STORMWATER POLLUTION PREVENTION PLAN

for

Stormytown Road Subdivision

39 Stormytown Road
Town of Ossining, New York

Prepared For:

Chocolate Sky, LLC
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Revised April 28, 2021

LANGAN

Project No.: 190065801

Preparer of the SWPPP

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the SPDES General Permit for Stormwater Discharges from Construction Activity. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil or administrative proceedings.

Name: Michael Finan, PE, LEED-AP

Date: April 28, 2021

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1 Executive Summary

This Stormwater Pollution Prevention Plan (SWPPP) and accompanying project plans have been prepared in accordance with the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (General Permit) latest revision, the *New York State Stormwater Management Design Manual* (*Design Manual*) latest revision, and the *New York State Standards and Specifications for Erosion and Sediment Control* latest revision. The Applicant, Chocolate Sky, LLC, is proposing to develop ±6.7 acre property at 39 Stormytown Road, in the Town of Ossining, New York. The project, Stormytown Road Subdivision, is a 9 lot residential subdivision.

The proposed project is a new development that will maintain existing drainage patterns as much as practical, control the rate of stormwater runoff resulting from the development, and mitigate potential impacts on water quality and erosion generated during and after construction. A combination of runoff reduction techniques and standard stormwater management practices with runoff reduction volume capacity will be used to treat stormwater runoff.

The pre- and post-development conditions were analyzed using the USDA Soil Conservation Service Publication Technical Release (TR-55) "Urban Hydrology for Small Watersheds", which provides procedures for estimating runoff and peak discharges in small watersheds. The analysis is based upon the watershed areas, land coverage, soil group types, curve numbers (CN), times of concentration (Tc), rainfall distribution type, and rainfall amount for the design storm events. The pre- and post-development peak discharge rates of runoff have been evaluated utilizing stormwater modeling software. An overall comparison of the pre- and post-development peak discharge rates for each of the design storms analyzed is provided in the table below.

Table 1-1: Overall Summary of Peak Discharge Rates

Storm Event	Pre (cfs)	Post (cfs)	Diff (cfs)
1-year	4.38	2.62	-1.76
10-year	17.01	15.69	-1.32
100-year	43.74	39.68	-4.06

The overall comparison of the pre- and post-development stormwater runoff peak discharge rates demonstrates no significant adverse impacts to the design points analyzed. In addition, the erosion control, sediment control, pollution-prevention, and stormwater management measures to be implemented during construction as outlined in this SWPPP and project drawings will minimize soil erosion and control sediment transport off site, and after construction will control the water quality and quantity of stormwater runoff.

2 Project Information

The Applicant is proposing to develop a property in the Town of Ossining, New York (see Figure 1). Below is a summary of the project information:

Table 2-1: Project Summary

Project Name:	Stormytown Road Subdivision
Project Location:	39 Stormytown Road Town of Ossining, New York
Property Tax ID No.:	Block 3 Lot 62
Property Acreage:	±6.7 acres
Municipality:	Town of Ossining, which is an municipal separate storm sewer system (MS4)
Project Description:	9 lot single-family residential subdivision with a ±721 linear foot roadway with sidewalk
Estimated Disturbed Area:	4.6 acres, which does require coverage under the SPDES General Permit
Existing Site Conditions:	Woods (fair condition), grass (fair condition), impervious area (pavement, buildings) ±0.3 acres of existing impervious area
Proposed Site Conditions:	Woods (fair condition), grass (good condition), impervious area (pavement, buildings, concrete sidewalks and walkways) ±1.4 acres of proposed impervious area
Stormwater Management Practices:	Infiltration basin and underground infiltration chambers
Construction Duration:	From spring 2022 to fall 2023, including planned winter shutdowns.

Coverage under the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (General Permit) latest revision will be required (see Appendix A), since the project involves soil disturbance of 1 or more acres. The proposed project is also in a municipal separate storm sewer system (MS4); therefore, the (city, town, village) of (name) will review and accept the SWPPP. The Notice of Intent (NOI) form and signed "MS4 SWPPP Acceptance" form will be submitted to the NYSDEC before construction begins to obtain coverage under the SPDES General Permit. The forms have been provided in Appendix B.

3 Site Conditions

3.1 Soils

The United States Department of Agriculture (USDA) Soil Conservation Service Soil Survey for Westchester County has been reviewed. The surficial soil conditions are shown in Figure 2 and are summarized in the table below.

Table 3-1: USDA Soil Data

Map Symbol	Description	Depth to Groundwater (ft.)	Depth to Bedrock (ft)	Hydrologic Soil Group
ChE	Charlton loan, 25 to 35 percent slopes	>6.0	>6.0	B
CrC	Charlton-Chatfield complex, 0 to 15 percent slopes very rocky	>6.0	>6.0	B
CuD	Chatfield-Hollis-Rock outcrop complex, 15 to 35 percent slopes	>6.0	2.5	D
LcB	Leicester loam, 3 to 8 percent slopes, stony	1.0	>6.0	A/D[1]
PnC	Paxton fine sandy loam, 8 to 15 percent slopes	2.0	2.0	C

1. Dual hydrologic soil groups cannot be model. Therefore, hydrologic soil group D will be used to be conservative.

Deep tests were performed on March 29, 2019 by Fusion Engineering PC on each of the residential lots and in the road. The results of the soil testing is provided in report entitled "Stormwater Pollution Prevention Plan Engineer's Report for Rinadli Property" prepared by Fusion Engineering PC last revised July 27, 2019 and summarized below:

- Test Pit 1 was excavated to a depth of 72 inches. Groundwater was not encountered. Rock was encountered 72 inches below existing grade.
- Test Pits 2 and 3 were excavated to a depth of 80 inches. Groundwater was not encountered. Rock was encountered 80 inches below existing grade.
- Test Pits 4, 5, 6, 7, 8, 9, and 10 were excavated to a depth of 84 inches. Groundwater and rock were not encountered.
- Test Pit 11 was excavated to a depth of 84 inches. Groundwater seepage was observed at 36 inches. Rock were not encountered.
- Test Pit 12 was excavated to a depth of 84 inches. Groundwater seepage was observed at 24 inches. Rock were not encountered.

Percolation tests were performed at Test Pit 5 and Test Pit 6. The percolation rates ranged from 13.33 to 14.67 minutes per inch (4.1 to 4.5 inches per hour). Refer to the Fusion Engineering PC engineer's report for additional information.

3.2 Water Resources

There are no wetlands present on the property. There is a stream that flows through a portion of the site, which starts at the outfall of twin 48 inch diameter culverts. The stream has a 50 foot setback requirement.

Aquifer mapping was reviewed to determine whether the site is over a sole source, primary or principal aquifer. According to the Environmental Protection Agency "Sole Source Aquifers" map, the site is not over a sole-source aquifer. According to the NYSDEC "Primary and Principal Aquifers in New York State" map, the site is not over a primary aquifer or a principal aquifer.

3.3 Floodplains

The Flood Insurance Rate Map (FIRM) was reviewed and the property is not located within a floodplain (see Figure 3).

3.4 Cultural Resources

According to the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) Cultural Resource Information System (CRIS) database, the site is within an archaeologically sensitive area (see Figure 4).

4 Stormwater Management Plan

4.1 Stormwater Site Planning

4.1.1 Preservation of Natural Features and Conservation

Preservation of natural features includes techniques to identify and preserve natural areas that can be used to protect water, habitat and vegetative resources. Conservation includes designing elements of the development in a way that the site design takes advantage of a site's natural features, preserves sensitive areas and identifies constraints and opportunities to prevent or reduce negative effects of a development. An evaluation of the preservation of natural features and conservation planning practices is provided in the table below.

Table 4-1: Preservation of Natural Features and Conservation

Practice	Description	Incorporated	Reason
Preservation of Undisturbed Areas	Delineate and place into permanent conservation undisturbed forests, native vegetated areas, riparian corridors, wetlands, and natural terrain.	Considered and Not Applied	Areas are not being fully disturbed; however, these areas are not being placed into permanent conservation easements.
Preservation of Buffers	Define, delineate and preserve naturally vegetated buffers along perennial streams, rivers, shorelines and wetlands.	Considered and Applied	N/A
Reduction of Clearing and Grading	Limit clearing and grading to the minimum amount needed for roads, driveways, foundations, utilities and stormwater management facilities.	Considered and Applied	N/A

Practice	Description	Incorporated	Reason
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 and Applied	N/A
Open Space Design	Use clustering, conservation design or open space design to reduce impervious cover, preserve more open space and protect water resources.	N/A	
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.	Considered and Applied	N/A

4.1.2 Reduction of Impervious Cover

Reduction of impervious cover includes methods to reduce the amount of rooftops, parking lots, roadways, sidewalks, and other surfaces that do not allow rain to infiltrate into the soil. An evaluation of the reduction of impervious cover techniques is provided in the table below.

Table 4-2: Reduction of Impervious Cover

Practice	Description	Incorporated	Reason
Roadway Reduction	Minimize roadway widths and lengths to reduce site impervious area	Considered and Not Applied	In order to minimize the driveway lengths, the road has to extend farther into the site.
Sidewalk Reduction	Minimize sidewalk lengths and widths to reduce site impervious area	Considered and Applied	N/A
Driveway Reduction	Minimize driveway lengths and widths to reduce site impervious area	Considered and Applied	N/A
Cul-de-sac Reduction	Minimize the number of cul-de-sacs and incorporate landscaped areas to reduce their impervious cover.	Considered and Not Applied	A cul-de-sac is required, since the road cannot connect to an adjacent roadway.
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.	Considered and Applied	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.	N/A	

4.1.3 Runoff Reduction Techniques

Green infrastructure techniques use the natural features of the site and promote runoff reduction through micromanaging runoff, promoting groundwater recharge, increasing losses through evapotranspiration, and emulating the existing hydrology. An evaluation of the runoff reduction practices is provided in the table below.

Table 4-3: Runoff-Reduction Practices

Practice	Description	Incorporated	Reason
Conservation of Natural Areas	Retain the pre-development hydrologic and water quality characteristics of undisturbed natural areas, stream and wetland buffers by restoring and/or permanently conserving these areas on a site.	Considered and Not Applied	Areas are not being fully disturbed; however, these areas are not being placed into permanent conservation easements.
Sheet flow to Riparian Buffers or Filter Strips	Undisturbed natural areas such as forested conservation areas and stream buffers or vegetated filter strips and riparian buffers can be used to treat and control stormwater runoff from some areas of a development project.	Considered and Applied	N/A
Vegetated Open Swale	The natural drainage paths, or properly designed vegetated channels, can be used instead of constructing underground storm sewers or concrete open channels to increase time of concentration, reduce the peak discharge, and provide infiltration.	N/A	
Tree Planting/Tree Box	Plant or conserve trees to reduce stormwater runoff, increase nutrient uptake, and provide bank stabilization. Trees can be used for applications such as landscaping, stormwater management practice areas, conservation areas and erosion and sediment control.	Considered and Not Applied	Plantings are proposed; the plantings are not within close proximity to impervious areas or are being installed in stormwater management practices.
Disconnection of Rooftop Runoff	Direct runoff from residential rooftop areas and upland overland runoff flow to designated pervious areas.	Considered and Not Applied	The existing site topography slopes exceed the slope requirements.
Stream Daylighting for Redevelopment Projects	Stream daylight previously culverted/ piped streams to restore natural habitats, better attenuate runoff by increasing the storage size and promoting infiltration.	N/A	
Rain Garden	Manage and treat small volumes of stormwater runoff using a conditioned planting soil bed and planting materials to filter runoff stored within a shallow depression.	Considered and Not Applied	Another stormwater management practice is being used.
Green Roof	Capture runoff through a layer of vegetation and soil installed on top of a conventional flat or sloped roof.	Considered and Not Applied	Another stormwater management practice is being used.
Stormwater Planter	Small landscaped stormwater treatment devices that can be designed as infiltration or filtering practices.	Considered and Not Applied	Another stormwater management practice is being used.
Rain Tank/Cistern	Capture and store stormwater runoff to be used for irrigation systems or filtered and reused for non-contact activities.	Considered and Not Applied	Another stormwater management practice is being used.
Porous Pavement	Pervious types of pavements that provide an alternative to conventional paved surfaces, designed to infiltrate rainfall through the surface.	Considered and Not Applied	Another stormwater management practice is being used.

4.1.4 Standard Stormwater Management Practices

Standard stormwater management practices (SMPs) are structural practices that are designed to capture and treat the water quality volume. Some of the standard SMPs can also provide runoff reduction or water quantity controls. An evaluation of the standard SMPs is provided in the table below.

