof

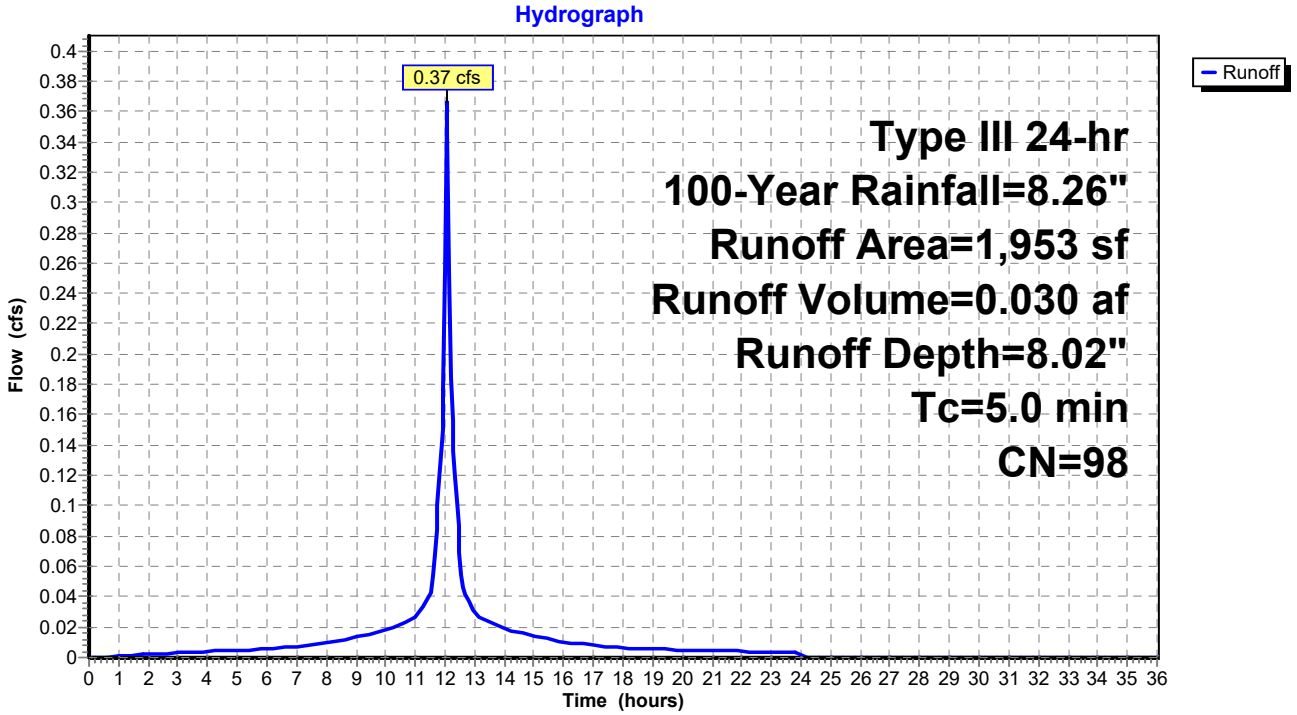
Runoff = 0.37 cfs @ 12.07 hrs, Volume= 0.030 af, Depth= 8.02"
Routed to Pond 14P : Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.26"

	Area (sf)	CN	Description
*	1,953	98	Roof Area
	1,953		100.00% Impervious Area

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

Subcatchment 9S: Lot #2 Roof



Summary for Subcatchment 10S: Lot #3 Roof

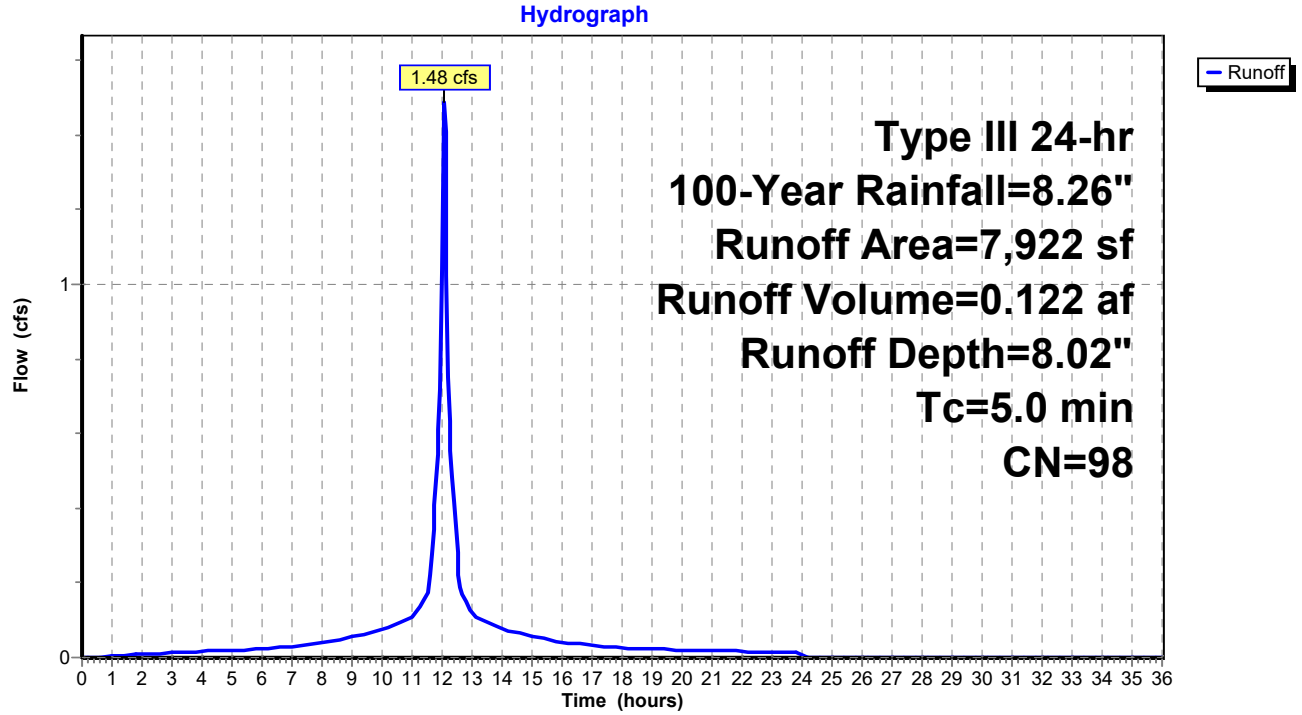
Runoff = 1.48 cfs @ 12.07 hrs, Volume= 0.122 af, Depth= 8.02"
Routed to Pond 17P : Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.26"