Table 4-4: Standard Stormwater Management Practices

Practice	Description	Incorporated	Reason
Stormwater Ponds	Constructed stormwater retention basins that have a permanent pool (or micropool). Runoff from each rain event is detained and treated in the pool. Can be used to treat hostspot runoff if 2 feet minimum separation to seasonally groundwater is provided or if a permeable liner is provided.	Considered and Not Applied	Using a standard practice that provides both water quality treatment and runoff reduction.
Stormwater Wetlands	Constructed stormwater wetlands that are structural practices that incorporate wetland plants to store and treat runoff. Can be used to treat hostspot runoff if 2 feet minimum separation to seasonally groundwater is provided.	Considered and Not Applied	Using a standard practice that provides both water quality treatment and runoff reduction.
Stormwater Infiltration	Excavated trench or basin used to capture and allow for infiltration into the surrounding soils from the bottom and sides of the basin or trench. Also, a standard stormwater practice that also provides runoff reduction volume capacity.	Considered and Applied	N/A
Underground Infiltration System	An underground perforated piping or chambers used to capture and allow for infiltration into the surrounding soils from the bottom and sides. Also, a standard stormwater practice that also provides runoff reduction volume capacity.	Considered and Applied	N/A
Stormwater Filtering Systems – Sand or Organic	Aboveground or underground multi-chamber practice designed to treat stormwater runoff through filtration using a sediment forebay, primary filter media and underdrain. Can be used to treat hostspot runoff if a permeable liner is provided.	Considered and Not Applied	Using a standard practice that provides both water quality treatment and runoff reduction.
Stormwater Filtering Systems – Bioretention	Shallow basin or landscaped area that uses engineered soils and vegetation to capture and treat runoff. Can be used to treat hostspot runoff if a permeable liner is provided. Also, a standard stormwater practice that also provides runoff reduction volume capacity.	Considered and Not Applied	Using a standard practice that provides both water quality treatment and runoff reduction.
Stormwater Open Channel Systems - Dry Swale	Vegetated channel that captures and treats runoff within dry cells formed by check dams or other means. Can be used to treat hostspot runoff if a permeable liner is provided. Also, a standard stormwater practice that also provides runoff reduction volume capacity.	Considered and Not Applied	The topography does not allow for incorporation of swales.

Practice	Description	Incorporated	Reason
Stormwater Open Channel Systems - Wet Swale	Vegetated channel that captures and treats runoff within wet cells formed by check dams or other means.	Considered and Not Applied	The topography does not allow for incorporation of swales.
Hydrodynamic Separator	Proprietary practice used to provide pretreatment in new development and treatment in redevelopment.	N/A	

4.2 Hydrologic Analysis

4.2.1 Drainage Patterns

In existing conditions, runoff generally flows in a southerly direction over land and into the onsite portion of the stream. In the proposed conditions, stormwater runoff will continue to flow overland in the same direction as in existing conditions. High and low points are proposed within the driveways and road to aide in the collection of stormwater runoff. The collected stormwater runoff will be conveyed to the stormwater management system for treatment.

4.2.2 Stormwater Modeling

The USDA Soil Conservation Service Publication Technical Release (TR-55) "Urban Hydrology for Small Watersheds" has been used to analyze the pre- and post-development rainfall runoff rates and volumes. Watershed areas, curve numbers (CN), and times of concentration (T_C) were calculated for each contributing watershed. The curve number is a land-sensitive coefficient that dictates the relationship between total rainfall depth and direct storm runoff. Based on the land coverage and soil group types, the average CN has been determined for each of the subcatchments for both the existing and proposed conditions.

The T_C is defined as the time for runoff to travel from the hydraulically most distant point in the watershed to a Design Point (DP). Values of the time of concentration were determined for both the pervious and impervious area of each watershed for both the existing and proposed conditions based on land cover and slope of the flow path using methods outlined in TR-55. As per TR-55, the minimum T_C used in 0.1 hours (for 6 minutes).

An overall watershed boundary was developed for the pre- and post-development conditions (see Figure 5 and Figure 6, respectively). The overall watershed was broken down into smaller watersheds, or subcatchments to allow for analysis of runoff conditions at several locations. Each of these locations is defined as a Design Point (DP) to compare the proposed development to the existing conditions. Descriptions of each of the selected design points are provided below:

- Design Point 1: onsite/offsite stream

Rainfall data used in the modeling and analysis was obtained from the isohyet maps provided in the *Design Manual* and the Northeast Regional Climate Center (NRCC). 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. The rainfall data used in the stormwater management design and analysis is provided in the table below.

Table 4-5: Rainfall Data

Storm Event	24-Hour Rainfall
90th Percentile(1,2)	1.50 inches
1-year	2.78 inches
2-year(3)	3.41 inches
10-year	5.14 inches
100-year	9.29 inches

1. The 90th percentile 24-hour rainfall value was taken from the *New York State Stormwater Management Design Manual*. The other 24-hour rainfall values are taken from NRCC.
2. The 90th percentile 24-hour rainfall amount was used to calculate the required total water quality volume.
3. The 2-year 24-hour rainfall amount was used to calculate the sheet flow component in the time of concentration.

The rainfall data used in the stormwater management design and analysis is provided in Appendix E. The results of the computer modeling used to analyze the pre- and post-development watershed conditions are provided in Appendix F and Appendix G, respectively.

4.2.3 Water Quality Control

The water quality volumes have been determined based on the methodology described in the Design Manual. The total water quality volume is provided in the table below.

Table 4-6: Total Water Quality Volume

Subcatchment	Area (ac)	Impervious Area (ac)	WQ_v (cf)
201	0.22	0.09	486
202	0.03	0.03	167
203	0.03	0.03	167
301	3.33	1.08	6,205
Total	**3.61**	**1.23**	**7,025**

Detailed design calculations have been provided in Appendix E.

4.2.4 Runoff Reduction Volume

The runoff-reduction-volume techniques that were used to reduce the total required water quality volume are in the table below.

Table 4-7: Implemented Runoff Reduction Volume Techniques

Techniques/ Practices	RRv Reduction Method	Reduction Amount
Infiltration Practice	Standard SMP with RRv capacity	100% of the WQv provided by the practice
Underground Infiltration System	Standard SMP with RRv capacity	100% of the WQv provided by the practice

After applying the above runoff-reduction techniques, the total required water quality volume was reduced 100 percent. Detailed design calculations have been provided in Appendix E.

4.2.5 Water Quantity Control

A comparison of the required and provided channel protection volume is provided in the table below.

Table 4-8: Summary of Channel Protection Volume

Water Quantity Parameter	Required (cf)	Provided (cf)
Channel Protection Volume	8,696	17,305

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

Table 4-9: Summary of Peak Discharge Rates

Storm Event	Design Point	Pre (cfs)	Post (cfs)	Diff (cfs)
1-year	1	4.38	2.62	-1.76
10-year	1	17.01	15.69	-1.32
100-year	1	43.74	39.68	-4.06

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 not be increased. The pre- and post-development stormwater models have been provided in Appendix F and Appendix G, respectively.

5 Erosion and Sediment Control Plan

5.1 Construction Phasing

Construction will be implemented in a single phase in the following order:

1. Install erosion, sediment, and pollution prevention measures:
   a. The existing driveway will be used for site access.
   b. Tag/mark all trees to be removed.
   c. Install tree protection around the trees to remain.
   d. Install silt fence along the limit of disturbance.
   e. Install temporary sanitary facilities (i.e., portable toilets) in a location at least 20 feet from any drainage facility or flow path. Temporarily stake the facility to prevent accidental tipping from construction activity or wind.
   f. Install waste container and maintain rigorous site cleaning schedule to prevent debris from blowing offsite. Construction waste shall be stored in a dumpster and carried offsite on a regular basis.
   g. Allocate concrete washout areas.

2. All existing structures to be demolished, except for the existing house and septic field. The existing house and septic field are to remain functional construction is completed to serve as a construction trailer.

3. Clearing and grubbing:

a. Strip and stockpile topsoil. Initiate cover practices and sediment controls at the base of the stockpile. Stockpile can be temporarily stabilized with tarp or mulch and/or temporary seeding.
b. Disturbed areas where construction will cease for more than 7 days will be stabilized with erosion controls, such hydro-seeding, hydro-mulch, or straw. Straw mulch shall be applied at the rate of 2 tons per acre.

4. Construct temporary erosion control measures including temporary sediment traps, swales, and sediment control measures.

5. Excavate to foundations subgrade elevation and Install dewatering practice if necessary.

6. Construct improvements.

7. Demolish existing house and Install subsurface storage system and site drainage to capture runoff.

8. Final stabilization of disturbed areas:
   a. Install minimum 6" topsoil and final stabilize with lawn or mulch in landscape areas. Refer to Section 5.4 for all soil restoration requirements.
   b. Remove all temporary erosion, sediment and pollution prevention measures once the site has achieved final stabilization.

5.2 Erosion and Sediment Control Measures

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

- **Stabilized Construction Access** - Before construction, the stabilized construction access shall be installed to reduce the tracking of sediment onto adjacent roadways. Construction traffic must enter and exit the site at the stabilized construction access. The stabilized construction access shall be maintained in good condition to control tracking of sediment onto rights-of-way or streets. When necessary, the placement of additional aggregate atop the filter fabric shall be done to maintain the minimum thickness. Sediments and soils spilled, dropped, or washed onto the public rights-of-way shall be removed immediately.

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

- **Temporary Soil Stockpile** - Materials, such as topsoil, shall be temporarily stockpiled (if necessary) on site during construction. Stockpiles shall be located away from storm drainage, water bodies or courses, and shall be properly protected from erosion in accordance with the NYSDEC standard detail.

- **Silt Fencing** - Before initiation of and during construction, silt fencing shall be established along the perimeter of areas to be disturbed as a result of the construction up gradient of water courses or adjacent properties. These barriers may extend into non-impact areas to adequately protect adjacent lands. Clearing and grubbing shall be performed only as necessary for the installation of the sediment control barrier. To maximize effectiveness of the silt fencing, daily inspections shall be performed by site personnel. Maintenance of the fence shall be performed as needed and when directed by the Qualified Inspector.

- **Temporary Seeding** - Within seven days after construction ceases on any particular area of the site, all disturbed areas where there shall be no construction for longer than 14 days shall be temporarily seeded and mulched to minimize erosion and sediment loss. Other stabilization methods maybe approved by the Qualified Inspector.

- **Inlet Protection** – Inlet protection shall be installed around existing and proposed catch basins (once installed) to keep sediment from entering the storm-sewer system. During construction, the inlet protection measures shall be replaced as needed to ensure proper function of the structure.

- **Temporary Sediment Basins and Traps** - Temporary sediment basins and traps 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 and traps shall be inspected at least every seven days. All damage caused by soil erosion and construction equipment shall be repaired upon discovery. Accumulated sediment shall be removed from the sediment basin or trap when it reaches 50 percent of the design capacity and must not exceed 50 percent. Sediment must not be placed downstream from the embankment, adjacent to a stream, or floodplain.

- **Erosion Control Matting** – Erosion control matting shall be installed on all slopes exceeding 3:1. Erosion control matting shall provide protection from temporary erosion, establishment of rapid vegetation, and long-term resistance of erosion to shear stresses associated with high runoff flow velocities associated with steep slopes.

- **Dewatering** - Dewatering, if required, must not be discharged directly into wetlands, water courses, water bodies, and storm sewer systems without appropriate protection or authorizations. Proper methods and devices shall be used 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 used after construction generally include the following:

- **Establish Permanent Vegetation** - Disturbed areas 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 14 days after completion of the major construction. All seeded areas shall be protected with mulch or hay. Final site stabilization is achieved when soil-disturbing activities have 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 the disturbed unpaved areas and areas not covered by permanent structures.

- **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.

5.3 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 shall 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 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 or water supply. Equipment wash-down zones shall be within areas draining to sediment control devices.

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

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

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

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

7. Dumpsters or debris containers shall be on site and shall be of adequate size to manage respective materials. Regular collection and disposal of wastes must occur as required.

8. Temporary concrete washout facilities shall be a minimum of 50 feet from storm drain inlets, open drainage facilities, and watercourses. Each facility should be away from construction traffic or access areas to prevent disturbance or tracking. A sign shall be installed adjacent to each washout facility to inform concrete equipment operators to use 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 or repaired, seeded, and mulched for final stabilization. Wastewater discharges from washout of concrete is prohibited.

9. Non-stormwater components of site discharge shall be clean water. Water used for construction, which discharges from the site, must originate from a public water supply or approved private well. Water used for construction that does not originate from an approved public supply must not discharge from the site.

10. Discharges from dewatering activities, including discharges from dewatering trenches and excavations, shall be managed by appropriate control measures.

11. Wastewater discharges from washout and cleanout of stucco, paint, form-release oils, curing compounds, and other construction materials is prohibited.

5.4 Soil Stabilization and Restoration

Stabilization

In areas where soil disturbance has temporarily or permanently ceased, the application of soil stabilization measures shall be initiated by the end of the next business day and completed within 14 days from the date the current soil disturbance ceased. The soil-stabilization measures shall be in conformance with the *New York State Standards and Specifications for Erosion and Sediment Control*, latest edition.

Restoration

Soil restoration shall be performed in the disturbed areas. The soils shall be restored in accordance with the table below.

Table 5-1: Soil Restoration

Type of Soil Disturbance	Soil Restoration Requirement
No Soil Disturbance (e.g., preservation of natural features)	Restoration not required.
Minimal Soil Disturbance (e.g., clearing and grubbing)	Restoration not required.
Areas where top soil is stripped only (e.g., no change in grade)	Aerate and apply 6 inches of topsoil.
Areas of cut or fill	Apply full soil restoration (see below).
Heavy traffic areas on site	Apply full soil restoration (see below).

(especially in 5 to 25 feet around buildings, but not within a 5-foot perimeter around foundation walls)	
Areas where runoff reduction or infiltration practices are applied	Restoration not required, but can be applied to enhance soil infiltration.
Redevelopment projects	Soil restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.

Full Soil Restoration

Before applying full soil restoration, all construction, including construction equipment and material storage, site cleanup and trafficking, should be finished and the site closed to further disturbance. Full soil restoration should be performed with a heavy-duty agricultural-grade deep ripper, deep angled-leg subsoiler, or equivalent machinery to achieve de-compaction.

Full soil restoration is implemented in a two-phase process:

1. Deep rip the affected thickness of exposed subsoil, aggressively fracturing it before the protected topsoil is reapplied on the site.
2. De-compact simultaneously through the restored topsoil layer and upper half of the affected subsoil.