	Area (sf)	CN	Description
*	7,922	98	Roof Area
	7,922		100.00% Impervious Area

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

Subcatchment 10S: Lot #3 Roof



Summary for Subcatchment 11S: Lot #4 Roof

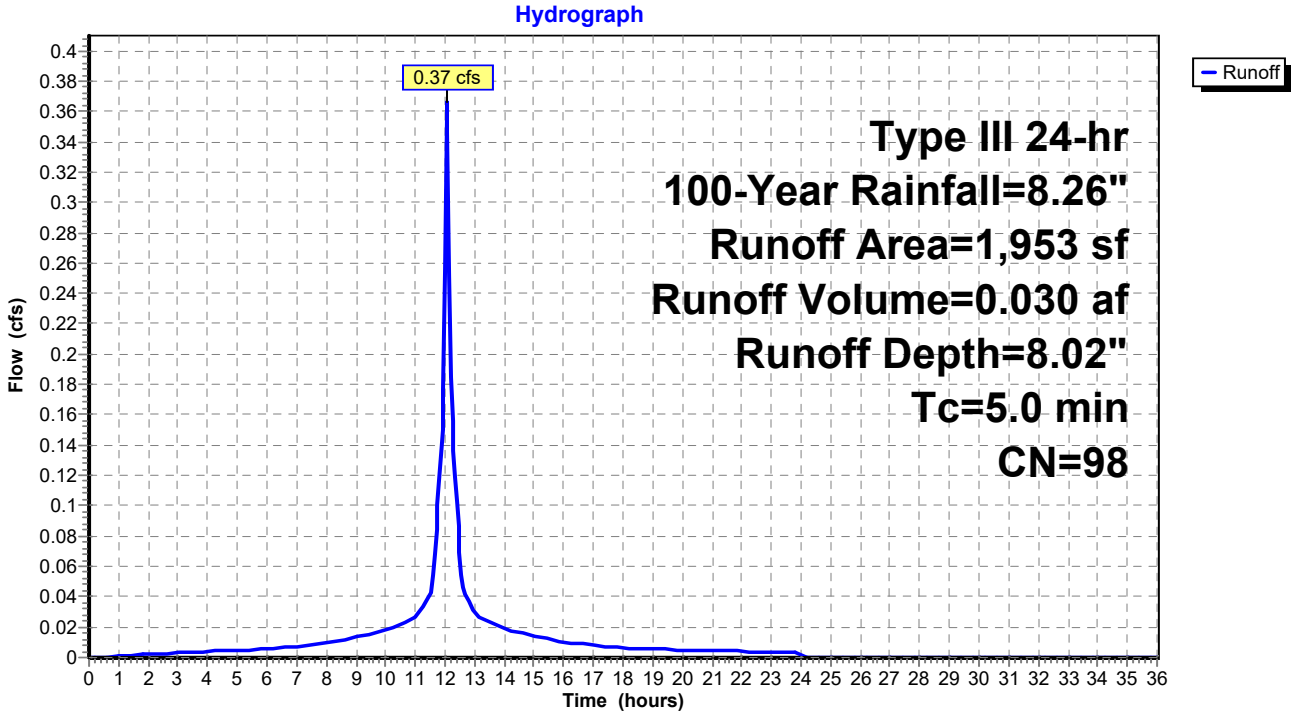
Runoff = 0.37 cfs @ 12.07 hrs, Volume= 0.030 af, Depth= 8.02"
Routed to Pond 15P : Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.26"

	Area (sf)	CN	Description
*	1,953	98	Roof Area
	1,953		100.00% Impervious Area

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

Subcatchment 11S: Lot #4 Roof



Summary for Subcatchment 12S: Lot #5 Roof

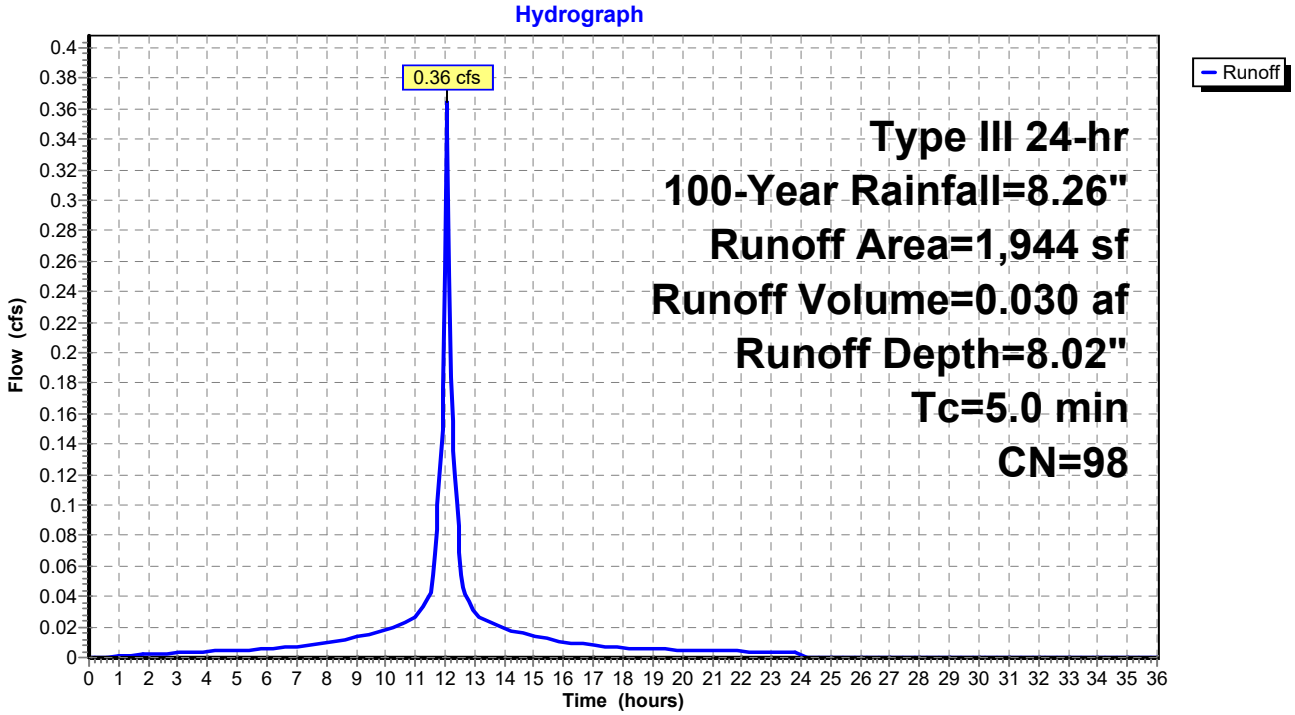
Runoff = 0.36 cfs @ 12.07 hrs, Volume= 0.030 af, Depth= 8.02"
Routed to Pond 16P : Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=8.26"

	Area (sf)	CN	Description
*	1,944	98	Roof Area
	1,944		100.00% Impervious Area

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

Subcatchment 12S: Lot #5 Roof

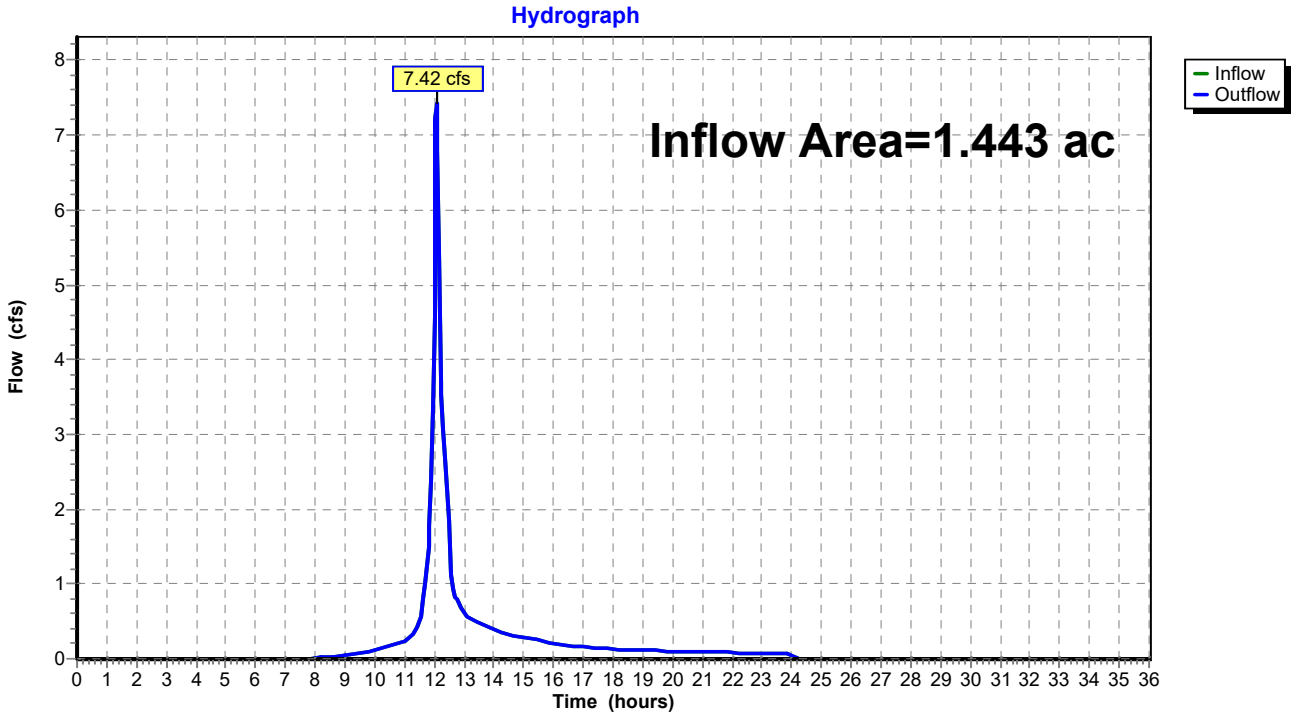


Summary for Reach 18R: DESIGN LINE

Inflow Area = 1.443 ac, 42.35% Impervious, Inflow Depth = 3.85" for 100-Year event
Inflow = 7.42 cfs @ 12.07 hrs, Volume= 0.463 af
Outflow = 7.42 cfs @ 12.07 hrs, Volume= 0.463 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Reach 18R: DESIGN LINE



Summary for Pond 13P: Infiltration

Inflow Area = 0.045 ac,100.00% Impervious, Inflow Depth = 8.02" for 100-Year event
Inflow = 0.37 cfs @ 12.07 hrs, Volume= 0.030 af
Outflow = 0.41 cfs @ 12.06 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.02 cfs @ 10.15 hrs, Volume= 0.020 af
Primary = 0.40 cfs @ 12.06 hrs, Volume= 0.010 af
Routed to Reach 18R : DESIGN LINE

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 5.06' @ 12.06 hrs Surf.Area= 0.002 ac Storage= 0.003 af

Plug-Flow detention time= 33.0 min calculated for 0.030 af (100% of inflow)
Center-of-Mass det. time= 33.0 min (772.9 - 739.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**6.33'W x 10.50'L x 3.54'H Field A** 0.005 af Overall - 0.001 af Embedded = 0.004 af x 40.0% Voids
#2A	0.50'	0.001 af	**Cultec R-330XLHD** 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
		0.003 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**12.000 in/hr Exfiltration over Surface area**
#2	Primary	5.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 10.15 hrs HW=0.05' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.36 cfs @ 12.06 hrs HW=5.06' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 0.36 cfs @ 0.78 fps)

Pond 13P: Infiltration - 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

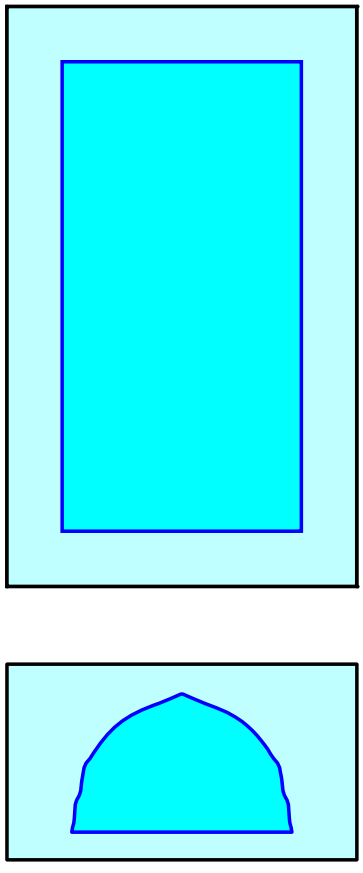
1 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 8.50' Row Length +12.0" End Stone x 2 = 10.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

1 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 63.3 cf Chamber Storage

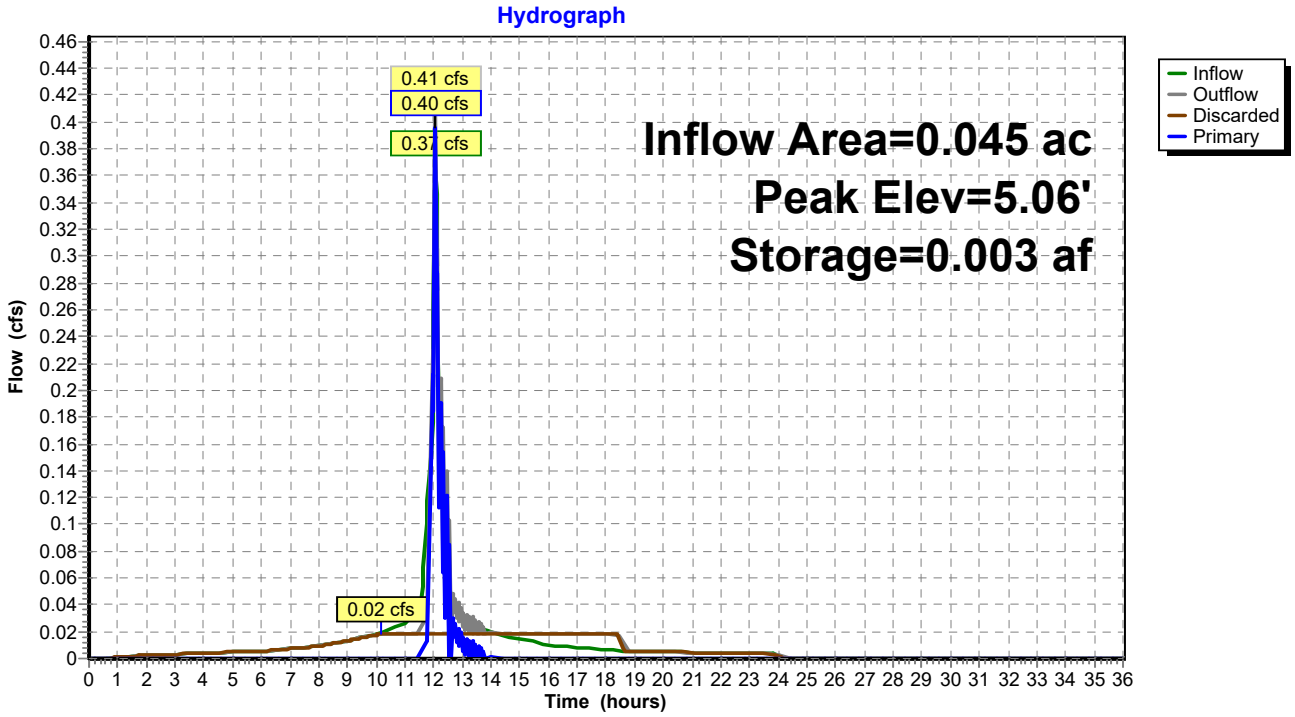
235.5 cf Field - 63.3 cf Chambers = 172.2 cf Stone x 40.0% Voids = 68.9 cf Stone Storage

Chamber Storage + Stone Storage = 132.2 cf = 0.003 af
Overall Storage Efficiency = 56.1%
Overall System Size = 10.50' x 6.33' x 3.54'

1 Chambers
8.7 cy Field
6.4 cy Stone



Pond 13P: Infiltration



Summary for Pond 14P: Infiltration

Inflow Area = 0.045 ac,100.00% Impervious, Inflow Depth = 8.02" for 100-Year event
Inflow = 0.37 cfs @ 12.07 hrs, Volume= 0.030 af
Outflow = 0.41 cfs @ 12.06 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.02 cfs @ 10.15 hrs, Volume= 0.020 af
Primary = 0.40 cfs @ 12.06 hrs, Volume= 0.010 af
Routed to Reach 18R : DESIGN LINE