Low to Moderate Subsoil Moisture

The disturbed soils are returned to rough grade and the following is applied:

1. Apply 3 inches of compost over the subsoil.
2. Till compost a minimum of 12 inches into the subsoil using a cat-mounted ripper, tractor-mounted disc, or tiller mixing and circulating air and compost into subsoils.
3. Rock-pick until uplifted stone and rock of 4 inches or larger size are cleaned off the site. All construction material and foreign debris and existing root masses shall be removed from proposed planting areas.
4. Apply 6 inches of topsoil. Newly installed planting soils shall be mixed with existing soils where they meet in order to create a transitional gradient to allow for proper drainage.
5. Install plants and vegetation in accordance with the Landscaping Plan.

6 Stormwater Pollution Prevention Plan Implementation

6.1 Certification Statements

Before starting construction, the owner/operator, contractors, and subcontractors are required to sign the certification statements provided in Appendix C.

The owner/operator must sign a copy of the Owner's/Operator's certification before submitting the Notice of Intent. The owner/operator acknowledges that the SWPPP has been developed and will be implemented as the first element of construction and agrees to comply with the terms and conditions of the general permit for which the Notice of Intent is being submitted.

The owner/operator must identify the contractors and subcontractors that will be responsible for installing, constructing, repairing, replacing, inspecting, and maintaining the erosion and sediment control practices; and constructing the post-construction stormwater management practices included in the SWPPP. The contractors and subcontractors must identify at least one trained individual from their company who will be responsible for implementation of the SWPPP. This person will be known as the trained contractor. At least one trained contractor will be on site daily when soil disturbing activities are being performed. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has begun, they must also sign the certification statement and identify their responsibilities.

6.2 Pre-Construction Meeting

Before beginning construction, the owner/operator must set up a pre-construction meeting with the Town representative, qualified professional, qualified inspector, contractors, and subcontractors. The primary purpose of the pre-construction meeting is to discuss the responsibilities of each party as they relate to the implementation of the SWPPP and to clarify any questions.

6.3 Construction Site Log

The owner/operator must maintain a copy of the following, including but not limited to: General Permit, signed NOI, signed MS4 Acceptance form, NOI Acknowledgement Letter, SWPPP, signed certification statements, and inspections reports. The documents must be maintained in a secure location on site. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

6.4 Construction Inspections and Maintenance

6.4.1 Contractor Maintenance Inspection Requirements

The trained contractor must inspect the erosion and sediment control practices and pollution-prevention measures to verify that they are being maintained in effective operating condition. The inspections will be conducted as follows:

- For construction sites where soil disturbance is on-going, the trained contractor must inspect the measures within the active work area daily. If deficiencies are identified, the contractor will begin implementing corrective actions within one business day and must complete the corrective actions by the end of the day.

- For construction sites where soil disturbance activities have been temporarily suspended (e.g., winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the trained contractor can stop conducting the maintenance inspections. The trained contractor must conduct the daily maintenance inspections as soil disturbance resumes.

- For construction sites where soil disturbance has been shut down with partial project completion, the trained contractor can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved final stabilization and all post-construction stormwater management practices required for the completed part of the project have been constructed in conformance with the SWPPP and are operational.

6.4.2 Qualified Inspector Inspection Requirements

The owner/operator must have a Qualified Inspector conduct site inspections to verify the stability and effectiveness of protective measures and practices employed during construction. The site inspections will be conducted as follows:

- For construction sites where soil disturbance is ongoing, the Qualified Inspector must conduct a site inspection at least once every seven days.

- For construction sites where soil disturbance activities have been temporarily suspended (e.g., winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the Qualified Inspector must conduct a site inspection at least once every 30 days. The owner/operator must notify the NYSDEC or MS4 in writing before reducing the frequency of the inspections.

- For construction sites where soil disturbance activities have been shut down with partial project completion, the Qualified Inspector can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved final stabilization and all post-construction stormwater management practices are operational. The owner/operator must notify the NYSDEC or the MS4 in writing before the shutdown.

All erosion and sediment control inspections shall be performed in accordance with this SWPPP, accompanying project plans, latest revision of *New York State Standards and Specifications for Erosion and Sediment Control,* and procedures outlined in Appendix H of the latest revision of the *New York State Stormwater Management Design Manual*. Inspection reports must identify and document the maintenance of the erosion and sediment control measures. An example inspection report has been provided in Appendix D.

Specific maintenance components, schedule frequency, inspection parameters and remediation procedures are provided on the accompanying project plans. Any adjustments or modifications to the maintenance plan shall be noted in the inspection reports and submitted to the Town for approval.

7 Termination of Coverage

The owner/operator may terminate coverage when:

a. Total project completion has occurred.
b. A planned shutdown with partial project completion has occurred.
c. Property ownership changes or when there is a change in operational control over the construction plans and specifications; and the new owner/operator has obtained coverage under the SPDES General Permit.
d. Coverage under an alternative SPDES general permit or an individual SPDES permit has been obtained.

The completed NOT must be submitted to the NYSDEC to cancel coverage. A blank copy of the NOT has been provided in Appendix B.

8 Post-Construction Requirements

8.1 Record Retention

Following construction, the owner/operator must retain a copy of the signed NOI, signed MS4 SWPPP Acceptance, NOI Acknowledgement Letter, SWPPP, project plans, and any inspection reports that were prepared in conjunction with the General Permit for at least five years from the date that the NYSDEC receives a complete NOT.

8.2 Inspection and Maintenance

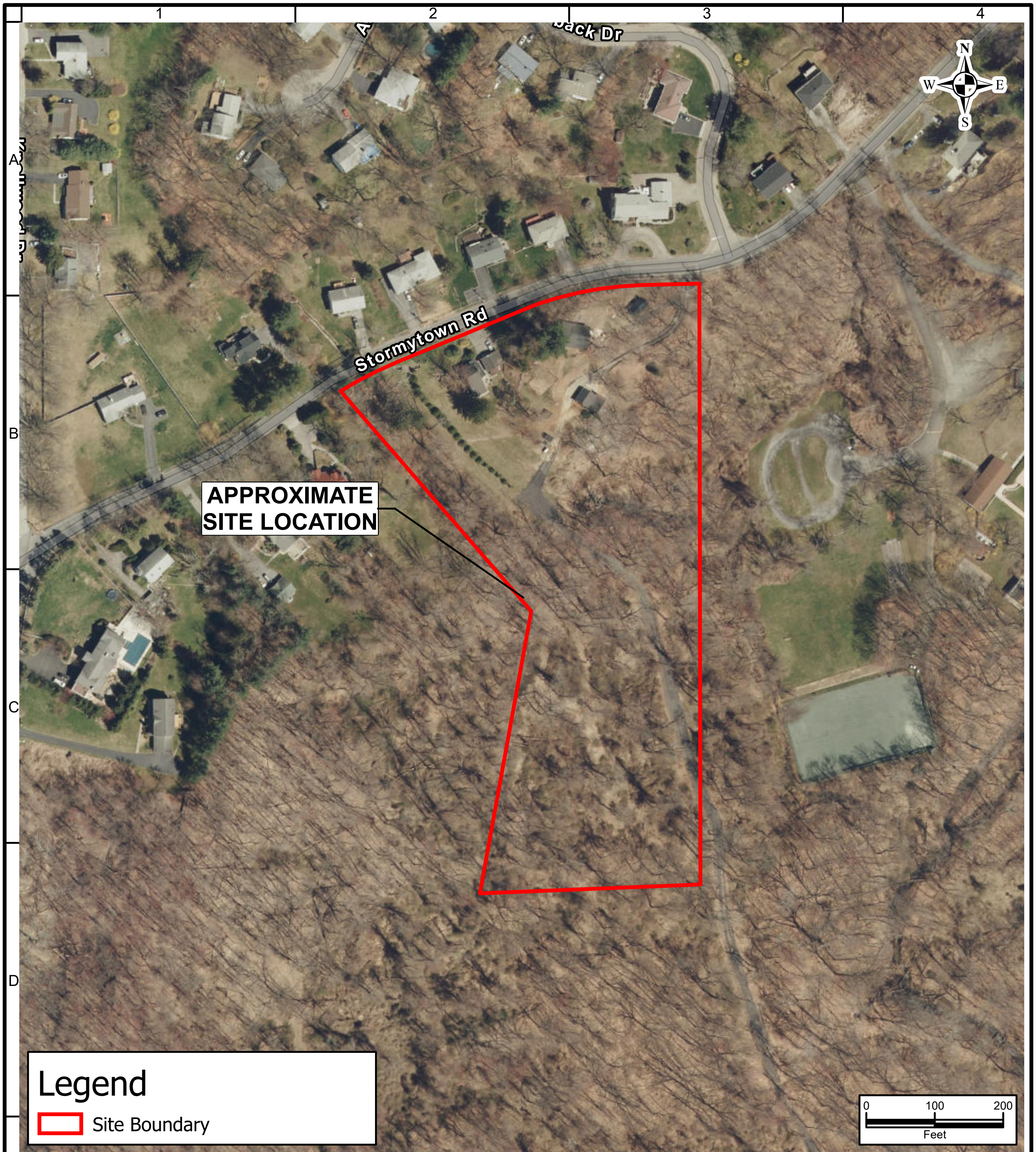
Post-construction inspections and maintenance will be performed by homeowner's association. Inspections and maintenance for the various site components and stormwater management facilities shall be performed in accordance with the accompanying project plans and this SWPPP. Detailed post-construction inspections and maintenance procedures are provided in Appendix H.

9 Conclusion

This Stormwater Pollution Prevention Plan has been developed in accordance with the requirements of the Town of Ossining and the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) Phase II technical guidelines. This SWPPP identifies the erosion control, sediment control, pollution-prevention, and stormwater management measures to be implemented during construction to minimize soil erosion and control sediment transport off site, and after construction to control and treat stormwater runoff from the developed site.

In the opinion of the SWPPP preparer, the proposed project will not have adverse impacts if the measures for erosion control, sediment control, pollution prevention, and stormwater management measures are properly constructed and maintained in accordance with the requirements outlined herein and on the accompanying project plans.

Figures



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Project	Drawing Title	Project No.	Figure
39 Stormytown Road Subdivision	**SITE LOCATION MAP**	190065801	FG1
TOWN OF OSSINING		Date: 3/28/2021	
WESTCHESTER NEW YORK		Scale: 1:200	
		Drawn By: Site Analyzer	
		Submission Date: 03/29/2021	Sheet 1 of 1

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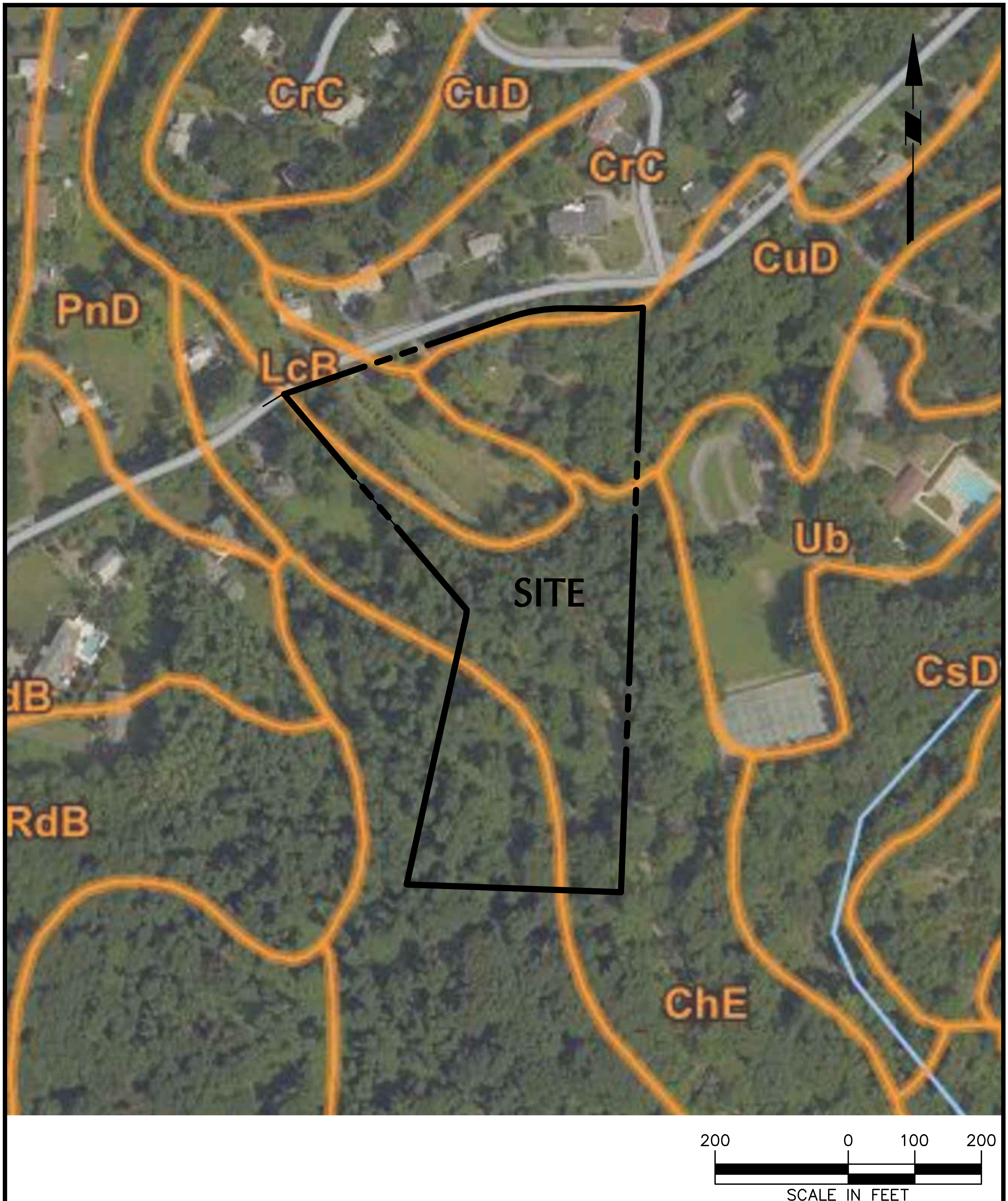
Spatial Reference: NAD 1983 StatePlane New York East FIPS 3101 Feet

Warning: It is a violation of the NYS Education Law Article 145 for any person, unless acting under the direction of a licensed professional engineer, land surveyor or geologist, to alter this item in any way.