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 5.06' @ 12.06 hrs Surf.Area= 0.002 ac Storage= 0.003 af

Plug-Flow detention time= 33.0 min calculated for 0.030 af (100% of inflow)
Center-of-Mass det. time= 33.0 min (772.9 - 739.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**6.33'W x 10.50'L x 3.54'H Field A** 0.005 af Overall - 0.001 af Embedded = 0.004 af x 40.0% Voids
#2A	0.50'	0.001 af	**Cultec R-330XLHD** 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
		0.003 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**12.000 in/hr Exfiltration over Surface area**
#2	Primary	5.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 10.15 hrs HW=0.05' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.36 cfs @ 12.06 hrs HW=5.06' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 0.36 cfs @ 0.78 fps)

Pond 14P: Infiltration - 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

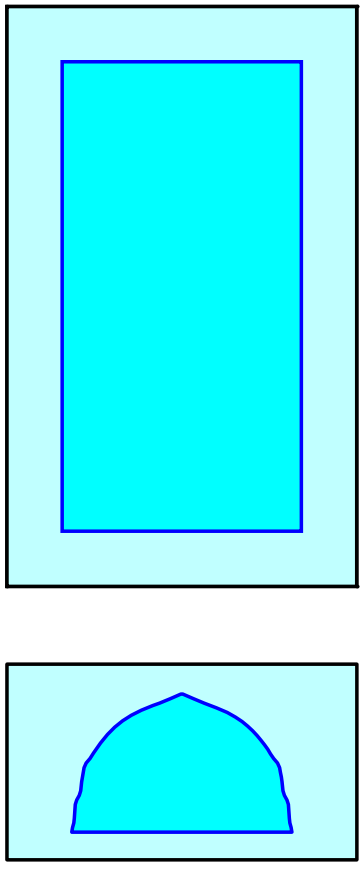
1 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 8.50' Row Length +12.0" End Stone x 2 = 10.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

1 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 63.3 cf Chamber Storage

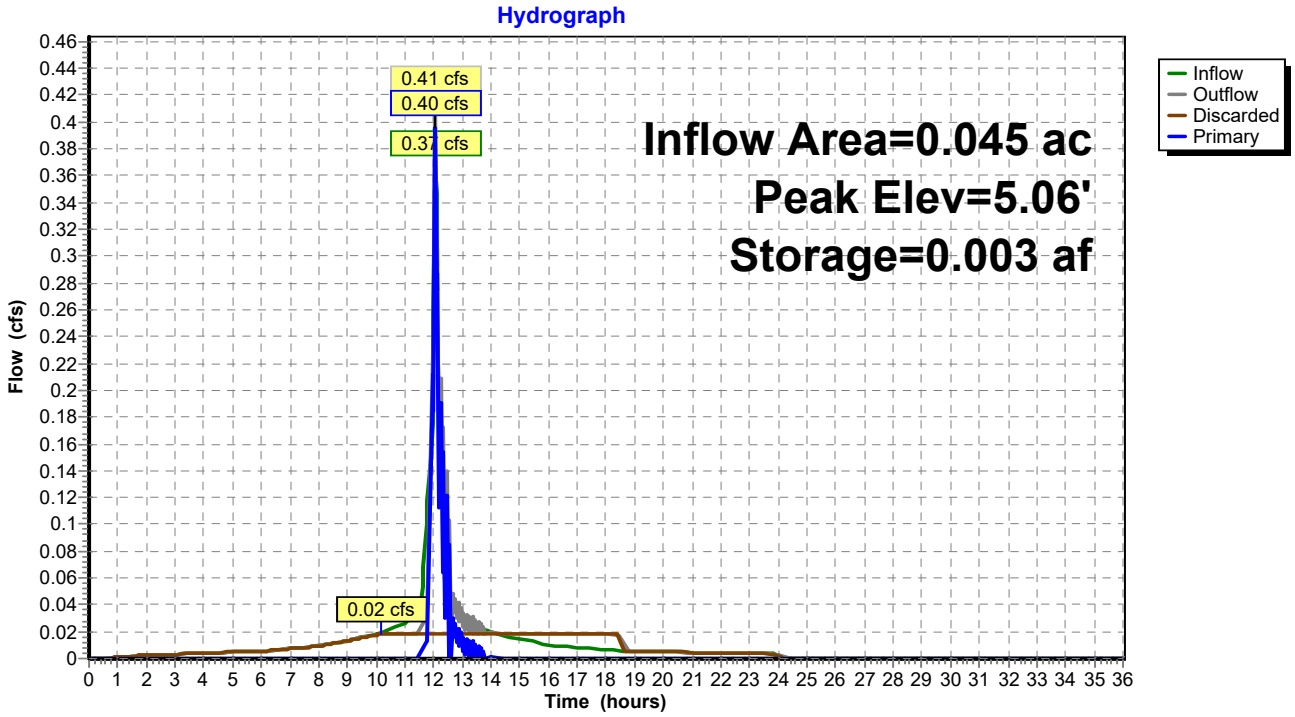
235.5 cf Field - 63.3 cf Chambers = 172.2 cf Stone x 40.0% Voids = 68.9 cf Stone Storage

Chamber Storage + Stone Storage = 132.2 cf = 0.003 af
Overall Storage Efficiency = 56.1%
Overall System Size = 10.50' x 6.33' x 3.54'

1 Chambers
8.7 cy Field
6.4 cy Stone



Pond 14P: Infiltration



Summary for Pond 15P: Infiltration

Inflow Area = 0.045 ac,100.00% Impervious, Inflow Depth = 8.02" for 100-Year event
Inflow = 0.37 cfs @ 12.07 hrs, Volume= 0.030 af
Outflow = 0.41 cfs @ 12.06 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.02 cfs @ 10.15 hrs, Volume= 0.020 af
Primary = 0.40 cfs @ 12.06 hrs, Volume= 0.010 af
Routed to Reach 18R : DESIGN LINE

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 5.06' @ 12.06 hrs Surf.Area= 0.002 ac Storage= 0.003 af

Plug-Flow detention time= 33.0 min calculated for 0.030 af (100% of inflow)
Center-of-Mass det. time= 33.0 min (772.9 - 739.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**6.33'W x 10.50'L x 3.54'H Field A** 0.005 af Overall - 0.001 af Embedded = 0.004 af x 40.0% Voids
#2A	0.50'	0.001 af	**Cultec R-330XLHD** 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
		0.003 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**12.000 in/hr Exfiltration over Surface area**
#2	Primary	5.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 10.15 hrs HW=0.05' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.36 cfs @ 12.06 hrs HW=5.06' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 0.36 cfs @ 0.78 fps)

Pond 15P: Infiltration - 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

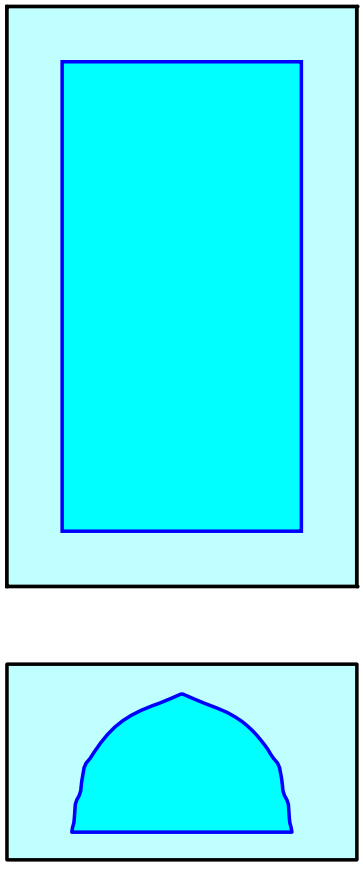
1 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 8.50' Row Length +12.0" End Stone x 2 = 10.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

1 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 63.3 cf Chamber Storage

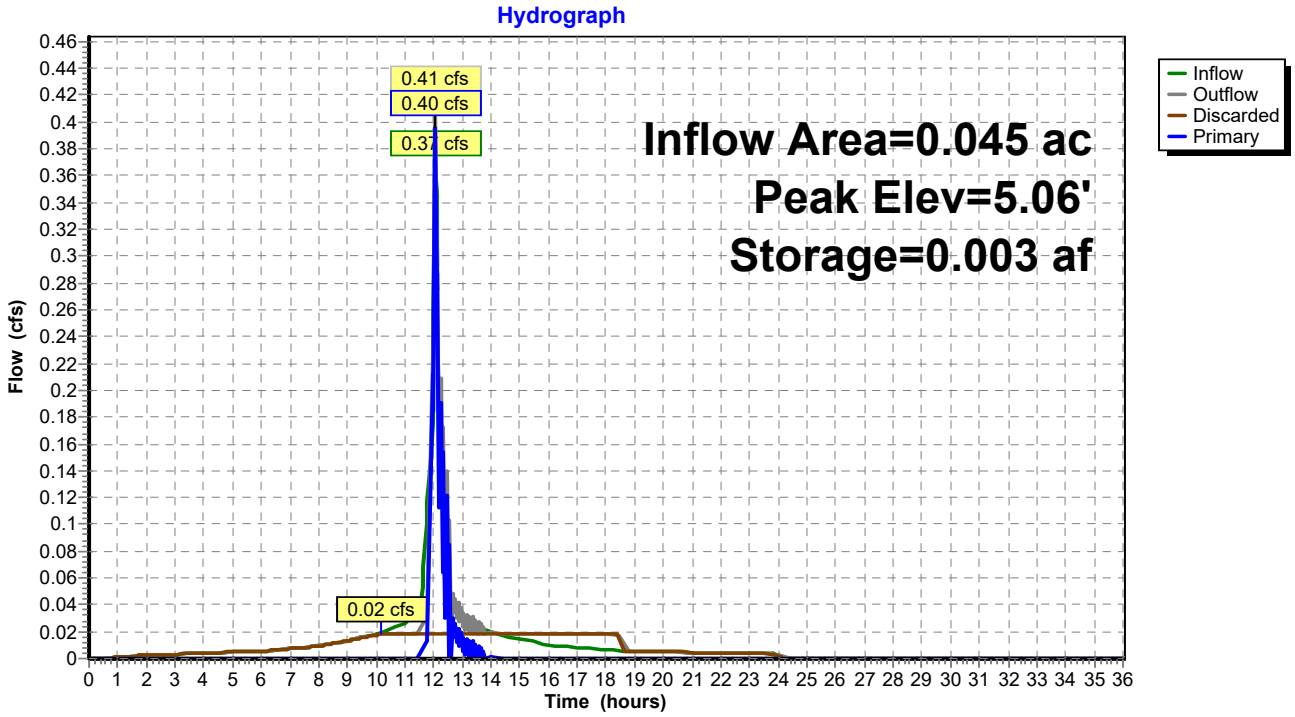
235.5 cf Field - 63.3 cf Chambers = 172.2 cf Stone x 40.0% Voids = 68.9 cf Stone Storage

Chamber Storage + Stone Storage = 132.2 cf = 0.003 af
Overall Storage Efficiency = 56.1%
Overall System Size = 10.50' x 6.33' x 3.54'

1 Chambers
8.7 cy Field
6.4 cy Stone



Pond 15P: Infiltration



Summary for Pond 16P: Infiltration

Inflow Area = 0.045 ac,100.00% Impervious, Inflow Depth = 8.02" for 100-Year event
Inflow = 0.36 cfs @ 12.07 hrs, Volume= 0.030 af
Outflow = 0.42 cfs @ 12.06 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.02 cfs @ 10.20 hrs, Volume= 0.020 af
Primary = 0.41 cfs @ 12.06 hrs, Volume= 0.010 af
Routed to Reach 18R : DESIGN LINE

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 5.06' @ 12.06 hrs Surf.Area= 0.002 ac Storage= 0.003 af

Plug-Flow detention time= 33.0 min calculated for 0.030 af (100% of inflow)
Center-of-Mass det. time= 33.0 min (772.9 - 739.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.002 af	**6.33'W x 10.50'L x 3.54'H Field A** 0.005 af Overall - 0.001 af Embedded = 0.004 af x 40.0% Voids
#2A	0.50'	0.001 af	**Cultec R-330XLHD** 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
		0.003 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**12.000 in/hr Exfiltration over Surface area**
#2	Primary	5.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 10.20 hrs HW=0.05' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.37 cfs @ 12.06 hrs HW=5.06' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 0.37 cfs @ 0.79 fps)

Pond 16P: Infiltration - 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

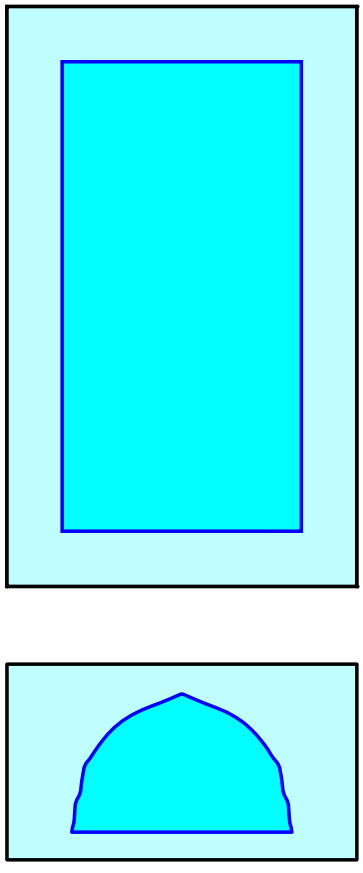
1 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 8.50' Row Length +12.0" End Stone x 2 = 10.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

1 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 63.3 cf Chamber Storage

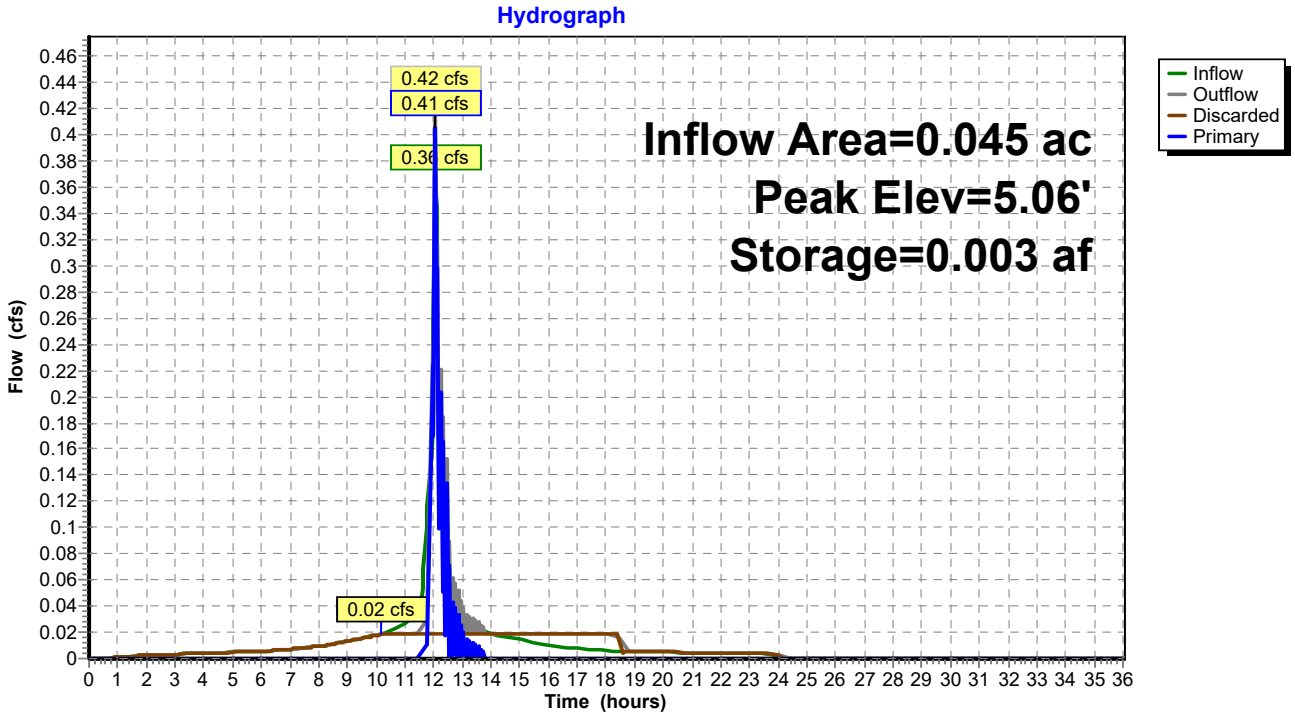
235.5 cf Field - 63.3 cf Chambers = 172.2 cf Stone x 40.0% Voids = 68.9 cf Stone Storage