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Project	Drawing Title	Project No.	Drawing No.
STORMYTOWN ROAD SUBDIVISION BLOCK No. 3, LOT No.62 TOWN OF OSSINING WESTCHESTER COUNTY NEW YORK	SOILS MAP	190065801 Date 03/29/2021 Drawn By CZ Checked By MF	FG2 Sheet 1 of 1

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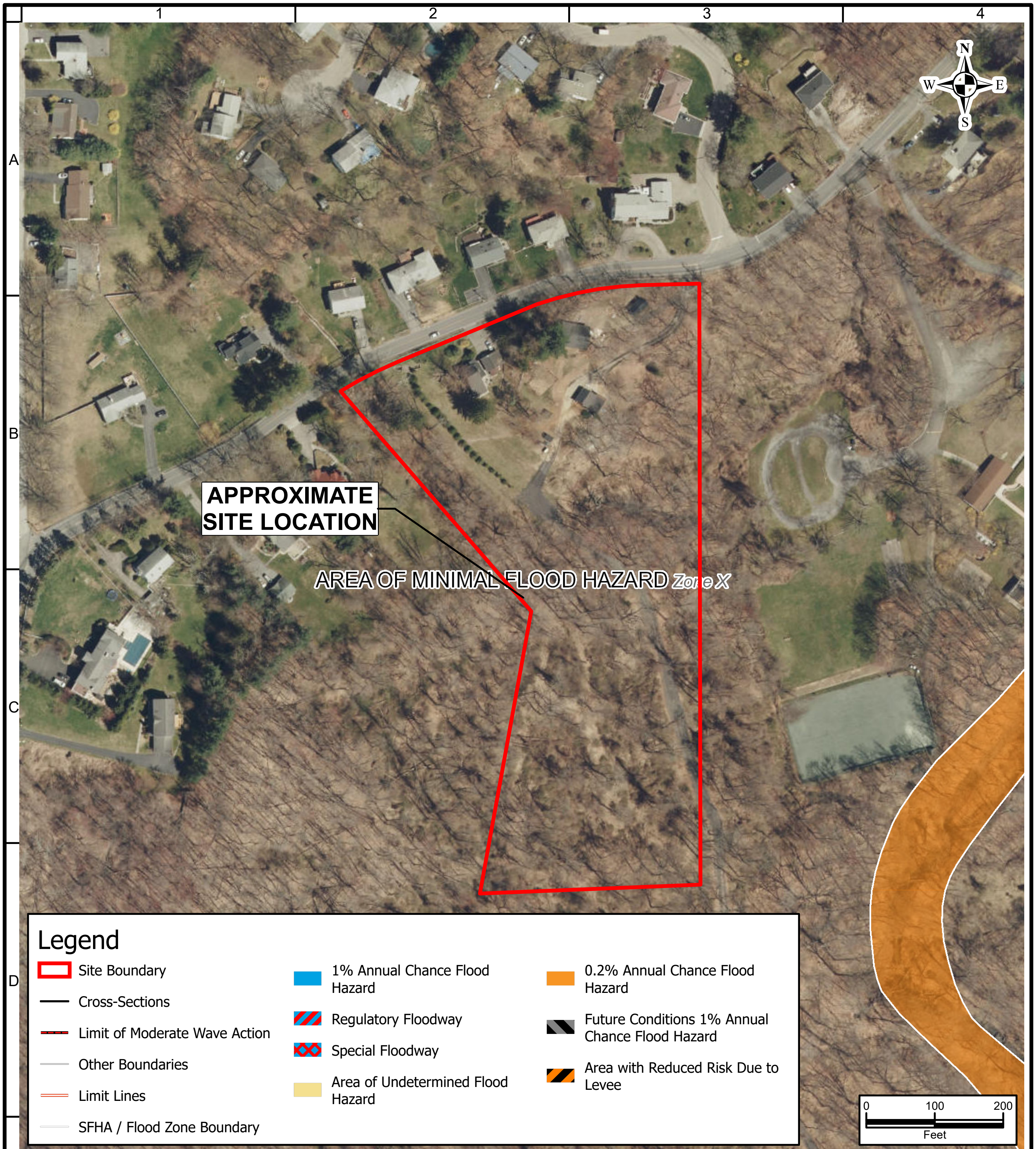

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community; FEMA, FEMA RiskMap CDS

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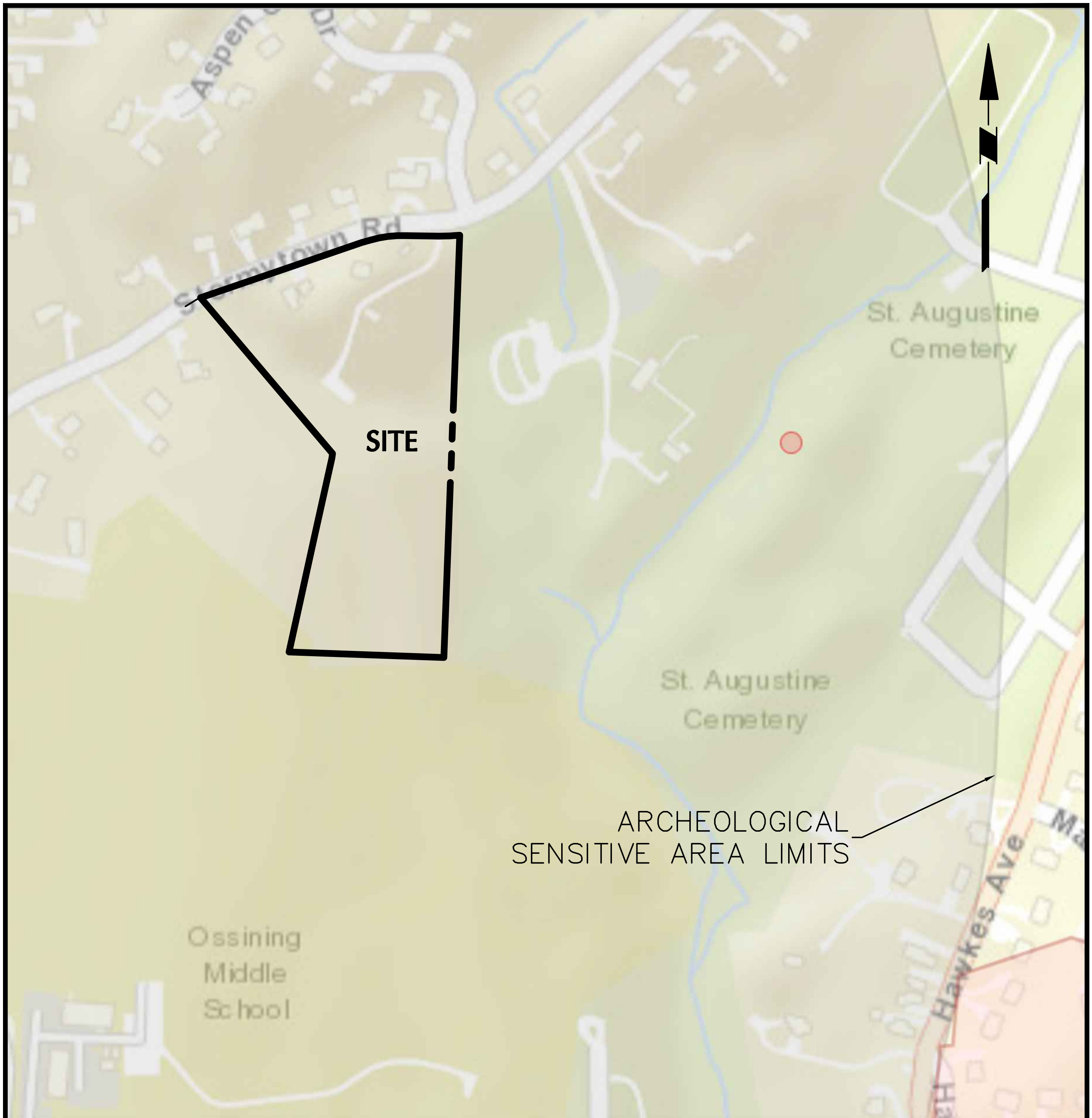
Project	Drawing Title	Project No. 190065801	Figure
39 Stormytown Road Subdivision TOWN OF OSSINING WESTCHESTER NEW YORK	**FLOOD INSURANCE RATE MAP**	Date 3/28/2021 Scale 1:200 Drawn By Site Analyzer Submission Date 03/29/2021	FG3 Sheet 1 of 1

Spatial Reference: NAD 1983 StatePlane New York East FIPS 3101 Feet



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LANGAN Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. One North Broadway, Suite 910 White Plains, NY 10601 T: 914.323.7400 F: 914.323.7401 www.langan.com	Project **STORMYTOWN ROAD SUBDIVISION** BLOCK No. 3, LOT No.62 TOWN OF OSSINING WESTCHESTER COUNTY NEW YORK	Drawing Title **CULTURAL RESOURCES**	Project No. 190065801 Date 03/29/2021 Drawn By CZ Checked By MF	Drawing No. **FG4** Sheet 1 of 1

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Project
STORMYTOWN ROAD SUBDIVISION
BLOCK No. 3, LOT No.62
TOWN OF OSSINING
WESTCHESTER COUNTY NEW YORK

Drawing Title
PRE-DEVELOPMENT WATERSHED ANALYSIS

Project No. 190065801
Date 03/29/2021
Drawn By CZ
Checked By MF

Drawing No. FG5
Sheet 1 of 1

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Project
STORMYTOWN ROAD SUBDIVISION
BLOCK No. 3, LOT No.62
TOWN OF OSSINING
WESTCHESTER COUNTY NEW YORK

Drawing Title
POST-DEVELOPMENT WATERSHED ANALYSIS

Project No. 190065801
Date 03/29/2021
Drawn By CZ
Checked By MF

Drawing No. FG6
Sheet 1 of 1

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Appendix A: NYSDEC SPDES General Permit

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP- 0-20-001

Issued Pursuant to Article 17, Titles 7, 8 and Article 70

of the Environmental Conservation Law

Effective Date: January 29, 2020 Expiration Date: January 28, 2025

John J. Ferguson

Chief Permit Administrator

1-23-20

Authorized Signature Date

Address: NYS DEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System ("NPDES")* permit or by a state permit program. New York administers the approved State Pollutant Discharge Elimination System (SPDES) program with permits issued in accordance with the New York State Environmental Conservation Law (ECL) Article 17, Titles 7, 8 and Article 70.

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of "*construction activity*", as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a *point source* and therefore, pursuant to ECL section 17-0505 and 17-0701, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. The *owner or operator* cannot wait until there is an actual *discharge* from the *construction site* to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

Table of Contents

Part 1. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application

This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;

2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State.*

3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

B. Effluent Limitations Applicable to Discharges from Construction Activities

*Discharge*s authorized by this permit must achieve, at a minimum, the effluent limitations in Part I.B.1. (a) – (f) of this permit. These limitations represent the degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in the *Stormwater Pollution Prevention Plan* (“SWPPP”) the reason(s) for the

deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

a. **Erosion and Sediment Controls.** Design, install and maintain effective erosion and sediment controls to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such controls must be designed, installed and maintained to:

   (i) *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharges*;

   (ii) Control stormwater *discharge*s, including both peak flowrates and total stormwater volume, to *minimize* channel and *streambank* erosion and scour in the immediate vicinity of the *discharge* points;

   (iii) *Minimize* the amount of soil exposed during *construction activity*;

   (iv) *Minimize* the disturbance of *steep slopes*;

   (v) *Minimize* sediment *discharge*s from the site;

   (vi) Provide and maintain *natural buffer*s around surface waters, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce *pollutant discharge*s, unless *infeasible*;

   (vii) *Minimize* soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted;

   (viii) Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover; and

   (ix) *Minimize* dust. On areas of exposed soil, *minimize* dust through the appropriate application of water or other dust suppression techniques to control the generation of pollutants that could be discharged from the site.

b. **Soil Stabilization**. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the current soil disturbance activity ceased. For construction sites that *directly discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. See Appendix A for definition of *Temporarily Ceased*.

c. **Dewatering**. *Discharge*s from *dewatering* activities, including *discharge*s from *dewatering* of trenches and excavations, must be managed by appropriate control measures.

d. **Pollution Prevention Measures**. Design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be designed, installed, implemented and maintained to:

(i) *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. This applies to washing operations that use clean water only. Soaps, detergents and solvents cannot be used;

(ii) *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, hazardous and toxic waste, and other materials present on the site to precipitation and to stormwater. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use) ; and

(iii) Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.

e. **Prohibited *Discharge*s.** The following *discharge*s are prohibited:

(i) Wastewater from washout of concrete;

(ii) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;

(iii) Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance;

(iv) Soaps or solvents used in vehicle and equipment washing; and

(v) Toxic or hazardous substances from a spill or other release.

f. Surface Outlets. When discharging from basins and impoundments, the outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

C. Post-construction Stormwater Management Practice Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must select, design, install, and maintain the practices to meet the *performance criteria* in the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015, using sound engineering judgment. Where post-construction stormwater management practices ("SMPs") are not designed in conformance with the *performance criteria* in the Design Manual, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must design the practices to meet the applicable *sizing criteria* in Part I.C.2.a., b., c. or d. of this permit.

a. Sizing Criteria for New Development

(i) Runoff Reduction Volume ("RRv"): Reduce the total Water Quality Volume ("WQv") by application of RR techniques and standard SMPs with RRv capacity. The total WQv shall be calculated in accordance with the criteria in Section 4.2 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: Construction activities that cannot meet the criteria in Part I.C.2.a.(i) of this permit due to site limitations shall direct runoff from all newly constructed impervious areas to a RR technique or standard SMP with RRv capacity unless infeasible. The specific site limitations that prevent the reduction of 100% of the WQv shall be documented in the SWPPP.