Chamber Storage + Stone Storage = 132.2 cf = 0.003 af
Overall Storage Efficiency = 56.1%
Overall System Size = 10.50' x 6.33' x 3.54'

1 Chambers
8.7 cy Field
6.4 cy Stone



Pond 16P: Infiltration



Summary for Pond 17P: Infiltration

Inflow Area = 0.182 ac,100.00% Impervious, Inflow Depth = 8.02" for 100-Year event
Inflow = 1.48 cfs @ 12.07 hrs, Volume= 0.122 af
Outflow = 0.57 cfs @ 12.32 hrs, Volume= 0.122 af, Atten= 61%, Lag= 14.9 min
Discarded = 0.17 cfs @ 11.55 hrs, Volume= 0.116 af
Primary = 0.40 cfs @ 12.32 hrs, Volume= 0.005 af
Routed to Reach 18R : DESIGN LINE

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 5.06' @ 12.30 hrs Surf.Area= 0.014 ac Storage= 0.031 af

Plug-Flow detention time= 45.2 min calculated for 0.121 af (100% of inflow)
Center-of-Mass det. time= 45.1 min (785.0 - 739.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.013 af	**16.00'W x 38.50'L x 3.54'H Field A** 0.050 af Overall - 0.019 af Embedded = 0.031 af x 40.0% Voids
#2A	0.50'	0.019 af	**Cultec R-330XLHD** x 15 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 3 rows
		0.031 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**12.000 in/hr Exfiltration over Surface area**
#2	Primary	5.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.17 cfs @ 11.55 hrs HW=0.05' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=0.34 cfs @ 12.32 hrs HW=5.06' (Free Discharge)
↑**2=Orifice/Grate** (Weir Controls 0.34 cfs @ 0.77 fps)

Pond 17P: Infiltration - 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 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

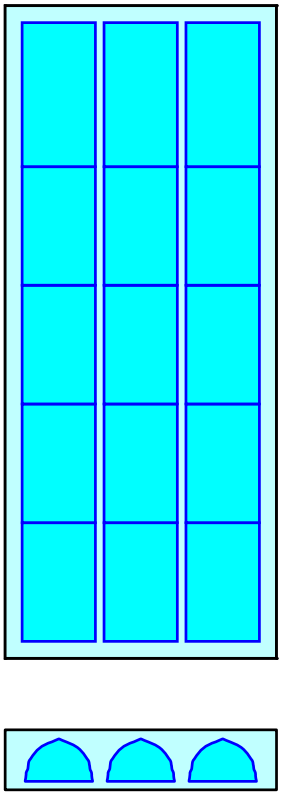
5 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 36.50' Row Length +12.0" End Stone x 2 = 38.50' Base Length
3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 16.00' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

15 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 815.9 cf Chamber Storage

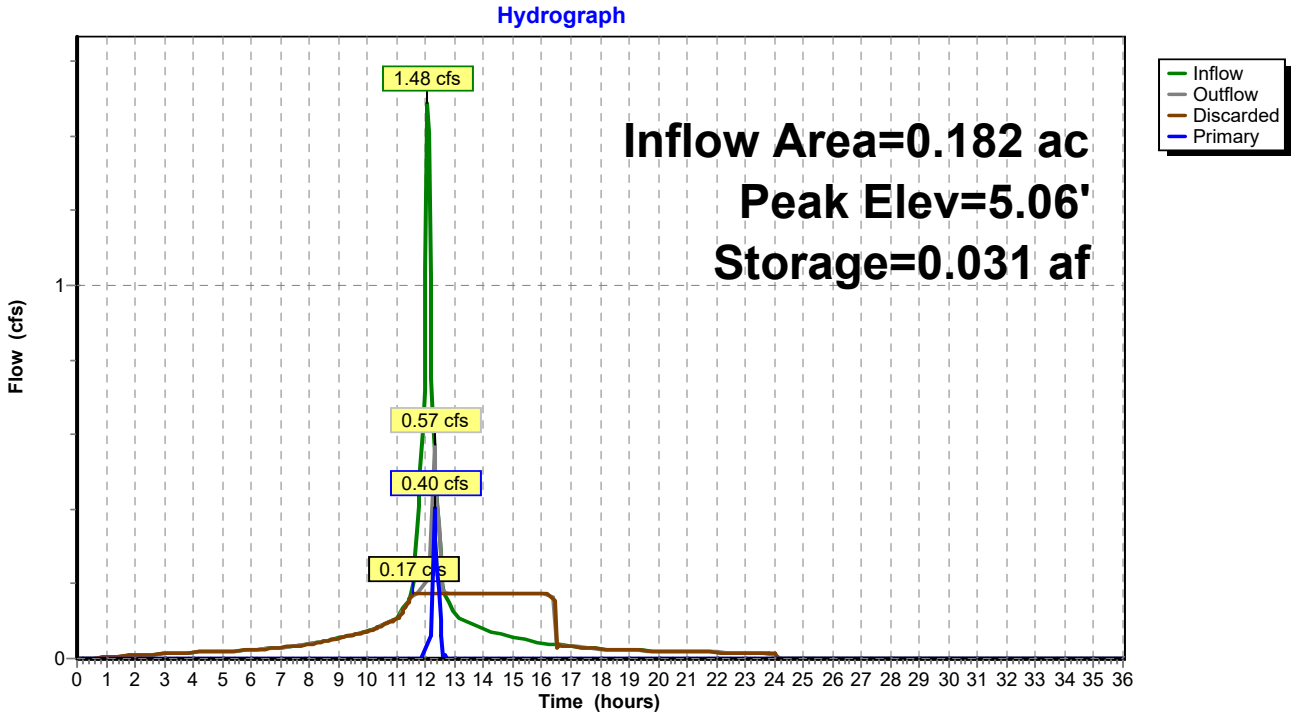
2,181.7 cf Field - 815.9 cf Chambers = 1,365.8 cf Stone x 40.0% Voids = 546.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,362.2 cf = 0.031 af
Overall Storage Efficiency = 62.4%
Overall System Size = 38.50' x 16.00' x 3.54'

15 Chambers
80.8 cy Field
50.6 cy Stone



Pond 17P: Infiltration



Appendix B

Soil 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 Dutchess County, New York