For each impervious area that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered infeasible.

In no case shall the runoff reduction achieved from the newly constructed impervious areas be less than the Minimum RRv as calculated using the criteria in Section 4.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (“Cpv”): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or
(2) The site discharges directly to tidal waters, or fifth order or larger streams.

(iv) *Overbank* Flood Control Criteria (“Qp”): Requires storage to attenuate the post-development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
(1) the site discharges directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

(v) Extreme Flood Control Criteria (“Qf”): Requires storage to attenuate the post-development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
(1) the site discharges directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

b. *Sizing Criteria* for *New Development* in Enhanced Phosphorus Removal Watershed

(i) Runoff Reduction Volume (RRv): Reduce the total Water Quality Volume (WQv) by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24 hour design storm over the post-developed watershed and shall be calculated in accordance with the criteria in Section 10.3 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.b.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 10.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:

(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) *Overbank* Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or

(2) A downstream analysis reveals that *overbank* control is not required.

(v) Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or

(2) A downstream analysis reveals that *overbank* control is not required.

c. Sizing Criteria for Redevelopment Activity

(i) Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* shall be addressed by one of the following options. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C of this permit) shall calculate the WQv in accordance with Section 10.3 of the Design Manual. All other *redevelopment activities* shall calculate the WQv in accordance with Section 4.2 of the Design Manual.

(1) Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the Design Manual must be applied to all newly created pervious areas, or

(2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRv capacity., or

(3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or

(4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

If there is an existing post-construction stormwater management practice located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 – 4 above.

(ii) Channel Protection Volume (Cpv): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iii) *Overbank* Flood Control Criteria (Qp): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iv) Extreme Flood Control Criteria (Qf): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site

d. Sizing Criteria for Combination of Redevelopment Activity and New Development

Construction projects that include both New Development and Redevelopment Activity shall provide post-construction stormwater management controls that meet the sizing criteria calculated as an aggregate of the Sizing Criteria in Part I.C.2.a. or b. of this permit for the New Development portion of the project and Part I.C.2.c of this permit for Redevelopment Activity portion of the project.

D. Maintaining Water Quality

The Department expects that compliance with the conditions of this permit will control *discharge*s necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any discharge to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the stormwater *discharge*s authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standards*; the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this general permit and document in accordance with Part IV.C.4. of this general permit. To address the *water quality standard* violation the *owner or operator* may need to provide additional information, include and implement appropriate controls in the SWPPP to correct the problem, or obtain an individual SPDES permit.

If there is evidence indicating that despite compliance with the terms and conditions of this general permit it is demonstrated that the stormwater *discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or if the Department determines that a modification of the permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

E. Eligibility Under This General Permit

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph F. of this Part.

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharge*s; including stormwater runoff, snowmelt runoff, and surface runoff and drainage, from *construction activities*.

3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater discharges are authorized by this permit: those listed in 6 NYCRR 750-1.2(a)(29)(vi), with the following exception: "Discharges from firefighting activities are authorized only when the firefighting activities are emergencies/unplanned"; waters to which other components have not been added that are used to control dust in accordance with the SWPPP; and uncontaminated *discharge*s from *construction site* de-watering operations. All non-stormwater discharges must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with *water quality standards* in Part I.D of this permit.

4. The *owner or operator* must maintain permit eligibility to *discharge* under this permit. Any *discharges* that are not compliant with the eligibility conditions of this permit are not authorized by the permit and the *owner or operator* must either apply for a separate permit to cover those ineligible *discharges* or take steps necessary to make the *discharge* eligible for coverage.

F. Activities Which Are Ineligible for Coverage Under This General Permit

All of the following are **<u>not</u>** authorized by this permit:

1. *Discharge*s after *construction activities* have been completed and the site has undergone *final stabilization*;

2. *Discharge*s that are mixed with sources of non-stormwater other than those expressly authorized under subsection E.3. of this Part and identified in the SWPPP required by this permit;

3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII.K. of this permit;

4. *Construction activities* or *discharges* from *construction activities* that may adversely affect an *endangered or threatened species* unless the *owner or*

operator has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.D.2 of this permit;

5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;

6. *Construction activities* for residential, commercial and institutional projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which are undertaken on land with no existing *impervious cover*; and

   c. Which disturb one (1) or more acres of land designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.

7. *Construction activities* for linear transportation projects and linear utility projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which are undertaken on land with no existing *impervious cover*; and

   c. Which disturb two (2) or more acres of land designated on the current USDA Soil Survey as Soil Slope Phase "D" (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.

8. *Construction activities* that have the potential to affect an *historic property*, unless there is documentation that such impacts have been resolved. The following documentation necessary to demonstrate eligibility with this requirement shall be maintained on site in accordance with Part II.D.2 of this permit and made available to the Department in accordance with Part VII.F of this permit:

   a. Documentation that the *construction activity* is not within an archeologically sensitive area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the *construction site* within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the *construction site* within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant.

      - 1-5 acres of disturbance - 20 feet
      - 5-20 acres of disturbance - 50 feet
      - 20+ acres of disturbance - 100 feet, or

   b. DEC consultation form sent to OPRHP, and copied to the NYS DEC Agency Historic Preservation Officer (APO), and
      (i) the State Environmental Quality Review (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP’s agreement with the resolution; or
      (ii) documentation from OPRHP that the *construction activity* will result in No Impact; or
      (iii) documentation from OPRHP providing a determination of No Adverse Impact; or
      (iv) a Letter of Resolution signed by the owner/operator, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA); or

   c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:

(i) No Affect
(ii) No Adverse Affect
(iii) Executed Memorandum of Agreement, or

d. Documentation that:

(i) SHPA Section 14.09 has been completed by NYS DEC or another state agency.

9. *Discharge*s from *construction activities* that are subject to an existing SPDES individual or general permit where a SPDES permit for *construction activity* has been terminated or denied; or where the *owner or operator* has failed to renew an expired individual permit.

Part II. PERMIT COVERAGE

A. How to Obtain Coverage

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a regulated, traditional land use control MS4 must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed Notice of Intent (NOI) to the Department to be authorized to discharge under this permit.

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then have the SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the “MS4 SWPPP Acceptance” form signed in accordance with Part VII.H., and then submit that form along with a completed NOI to the Department.

3. The requirement for an *owner or operator* to have its SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.F. (Change of *Owner or Operator*) or where the *owner or operator* of the *construction activity* is the *regulated, traditional land use control MS4* . This exemption does not apply to *construction activities* subject to the New York City Administrative Code.

B. Notice of Intent (NOI) Submittal

1. Prior to December 21, 2020, an owner or operator shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (http://www.dec.ny.gov/). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address:

   NOTICE OF INTENT
   NYS DEC, Bureau of Water Permits
   625 Broadway, 4th Floor
   Albany, New York 12233-3505

2. Beginning December 21, 2020 and in accordance with EPA's 2015 NPDES Electronic Reporting Rule (40 CFR Part 127), the *owner or operator* must submit the NOI electronically using the *Department's* online NOI.

3. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.

4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

C. Permit Authorization

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.

2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied all of the following criteria:

   a. project review pursuant to the State Environmental Quality Review Act ("SEQRA") have been satisfied, when SEQRA is applicable. See the Department's website (http://www.dec.ny.gov/) for more information,

   b. where required, all necessary Department permits subject to the *Uniform Procedures Act ("UPA")* (see 6 NYCRR Part 621), or the equivalent from another New York State agency, have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators* of *construction activities* that are required to obtain *UPA* permits must submit a preliminary SWPPP to the appropriate DEC Permit Administrator at the Regional Office listed in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,

c. the final SWPPP has been prepared, and

d. a complete NOI has been submitted to the Department in accordance with the requirements of this permit.

3. An *owner or operator* that has satisfied the requirements of Part II.C.2 above will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

   a. For *construction activities* that are not subject to the requirements of a *regulated, traditional land use control MS4*:

      (i) Five (5) business days from the date the Department receives a complete electronic version of the NOI (eNOI) for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.; or

      (ii) Sixty (60) business days from the date the Department receives a complete NOI (electronic or paper version) for *construction activities* with a SWPPP that has not been prepared in conformance with the design criteria in technical standard referenced in Part III.B.1. or, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C., the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, or;

      (iii) Ten (10) business days from the date the Department receives a complete paper version of the NOI for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.

b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:

(i) Five (5) business days from the date the Department receives both a complete electronic version of the NOI (eNOI) and signed "*MS4* SWPPP Acceptance" form, or

(ii) Ten (10) business days from the date the Department receives both a complete paper version of the NOI and signed "MS4 SWPPP Acceptance" form.

4. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department. The *owner or operator* shall not *commence construction activity* on the future or additional areas until their authorization to *discharge* under this permit goes into effect in accordance with Part II.C. of this permit.

D. General Requirements For Owners or Operators With Permit Coverage

1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination ("NOT") has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4. of this permit.

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-20-001), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, responsible contractor's or subcontractor's certification statement (see Part III.A.6.), and all documentation necessary to demonstrate eligibility with this permit at the *construction site* until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land* *use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*). At a minimum, the *owner or operator* must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:

a. The *owner or operator* shall have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. of this permit every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

b. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016.

c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

d. The *owner or operator* shall install any additional site-specific practices needed to protect water quality.

e. The *owner or operator* shall include the requirements above in their SWPPP.

4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements or consistent with Part VII.K..

5. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

6. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*, the *owner or operator* shall notify the

regulated, traditional land use control MS4 in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *regulated, traditional land use control MS4*, the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *regulated, traditional land use control MS4* prior to commencing construction of the post-construction stormwater management practice.

E. Permit Coverage for Discharges Authorized Under GP-0-15-002

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-15-002), an *owner or operator* of *a construction activity* with coverage under GP-0-15-002, as of the effective date of GP- 0-20-001, shall be authorized to *discharge* in accordance with GP- 0-20-001, unless otherwise notified by the Department.

   An *owner or operator* may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-20-001.

F. Change of Owner or Operator

1. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, <u>in writing,</u> of the requirement to obtain permit coverage by submitting a NOI with the Department. For *construction activities* subject to the requirements of a *regulated, traditional land use control MS4,* the original *owner or operator* must also notify the MS4, in writing, of the change in ownership at least 30 calendar days prior to the change in ownership.

2. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.B.1. of this permit. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

3. Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or*

operator was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

1. A SWPPP shall be prepared and implemented by the *owner or operator* of each *construction activity* covered by this permit. The SWPPP must document the selection, design, installation, implementation and maintenance of the control measures and practices that will be used to meet the effluent limitations in Part I.B. of this permit and where applicable, the post-construction stormwater management practice requirements in Part I.C. of this permit. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*. A copy of the completed, final NOI shall be included in the SWPPP.

2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the *pollutants* in stormwater *discharges* and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.

3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.

4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP, including construction drawings:

    a. whenever the current provisions prove to be ineffective in minimizing *pollutants* in stormwater *discharges* from the site;

b. whenever there is a change in design, construction, or operation at the *construction site* that has or could have an effect on the *discharge* of *pollutants*;

c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* the Department or other regulatory authority; and

d. to document the final construction conditions.

5. The Department may notify the *owner or operator* at any time that the SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.D.4. of this permit.

6. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor.* The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.

   The *owner or operator* shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

   "I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater *discharge*s from *construction activities* and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the *construction site*. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

   a. Background information about the scope of the project, including the location, type and size of project

b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours ; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater *discharge*(s);

c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);

d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;

e. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;

f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;

g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016;

j. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the stormwater *discharges*;

k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the *construction site*; and

l. Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. Post-construction stormwater management practice component – The *owner or operator* of any construction project identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the applicable *sizing criteria* in Part I.C.2.a., c. or d. of this permit and the *performance criteria* in the technical standard, New York State Stormwater Management Design Manual dated January 2015

   Where post-construction stormwater management practices are not designed in conformance with the *performance criteria* in the technical standard, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

   The post-construction stormwater management practice component of the SWPPP shall include the following:

   a. Identification of all post-construction stormwater management practices to be constructed as part of the project. Include the dimensions, material specifications and installation details for each post-construction stormwater management practice;

b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;

c. A Stormwater Modeling and Analysis Report that includes:
   (i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points;

   (ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and post-construction stormwater management practices;

   (iii) Results of stormwater modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre and post-development runoff rates and volumes for the different storm events;

   (iv) Summary table, with supporting calculations, which demonstrates that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;

   (v) Identification of any *sizing criteria* that is not required based on the requirements included in Part I.C. of this permit; and

   (vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the Design Manual. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the Design Manual;

d. Soil testing results and locations (test pits, borings);

e. Infiltration test results, when required; and

f. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the applicable *sizing criteria* in Part I.C.2. b., c. or d. of this permit and the *performance criteria,* Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.f. above.

C. Required SWPPP Components by Project Type

Unless otherwise notified by the Department, *owners or operators* of *construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1 of this permit. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3 of this permit.

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures) and all post-construction stormwater management practices identified in the SWPPP are inspected and maintained in accordance with Part IV.B. and C. of this permit.

2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York or protect the public health and safety and/or the environment.

B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity* identified in Tables 1 and 2 of Appendix B shall have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor shall

begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.

2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections. The *trained contractor* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. of this permit as soon as soil disturbance activities resume.

3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* <u>and</u> all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

C. Qualified Inspector Inspection Requirements

The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. and IV.B. of this permit **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- New York State Erosion and Sediment Control Certificate Program holder
- Registered Landscape Architect, or
- someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, <u>with the exception of</u>:

    a. the construction of a single family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is <u>not</u> located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and

d. *construction activities* located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:

   a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.

   b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.D.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

   c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to reducing the frequency of inspections.

d. For construction sites where soil disturbance activities have been shut down with partial project completion, the *qualified inspector* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization,* and all temporary, structural erosion and sediment control measures have been removed*;* and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The *owner or operator* shall then submit the completed NOT form to the address in Part II.B.1 of this permit.

e. For construction sites that directly *discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization,* all points of *discharge* to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the *construction site*, and all points of *discharge* from the *construction site*.

4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

a. Date and time of inspection;

b. Name and title of person(s) performing inspection;

c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

d. A description of the condition of the runoff at all points of *discharge* from the *construction site*. This shall include identification of any *discharges* of sediment from the *construction site*. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;

e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the *construction site* which receive runoff from disturbed areas. This shall include identification of any *discharges* of sediment to the surface waterbody;

f. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;

g. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;

h. Description and sketch of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection;

i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s);

k. Identification and status of all corrective actions that were required by previous inspection; and

l. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of this permit of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

6. All inspection reports shall be signed by the *qualified inspector.* Pursuant to Part II.D.2. of this permit, the inspection reports shall be maintained on site with the SWPPP.

Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.B.1 of this permit. The NOT form shall be one which is associated with this permit, signed in accordance with Part VII.H of this permit.

2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:

   a. Total project completion - All *construction activity* identified in the SWPPP has been completed; <u>and</u> all areas of disturbance have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; <u>and</u> all areas disturbed as of the project shutdown date have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;

c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.F. of this permit.

d. The *owner or operator* obtains coverage under an alternative SPDES general permit or an individual SPDES permit.

3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice certification statements on the NOT, certify that all the requirements in Part V.A.2.a. or b. of this permit have been achieved.

4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *regulated, traditional land use control MS4* sign the "MS4 Acceptance" statement on the NOT in accordance with the requirements in Part VII.H. of this permit. The *regulated, traditional land use control MS4* official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The *regulated, traditional land use control MS4* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*'s final site inspection certification(s) required in Part V.A.3. of this permit.

5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:

a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,

b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),

c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record,

d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility; the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

Part VI. REPORTING AND RETENTION RECORDS

A. Record Retention

The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the Department receives a complete NOT submitted in accordance with Part V. of this general permit.

B. Addresses

With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.B.1 of this permit), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate DOW Water (SPDES) Program contact at the Regional Office listed in Appendix F.

Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply

The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water

Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE). *Construction activity* shall not resume until written permission to do so has been received from the RWE.

B. Continuation of the Expired General Permit

This permit expires five (5) years from the effective date. If a new general permit is not issued prior to the expiration of this general permit, an *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the terms and conditions of this general permit, if it is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, until a new general permit is issued.

C. Enforcement

Failure of the *owner or operator,* its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

E. Duty to Mitigate

The *owner or operator* and its contractors and subcontractors shall take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. Duty to Provide Information

The *owner or operator* shall furnish to the Department, within a reasonable specified time period of a written request, all documentation necessary to demonstrate eligibility and any information to determine compliance with this permit or to determine whether cause exists for modifying or revoking this permit, or suspending or denying coverage under this permit, in accordance with the terms and conditions of this permit. The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester’s expense.

G. Other Information

When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any of the documents required by this permit , or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or *impervious area*), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department using the contact information in Part II.A. of this permit. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. Signatory Requirements

1. All NOIs and NOTs shall be signed as follows:

    a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

(i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

(ii) the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(i) the chief executive officer of the agency, or

(ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Part VII.H.1. of this permit;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of *equivalent* responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position) and,

c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.

3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.

4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4,* or by a duly authorized representative of that person.

   It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

I. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity*.

J. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any owner or operator authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any discharger authorized by a general permit to apply for an individual SPDES permit, it shall notify the discharger in writing that a permit application is required. This notice shall

include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the owner or operator to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from owner or operator receipt of the notification letter, whereby the authorization to discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. When an individual SPDES permit is issued to a discharger authorized to *discharge* under a general SPDES permit for the same *discharge*(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

L. Proper Operation and Maintenance

The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

M. Inspection and Entry

The *owner or operator* shall allow an authorized representative of the Department, EPA, applicable county health department, or, in the case of a *construction site* which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the owner’s or operator's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), practices or operations regulated or required by this permit.

4. Sample or monitor at reasonable times, for purposes of assuring permit compliance or as otherwise authorized by the Act or ECL, any substances or parameters at any location.

N. Permit Actions

This permit may, at any time, be modified, suspended, revoked, or renewed by the Department in accordance with 6 NYCRR Part 621. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

O. Definitions

Definitions of key terms are included in Appendix A of this permit.

P. Re-Opener Clause

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with construction activity covered by this permit, the owner or operator of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.

2. Any Department initiated permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

Q. Penalties for Falsification of Forms and Reports

In accordance with 6NYCRR Part 750-2.4 and 750-2.5, any person who knowingly makes any false material statement, representation, or certification in any application, record, report or other document filed or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished in accordance with ECL §71-1933 and or Articles 175 and 210 of the New York State Penal Law.

R. Other Permits

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

APPENDIX A – Acronyms and Definitions

Acronyms

APO – Agency Preservation Officer
BMP – Best Management Practice
CPESC – Certified Professional in Erosion and Sediment Control
Cpv – Channel Protection Volume
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
DOW – Division of Water
EAF – Environmental Assessment Form
ECL - Environmental Conservation Law
EPA – U. S. Environmental Protection Agency
HSG – Hydrologic Soil Group
MS4 – Municipal Separate Storm Sewer System
NOI – Notice of Intent
NOT – Notice of Termination
NPDES – National Pollutant Discharge Elimination System
OPRHP – Office of Parks, Recreation and Historic Places
Qf – Extreme Flood
Qp – Overbank Flood
RRv – Runoff Reduction Volume
RWE – Regional Water Engineer
SEQR – State Environmental Quality Review
SEQRA - State Environmental Quality Review Act
SHPA – State Historic Preservation Act
SPDES – State Pollutant Discharge Elimination System
SWPPP – Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
UPA – Uniform Procedures Act
USDA – United States Department of Agriculture
WQv – Water Quality Volume

Definitions

All definitions in this section are solely for the purposes of this permit.

Agricultural Building – a structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products; excluding any structure designed, constructed or used, in whole or in part, for human habitation, as a place of employment where agricultural products are processed, treated or packaged, or as a place used by the public.

Agricultural Property –means the land for construction of a barn, *agricultural building*, silo, stockyard, pen or other structural practices identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" prepared by the Department in cooperation with agencies of New York Nonpoint Source Coordinating Committee (dated June 2007).

Alter Hydrology from Pre to Post-Development Conditions - means the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer - means a sewer that is designed to collect and convey both "sewage" and "stormwater".

Commence (Commencement of) Construction Activities - means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for "*Construction Activity(ies)*" also.

Construction Activity(ies) - means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Construction Site – means the land area where *construction activity(ies)* will occur. See definition for "*Commence (Commencement of) Construction Activities"* and "*Larger Common Plan of Development or Sale" also.*

Dewatering – means the act of draining rainwater and/or groundwater from building foundations, vaults or excavations/trenches.

Direct Discharge (to a specific surface waterbody) - means that runoff flows from a *construction site* by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a *construction site* to a separate storm sewer system and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

Discharge(s) - means any addition of any pollutant to waters of the State through an outlet or *point source*.

Embankment –means an earthen or rock slope that supports a road/highway.

Endangered or Threatened Species – see 6 NYCRR Part 182 of the Department's rules and regulations for definition of terms and requirements.

Environmental Conservation Law (ECL) - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

Equivalent (Equivalence) – means that the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 and Section 70-0117 of the ECL authorizing a category of discharges.

Groundwater(s) - means waters in the saturated zone. The saturated zone is a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

Historic Property – means any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State or National Registers of Historic Places.

Impervious Area (Cover) - means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Infeasible – means not technologically possible, or not economically practicable and achievable in light of best industry practices.

Larger Common Plan of Development or Sale - means a contiguous area where multiple separate and distinct *construction activities* are occurring, or will occur, under one plan. The term “plan” in “larger common plan of development or sale” is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that *construction activities* may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same “common plan” is not concurrently being disturbed.

Minimize – means reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

- (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State*;*
- (ii) Designed or used for collecting or conveying stormwater;
- (iii) Which is not a *combined sewer*; and
- (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES) - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

Natural Buffer –means an undisturbed area with natural cover running along a surface water (e.g. wetland, stream, river, lake, etc.).

New Development – means any land disturbance that does not meet the definition of Redevelopment Activity included in this appendix.

New York State Erosion and Sediment Control Certificate Program – a certificate program that establishes and maintains a process to identify and recognize individuals who are capable of developing, designing, inspecting and maintaining erosion and sediment control plans on projects that disturb soils in New York State. The certificate program is administered by the New York State Conservation District Employees Association.

NOI Acknowledgment Letter - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from *construction activity*.

Nonpoint Source - means any source of water pollution or pollutants which is not a discrete conveyance or *point source* permitted pursuant to Title 7 or 8 of Article 17 of the Environmental Conservation Law (see ECL Section 17-1403).

Overbank –means flow events that exceed the capacity of the stream channel and spill out into the adjacent floodplain.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications; and/or an entity that has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions.

Performance Criteria – means the design criteria listed under the "Required Elements" sections in Chapters 5, 6 and 10 of the technical standard, New York State Stormwater Management Design Manual, dated January 2015. It does not include the Sizing Criteria (i.e. WQv, RRv, Cpv, Qp and Qf) in Part I.C.2. of the permit.

Point Source - means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft, or landfill leachate collection system from which *pollutants* are or may be discharged.

Pollutant - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq .

Qualified Inspector - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, New York State Erosion and Sediment Control Certificate Program holder or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional - means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

Redevelopment Activity(ies) – means the disturbance and reconstruction of existing impervious area, including impervious areas that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is authorized to discharge under New York State DEC's

SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s) or the City of New York's Individual SPDES Permit for their Municipal Separate Storm Sewer Systems (NY-0287890).

Routine Maintenance Activity - means *construction activity* that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),
- Placement of aggregate shoulder backing that stabilizes the transition between the road shoulder and the ditch or *embankment*,
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or *embankment*,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

Site limitations – means site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical site limitations include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of site limitations shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

Sizing Criteria – means the criteria included in Part I.C.2 of the permit that are used to size post-construction stormwater management control practices. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), *Overbank* Flood (Qp), and Extreme Flood (Qf).

State Pollutant Discharge Elimination System (SPDES) - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Steep Slope – means land area designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name is inclusive of slopes greater than 25%) , or Soil Slope Phase E or F, (regardless of the map unit name), or a combination of the three designations.

Streambank – as used in this permit, means the terrain alongside the bed of a creek or stream. The bank consists of the sides of the channel, between which the flow is confined.

Stormwater Pollution Prevention Plan (SWPPP) – means a project specific report, including construction drawings, that among other things: describes the construction activity(ies), identifies the potential sources of pollution at the *construction site*; describes and shows the stormwater controls that will be used to control the pollutants (i.e. erosion and sediment controls; for many projects, includes post-construction stormwater management controls); and identifies procedures the *owner or operator* will implement to comply with the terms and conditions of the permit. See Part III of the permit for a complete description of the information that must be included in the SWPPP.

Surface Waters of the State - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporarily Ceased – means that an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Loads (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and *nonpoint source*s. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet *water quality standards*, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for *point source* discharges, load allocations (LAs) for *nonpoint source*s, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, New York State Erosion and Sediment Control Certificate Program holder, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* is responsible for the day to day implementation of the SWPPP.

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part 621 of the Environmental Conservation Law (ECL), Article 70.