May 17, 2022

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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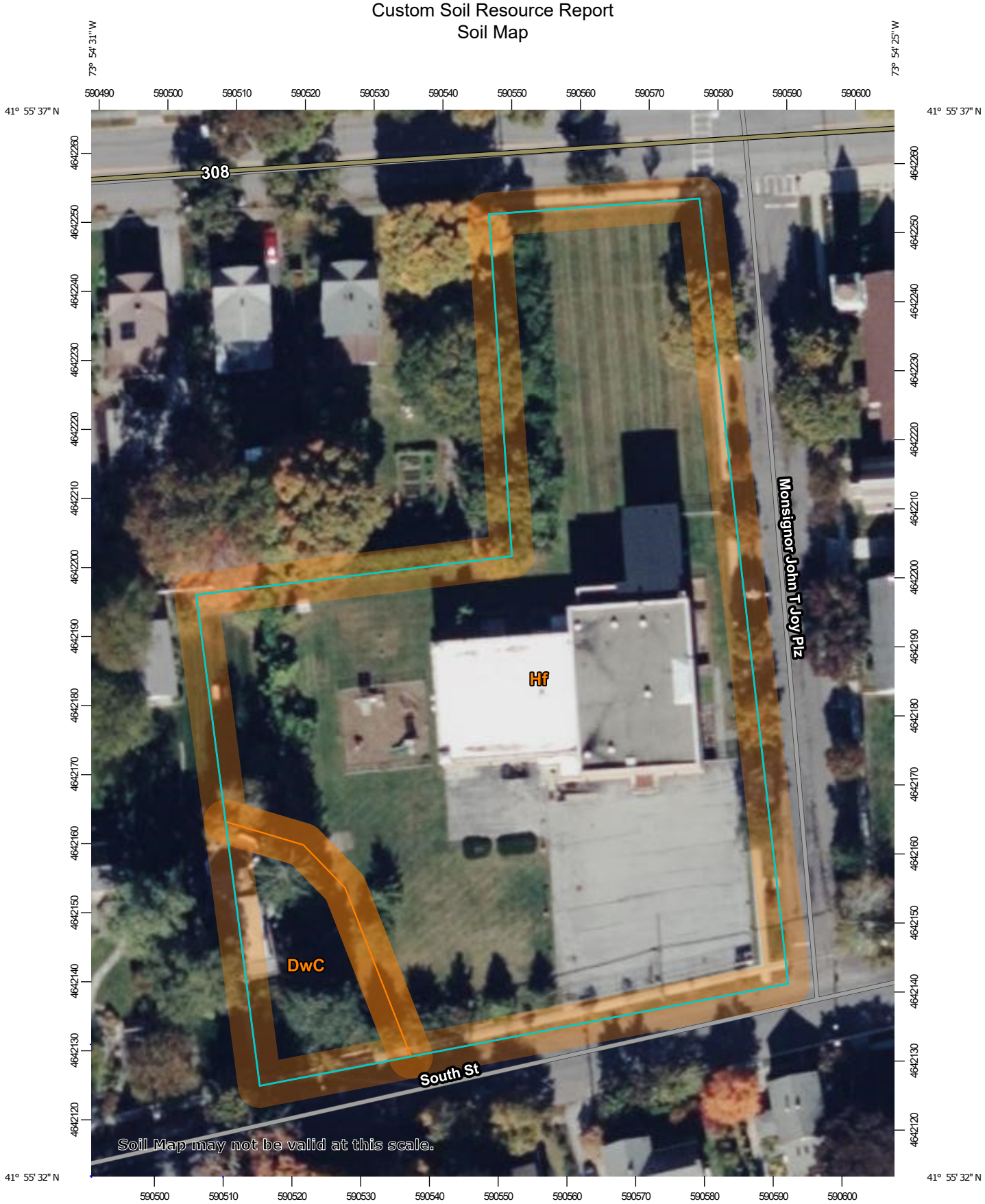
Contents

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 Scale: 1:753 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 35 70 140 210

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

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 1:24,000.

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: Dutchess County, New York
Survey Area Data: Version 18, Sep 1, 2021

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

Date(s) aerial images were photographed: Oct 8, 2020—Oct 14, 2020

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
DwC	Dutchess-Cardigan complex, rolling, rocky	0.2	8.9%
Hf	Haven-Urban land complex	1.6	91.1%
Totals for Area of Interest		**1.7**	**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.

Dutchess County, New York

DwC—Dutchess-Cardigan complex, rolling, rocky

Map Unit Setting

National map unit symbol: 9rfp
Elevation: 0 to 1,330 feet
Mean annual precipitation: 41 to 47 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 115 to 195 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Dutchess and similar soils: 40 percent
Cardigan and similar soils: 30 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dutchess

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from phyllite, slate, schist, and shale

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 28 inches: silt loam
H3 - 28 to 86 inches: channery silt loam

Properties and qualities

Slope: 5 to 16 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Cardigan

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till or colluvium derived from phyllite, slate, shale, and schist

Typical profile

H1 - 0 to 8 inches: channery silt loam
H2 - 8 to 20 inches: channery loam
H3 - 20 to 30 inches: channery silt loam
H4 - 30 to 34 inches: unweathered bedrock

Properties and qualities

Slope: 5 to 16 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Georgia

Percent of map unit: 10 percent
Hydric soil rating: No

Nassau

Percent of map unit: 9 percent
Hydric soil rating: No

Massena

Percent of map unit: 9 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 1 percent
Hydric soil rating: Unranked

Sun

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Hf—Haven-Urban land complex

Map Unit Setting

National map unit symbol: 9rgc
Elevation: 160 to 230 feet
Mean annual precipitation: 41 to 47 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 115 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition

Haven 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 Haven

Setting

Landform: Outwash plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits

Typical profile

H1 - 0 to 12 inches: loam
H2 - 12 to 23 inches: gravelly loam
H3 - 23 to 72 inches: stratified very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Ecological site: F144AY023CT - Well Drained Outwash
Hydric soil rating: No

Description of Urban Land

Typical profile

H1 - 0 to 6 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Minor Components