Water Quality Standard - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B – Required SWPPP Components by Project Type

Table 1
Construction Activities that Require the Preparation of a SWPPP That Only Includes Erosion and Sediment Controls

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres: • Single family home not located in one of the watersheds listed in Appendix C or not *directly discharging* to one of the 303(d) segments listed in Appendix E • Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E • Construction of a barn or other *agricultural building*, silo, stock yard or pen.
The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land: All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.
The following construction activities that involve soil disturbances of one (1) or more acres of land: • Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains • Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects • Pond construction • Linear bike paths running through areas with vegetative cover, including bike paths surfaced with an impervious cover • Cross-country ski trails and walking/hiking trails • Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are not part of residential, commercial or institutional development; • Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that include incidental shoulder or curb work along an existing highway to support construction of the sidewalk, bike path or walking path. • Slope stabilization projects • Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics

Table 1 (Continued) CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Spoil areas that will be covered with vegetation
- Vegetated open space projects (i.e. recreational parks, lawns, meadows, fields, downhill ski trails) excluding projects that *alter hydrology from pre to post development* conditions,
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions
- Demolition project where vegetation will be established, and no redevelopment is planned
- Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*
- Structural practices as identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State”, excluding projects that involve soil disturbances of greater than five acres and construction activities that include the construction or reconstruction of impervious area
- Temporary access roads, median crossovers, detour roads, lanes, or other temporary impervious areas that will be restored to pre-construction conditions once the construction activity is complete

Table 2

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family home that disturbs five (5) or more acres of land
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes duplexes, townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Breweries, cideries, and wineries, including establishments constructed on agricultural land
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other *agricultural building* (e.g. silo) and structural practices as identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State” that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional development; includes hospitals, prisons, schools and colleges
- Industrial facilities; includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW’s, water treatment plants, and water storage tanks
- Office complexes
- Playgrounds that include the construction or reconstruction of impervious area
- Sports complexes
- Racetracks; includes racetracks with earthen (dirt) surface
- Road construction or reconstruction, including roads constructed as part of the construction activities listed in Table 1

Table 2 (Continued)

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Parking lot construction or reconstruction, including parking lots constructed as part of the construction activities listed in Table 1
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover,* and constructed as part of an over-head electric transmission line project, wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a residential, commercial or institutional development
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a highway construction or reconstruction project
- All other construction activities that include the construction or reconstruction of *impervious area* <u>or</u> *alter the hydrology from pre to post development* conditions, <u>and</u> are not listed in Table 1

APPENDIX C – Watersheds Requiring Enhanced Phosphorus Removal

Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

- Entire New York City Watershed located east of the Hudson River **-** Figure 1
- Onondaga Lake Watershed **-** Figure 2
- Greenwood Lake Watershed **-**Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