Udorthents

Percent of map unit: 10 percent
Hydric soil rating: No

Hoosic

Percent of map unit: 5 percent
Hydric soil rating: No

Knickerbocker

Percent of map unit: 5 percent
Hydric soil rating: No

Fredon

Percent of map unit: 4 percent
Landform: Depressions
Hydric soil rating: Yes

Halsey

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

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Appendix C

Precipitation Data

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point

Smoothing	Yes
State	New York
Location	New York, United States
Latitude	41.927 degrees North
Longitude	73.908 degrees West
Elevation	60 feet
Date/Time	Tue Apr 04 2023 20:53:09 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr	
1yr	0.30	0.46	0.58	0.76	0.94	1.18	**1yr**	0.81	1.10	1.36	1.69	2.09	2.59	2.97	**1yr**
2yr	0.37	0.56	0.70	0.92	1.16	1.45	**2yr**	1.00	1.33	1.67	2.07	2.55	3.13	3.55	**2yr**
5yr	0.43	0.67	0.84	1.13	1.44	1.83	**5yr**	1.25	1.65	2.11	2.61	3.21	3.93	4.51	**5yr**
10yr	0.49	0.76	0.96	1.31	1.70	2.17	**10yr**	1.47	1.94	2.51	3.11	3.82	4.66	5.40	**10yr**
25yr	0.57	0.90	1.15	1.60	2.12	2.73	**25yr**	1.83	2.40	3.18	3.94	4.82	5.85	6.86	**25yr**
50yr	0.65	1.04	1.33	1.86	2.51	3.25	**50yr**	2.17	2.83	3.79	4.70	5.75	6.95	8.23	**50yr**
100yr	0.74	1.19	1.54	2.18	2.98	3.88	**100yr**	2.57	3.34	4.53	5.62	6.85	8.26	9.87	**100yr**
200yr	0.85	1.38	1.79	2.56	3.53	4.62	**200yr**	3.05	3.94	5.40	6.71	8.17	9.82	11.86	**200yr**
500yr	1.02	1.68	2.19	3.17	4.44	5.84	**500yr**	3.83	4.90	6.83	8.49	10.32	12.36	15.12	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr	
1yr	0.27	0.41	0.50	0.67	0.83	0.95	**1yr**	0.71	0.93	1.16	1.40	1.75	2.25	2.64	**1yr**
2yr	0.35	0.55	0.67	0.91	1.13	1.31	**2yr**	0.97	1.28	1.47	1.90	2.41	3.04	3.45	**2yr**
5yr	0.39	0.60	0.75	1.03	1.31	1.52	**5yr**	1.13	1.48	1.71	2.20	2.77	3.64	4.16	**5yr**
10yr	0.43	0.66	0.82	1.15	1.48	1.69	**10yr**	1.28	1.65	1.90	2.45	3.06	4.12	4.78	**10yr**
25yr	0.49	0.75	0.93	1.33	1.75	1.92	**25yr**	1.51	1.88	2.16	2.76	3.46	4.94	5.75	**25yr**
50yr	0.54	0.83	1.03	1.48	2.00	2.11	**50yr**	1.72	2.06	2.38	3.06	3.81	5.65	6.61	**50yr**
100yr	0.61	0.92	1.15	1.66	2.27	2.33	**100yr**	1.96	2.27	2.64	3.39	4.19	6.50	7.61	**100yr**
200yr	0.68	1.02	1.30	1.88	2.62	2.54	**200yr**	2.26	2.48	2.91	3.77	4.57	7.46	8.79	**200yr**
500yr	0.80	1.19	1.54	2.23	3.18	2.88	**500yr**	2.74	2.82	3.32	4.34	5.12	9.03	10.64	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr	
1yr	0.33	0.52	0.63	0.85	1.04	1.25	**1yr**	0.90	1.22	1.38	1.79	2.27	2.83	3.23	**1yr**
2yr	0.38	0.59	0.73	0.99	1.22	1.45	**2yr**	1.05	1.42	1.63	2.10	2.65	3.26	3.71	**2yr**
5yr	0.47	0.73	0.90	1.24	1.57	1.85	**5yr**	1.36	1.81	2.13	2.75	3.44	4.24	4.87	**5yr**
10yr	0.56	0.86	1.06	1.48	1.91	2.27	**10yr**	1.65	2.22	2.61	3.40	4.22	5.25	6.03	**10yr**
25yr	0.70	1.06	1.32	1.88	2.48	2.97	**25yr**	2.14	2.91	3.45	4.58	5.55	6.80	8.00	**25yr**
50yr	0.83	1.26	1.56	2.25	3.03	3.66	**50yr**	2.61	3.57	4.27	5.70	6.82	8.33	9.90	**50yr**

Appendix D

WQv and RRv Calculations

Version 1.8
Last Updated: 11/09/2015

Total Water Quality Volume Calculation
WQv(acre-feet) = [(P)(Rv)(A)] /12

Dutchess Shepard April 2023

Is this project subject to Chapter 10 of the NYS Design Manual (i.e. WQv is equal to post-development 1 year runoff volume)?.....	No

Design Point:	Design Line	
P=	1.30	*inch*

Manually enter P, Total Area and Impervious Cover.

Breakdown of Subcatchments

Catchment Number	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Rv	WQv *(ft^3)*	Description
1	0.18	0.06	33%	0.35	297	Dry Well
2	0.19	0.06	32%	0.33	300	Dry Well
3	0.67	0.36	54%	0.53	1,687	Dry Well
4	0.20	0.06	30%	0.32	302	Dry Well
5	0.20	0.07	35%	0.37	344	Dry Well
6						
7						
8						
9						
10						
Subtotal (1-30)	1.44	0.61	42%	0.43	**2,930**	**Subtotal 1**
Total	1.44	0.61	42%	0.43	**2,930**	**Initial WQv**	**0.07**	**af**

Identify Runoff Reduction Techniques By Area

Technique	Total Contributing Area *(Acre)*	Contributing Impervious Area *(Acre)*	Notes
Conservation of Natural Areas	0.00	0.00	*minimum 10,000 sf*
Riparian Buffers	0.00	0.00	*maximum contributing length 75 feet to 150 feet*
Filter Strips	0.00	0.00	
Tree Planting	0.00	0.00	*Up to 100 sf directly connected impervious area may be subtracted per tree*
Total	**0.00**	**0.00**	

Recalculate WQv after application of Area Reduction Techniques

	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Runoff Coefficient Rv	WQv *(ft^3)*		
"<<Initial WQv"	1.44	0.61	42%	0.43	2,930		
Subtract Area	0.00	0.00					
WQv adjusted after Area Reductions	**1.44**	**0.61**	42%	0.43	2,930		
Disconnection of Rooftops		0.00					
Adjusted WQv after Area Reduction and Rooftop Disconnect	1.44	0.61	42%	0.43	**2,930**	**0.07**	**af**
WQv reduced by Area Reduction techniques					0	**0.00**	**af**

Total Water Quality Volume Calculation

WQv(acre-feet) = [(P)(Rv)(A)] /12

All Subcatchments						
Catchment	**Total Area** *(Acres)*	**Impervious Cover** *(Acres)*	**Percent Impervious** *%*	**Runoff Coefficient** *Rv*	**WQv** *(ft^3)*	**Description**
1	0.18	0.06	0.33	0.35	297.30	Dry Well
2	0.19	0.06	0.32	0.33	300	Dry Well
3	0.67	0.36	0.54	0.53	1687.04	Dry Well
4	0.20	0.06	0.30	0.32	302.02	Dry Well
5	0.20	0.07	0.35	0.37	344.49	Dry Well
6						
7						
8						
9						
10						
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28						
29						
30						

Minimum RRv

Enter the Soils Data for the site		
Soil Group	Acres	S
A		55%
B	0.00	40%
C	1.44	30%
D	**0.00**	20%
Total Area	1.44	
Calculate the Minimum RRv		
S =	**0.30**	
Impervious =	0.61	*acre*
Precipitation	1.3	*in*
Rv	0.95	
Minimum RRv	**820**	***ft3***
	0.02	af

Planning

Practice	Description	Application
Preservation of Undisturbed Areas	Delineate and place into permanent conservation undisturbed forests, native vegetated areas, riparian corridors, wetlands, and natural terrain.	Considered & Applied
Preservation of Buffers	Define, delineate and preserve naturally vegetated buffers along perennial streams, rivers, shorelines and wetlands.	Considered & Applied
Reduction of Clearing and Grading	Limit clearing and grading to the minimum amount needed for roads, driveways, foundations, utilities and stormwater management facilities.	Considered & Applied
Locating Development in Less Sensitive Areas	Avoid sensitive resource areas such as floodplains, steep slopes, erodible soils, wetlands, mature forests and critical habitats by locating development to fit the terrain in areas that will create the least impact.	Considered & Applied
Open Space Design	Use clustering, conservation design or open space design to reduce impervious cover, preserve more open space and protect water resources.	Considered & Applied
Soil Restoration	Restore the original properties and porosity of the soil by deep till and amendment with compost to reduce the generation of runoff and enhance the runoff reduction performance of post construction practices.	N/A
Roadway Reduction	Minimize roadway widths and lengths to reduce site impervious area	N/A
Sidewalk Reduction	Minimize sidewalk lengths and widths to reduce site impervious area	Considered & Applied
Driveway Reduction	Minimize driveway lengths and widths to reduce site impervious area	Considered & Applied
Cul-de-sac Reduction	Minimize the number of cul-de-sacs and incorporate landscaped areas to reduce their impervious cover.	N/A
Building Footprint Reduction	Reduce the impervious footprint of residences and commercial buildings by using alternate or taller buildings while maintaining the same floor to area ratio.	N/A
Parking Reduction	Reduce imperviousness on parking lots by eliminating unneeded spaces, providing compact car spaces and efficient parking lanes, minimizing stall dimensions, using porous pavement surfaces in overflow parking areas, and using multi-storied parking decks where appropriate.	