Figure 1 - New York City Watershed East of the Hudson

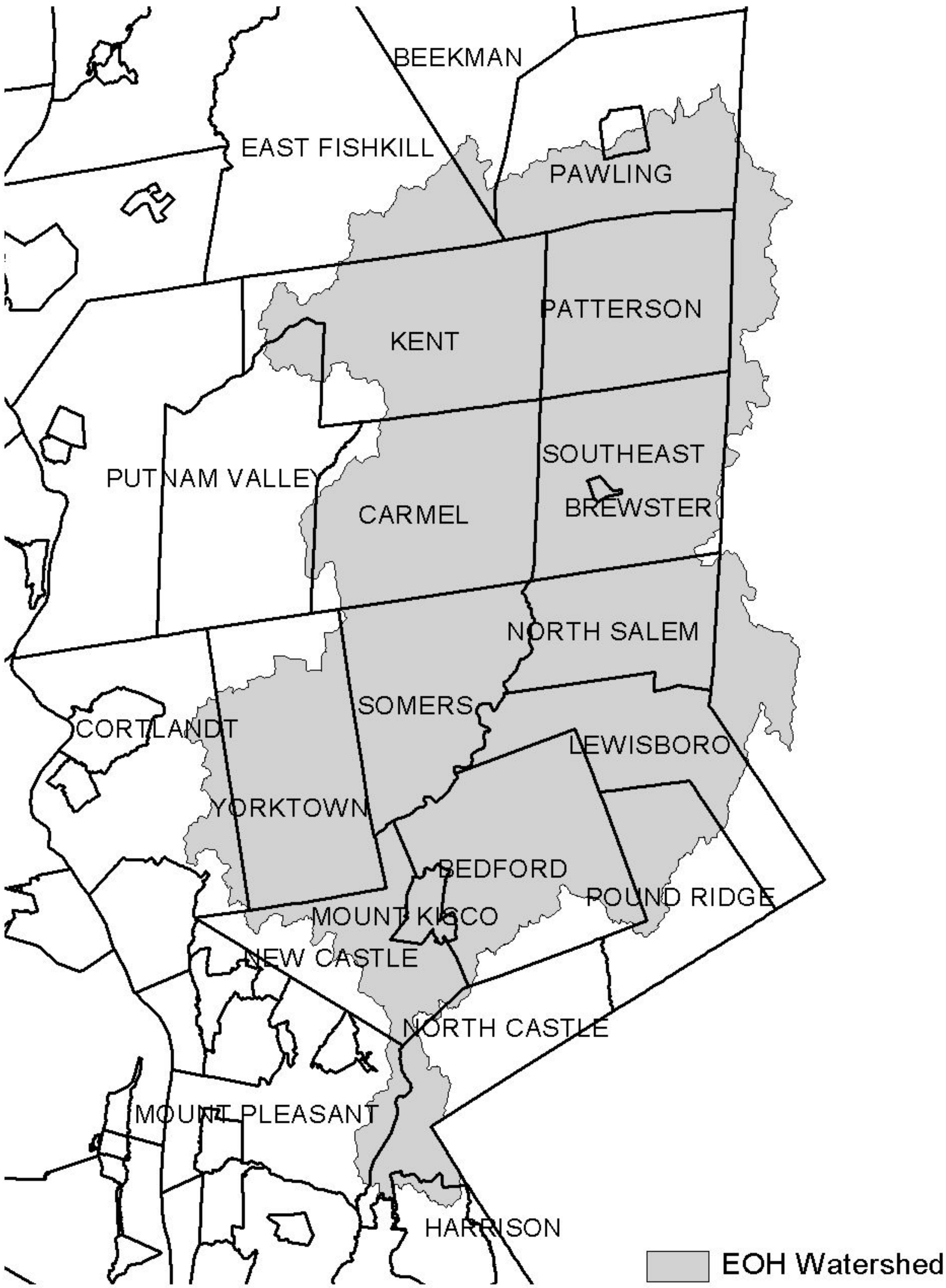


Figure 2 - Onondaga Lake Watershed

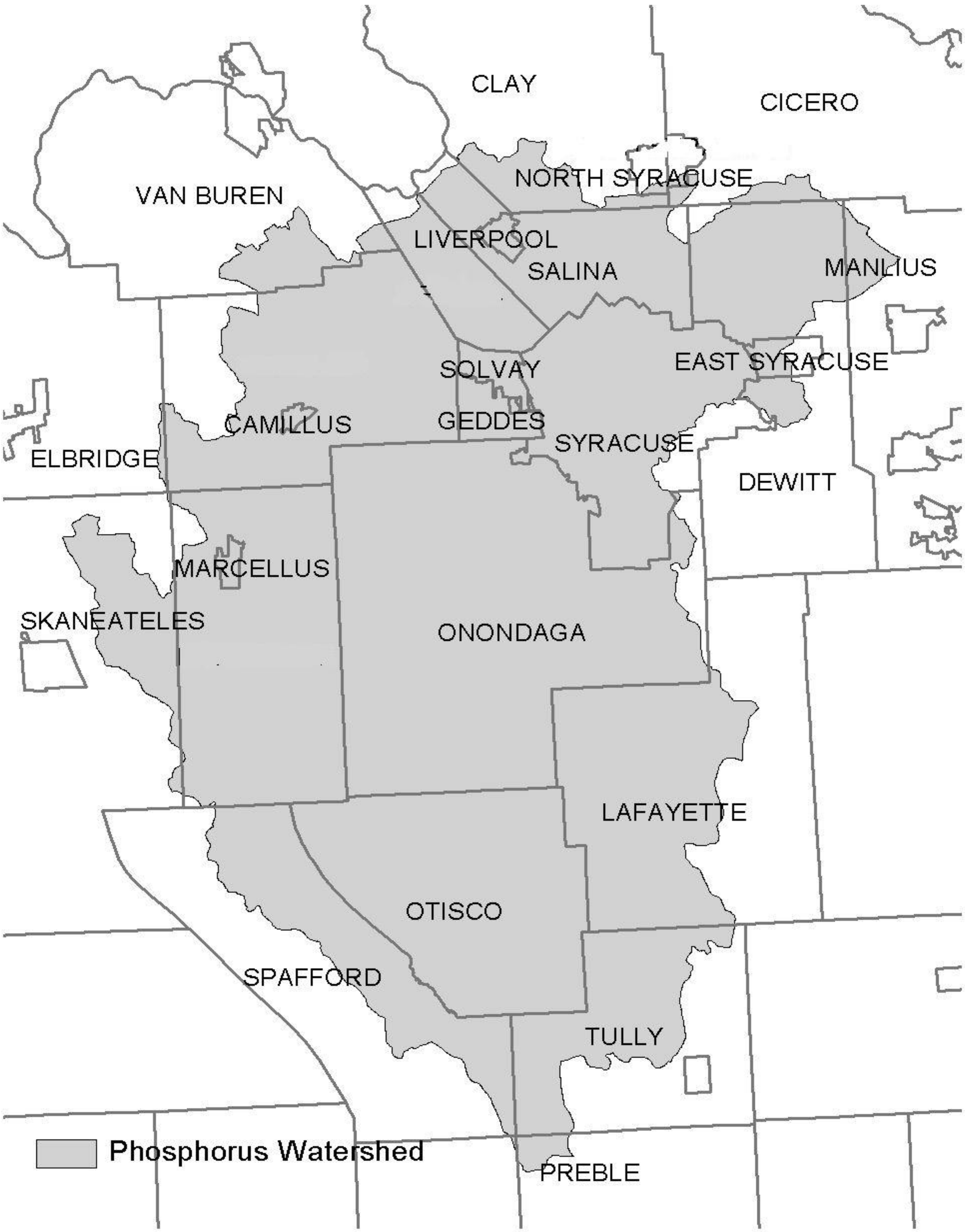


Figure 3 - Greenwood Lake Watershed

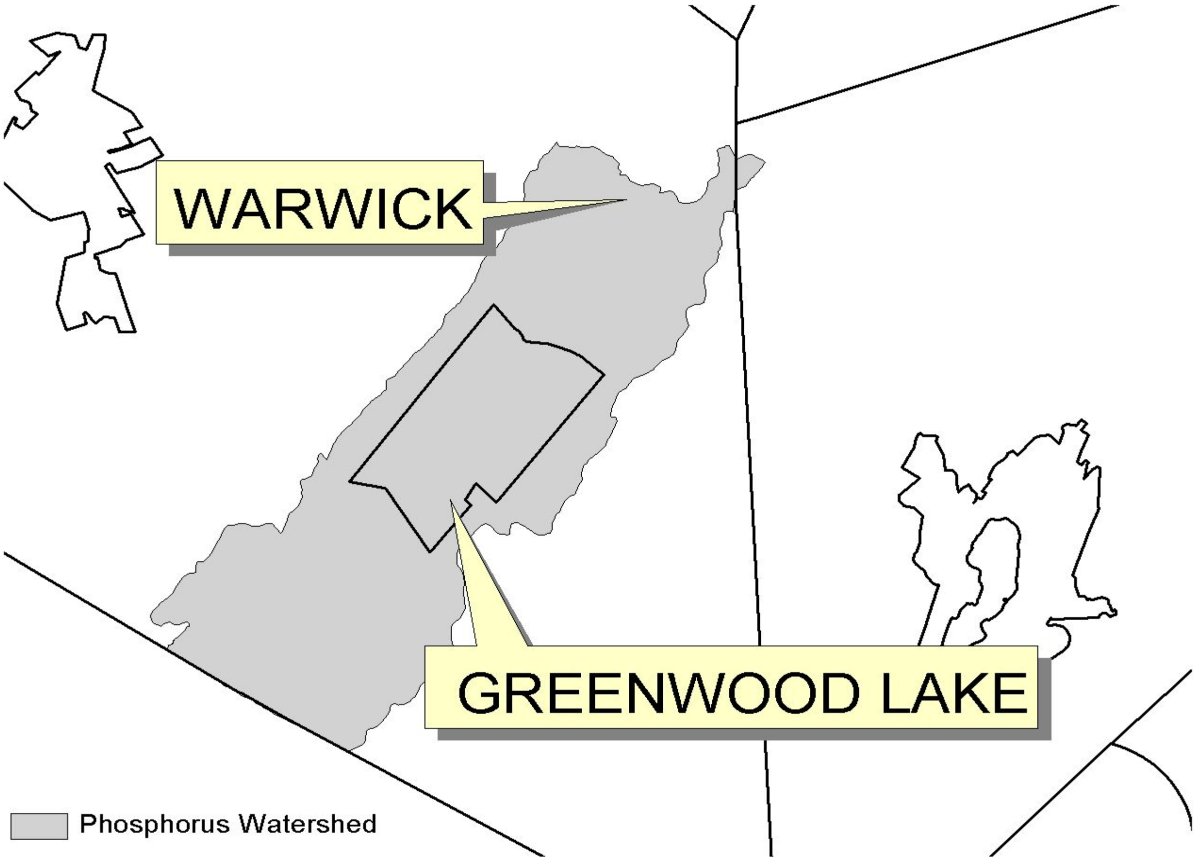


Figure 4 - Oscawana Lake Watershed

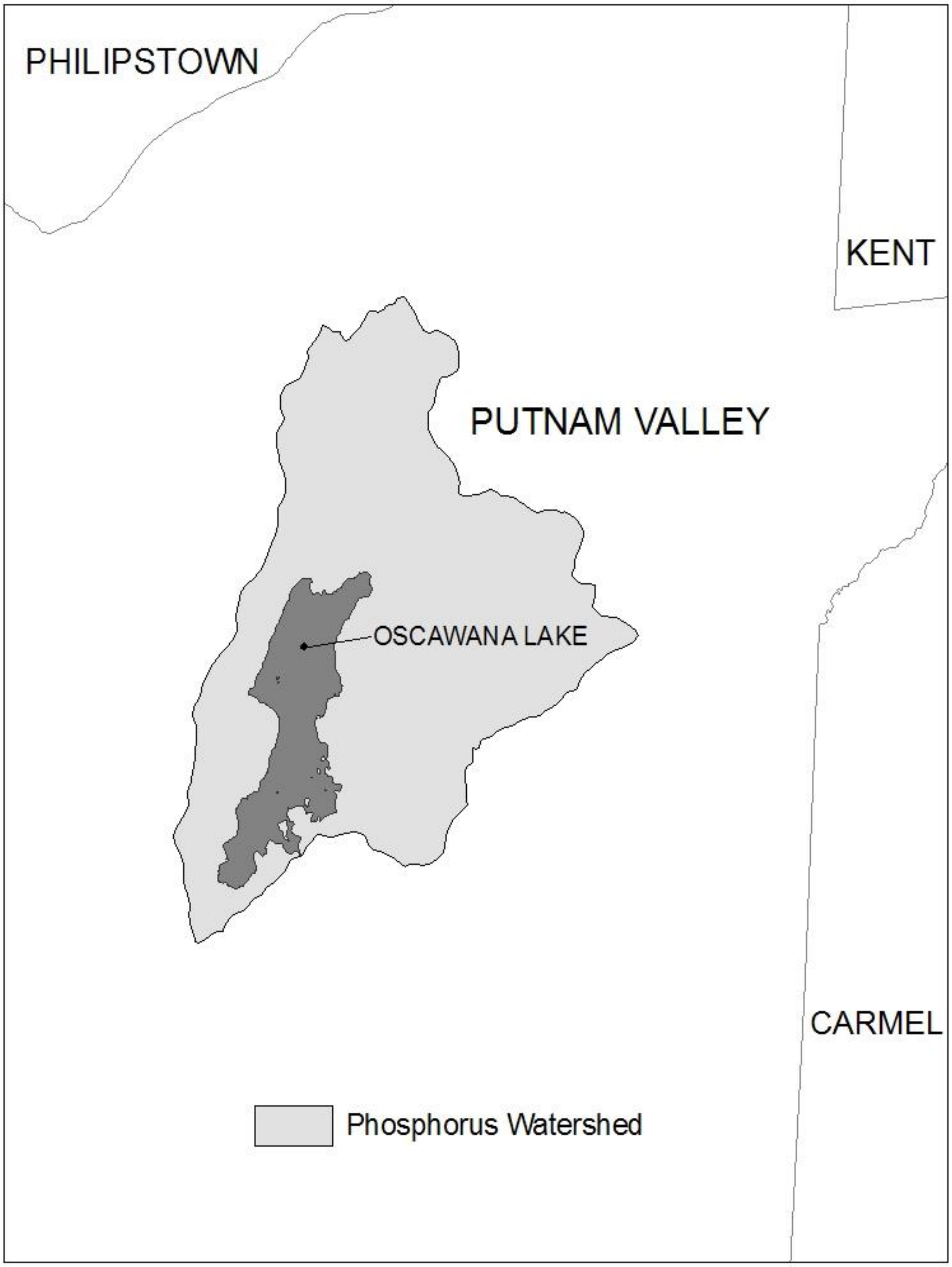
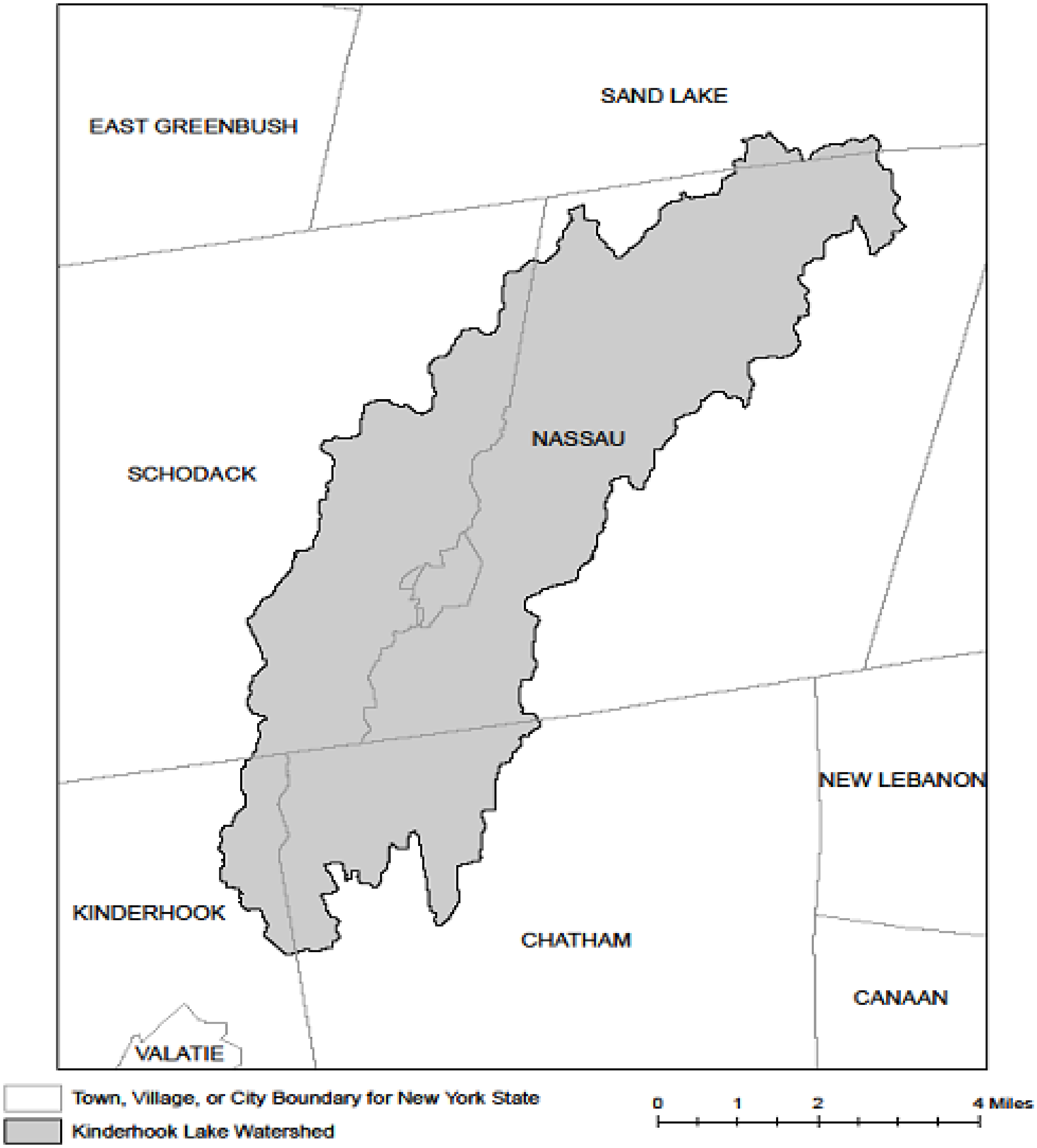


Figure 5 - Kinderhook Lake Watershed



APPENDIX D – Watersheds with Lower Disturbance Threshold

Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.

Entire New York City Watershed that is located east of the Hudson River **-** See Figure 1 in Appendix C

APPENDIX E – 303(d) Segments Impaired by Construction Related Pollutant(s)

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). The list was developed using "The Final New York State 2016 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy" dated November 2016. *Owners or operators* of single family home and single family residential subdivisions with 25% or less total impervious cover at total site build-out that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015.

COUNTY	WATERBODY	POLLUTANT
Albany	Ann Lee (Shakers) Pond, Stump Pond	Nutrients
Albany	Basic Creek Reservoir	Nutrients
Allegany	Amity Lake, Saunders Pond	Nutrients
Bronx	Long Island Sound, Bronx	Nutrients
Bronx	Van Cortlandt Lake	Nutrients
Broome	Fly Pond, Deer Lake, Sky Lake	Nutrients
Broome	Minor Tribs to Lower Susquehanna (north)	Nutrients
Broome	Whitney Point Lake/Reservoir	Nutrients
Cattaraugus	Allegheny River/Reservoir	Nutrients
Cattaraugus	Beaver (Alma) Lake	Nutrients
Cattaraugus	Case Lake	Nutrients
Cattaraugus	Linlyco/Club Pond	Nutrients
Cayuga	Duck Lake	Nutrients
Cayuga	Little Sodus Bay	Nutrients
Chautauqua	Bear Lake	Nutrients
Chautauqua	Chadakoin River and tribs	Nutrients
Chautauqua	Chautauqua Lake, North	Nutrients
Chautauqua	Chautauqua Lake, South	Nutrients
Chautauqua	Findley Lake	Nutrients
Chautauqua	Hulburt/Clymer Pond	Nutrients
Clinton	Great Chazy River, Lower, Main Stem	Silt/Sediment
Clinton	Lake Champlain, Main Lake, Middle	Nutrients
Clinton	Lake Champlain, Main Lake, North	Nutrients
Columbia	Kinderhook Lake	Nutrients
Columbia	Robinson Pond	Nutrients
Cortland	Dean Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Dutchess	Fall Kill and tribs	Nutrients
Dutchess	Hillside Lake	Nutrients
Dutchess	Wappingers Lake	Nutrients
Dutchess	Wappingers Lake	Silt/Sediment
Erie	Beeman Creek and tribs	Nutrients
Erie	Ellicott Creek, Lower, and tribs	Silt/Sediment
Erie	Ellicott Creek, Lower, and tribs	Nutrients
Erie	Green Lake	Nutrients
Erie	Little Sister Creek, Lower, and tribs	Nutrients
Erie	Murder Creek, Lower, and tribs	Nutrients
Erie	Rush Creek and tribs	Nutrients
Erie	Scajaquada Creek, Lower, and tribs	Nutrients
Erie	Scajaquada Creek, Middle, and tribs	Nutrients
Erie	Scajaquada Creek, Upper, and tribs	Nutrients
Erie	South Branch Smoke Cr, Lower, and tribs	Silt/Sediment
Erie	South Branch Smoke Cr, Lower, and tribs	Nutrients
Essex	Lake Champlain, Main Lake, South	Nutrients
Essex	Lake Champlain, South Lake	Nutrients
Essex	Willsboro Bay	Nutrients
Genesee	Bigelow Creek and tribs	Nutrients
Genesee	Black Creek, Middle, and minor tribs	Nutrients
Genesee	Black Creek, Upper, and minor tribs	Nutrients
Genesee	Bowen Brook and tribs	Nutrients
Genesee	LeRoy Reservoir	Nutrients
Genesee	Oak Orchard Cr, Upper, and tribs	Nutrients
Genesee	Tonawanda Creek, Middle, Main Stem	Nutrients
Greene	Schoharie Reservoir	Silt/Sediment
Greene	Sleepy Hollow Lake	Silt/Sediment
Herkimer	Steele Creek tribs	Silt/Sediment
Herkimer	Steele Creek tribs	Nutrients
Jefferson	Moon Lake	Nutrients
Kings	Hendrix Creek	Nutrients
Kings	Prospect Park Lake	Nutrients
Lewis	Mill Creek/South Branch, and tribs	Nutrients
Livingston	Christie Creek and tribs	Nutrients
Livingston	Conesus Lake	Nutrients
Livingston	Mill Creek and minor tribs	Silt/Sediment
Monroe	Black Creek, Lower, and minor tribs	Nutrients
Monroe	Buck Pond	Nutrients
Monroe	Cranberry Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Monroe	Lake Ontario Shoreline, Western	Nutrients
Monroe	Long Pond	Nutrients
Monroe	Mill Creek and tribs	Nutrients
Monroe	Mill Creek/Blue Pond Outlet and tribs	Nutrients
Monroe	Minor Tribs to Irondequoit Bay	Nutrients
Monroe	Rochester Embayment - East	Nutrients
Monroe	Rochester Embayment - West	Nutrients
Monroe	Shipbuilders Creek and tribs	Nutrients
Monroe	Thomas Creek/White Brook and tribs	Nutrients
Nassau	Beaver Lake	Nutrients
Nassau	Camaans Pond	Nutrients
Nassau	East Meadow Brook, Upper, and tribs	Silt/Sediment
Nassau	East Rockaway Channel	Nutrients
Nassau	Grant Park Pond	Nutrients
Nassau	Hempstead Bay	Nutrients
Nassau	Hempstead Lake	Nutrients
Nassau	Hewlett Bay	Nutrients
Nassau	Hog Island Channel	Nutrients
Nassau	Long Island Sound, Nassau County Waters	Nutrients
Nassau	Massapequa Creek and tribs	Nutrients
Nassau	Milburn/Parsonage Creeks, Upp, and tribs	Nutrients
Nassau	Reynolds Channel, west	Nutrients
Nassau	Tidal Tribs to Hempstead Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Silt/Sediment
Nassau	Tribs to Smith/Halls Ponds	Nutrients
Nassau	Woodmere Channel	Nutrients
New York	Harlem Meer	Nutrients
New York	The Lake in Central Park	Nutrients
Niagara	Bergholtz Creek and tribs	Nutrients
Niagara	Hyde Park Lake	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Oneida	Ballou, Nail Creeks and tribs	Nutrients
Onondaga	Harbor Brook, Lower, and tribs	Nutrients
Onondaga	Ley Creek and tribs	Nutrients
Onondaga	Minor Tribs to Onondaga Lake	Nutrients
Onondaga	Ninemile Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Middle, and tribs	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Onondaga	Onondaga Lake, northern end	Nutrients
Onondaga	Onondaga Lake, southern end	Nutrients
Ontario	Great Brook and minor tribs	Silt/Sediment
Ontario	Great Brook and minor tribs	Nutrients
Ontario	Hemlock Lake Outlet and minor tribs	Nutrients
Ontario	Honeoye Lake	Nutrients
Orange	Greenwood Lake	Nutrients
Orange	Monhagen Brook and tribs	Nutrients
Orange	Orange Lake	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Oswego	Lake Neatahwanta	Nutrients
Oswego	Pleasant Lake	Nutrients
Putnam	Bog Brook Reservoir	Nutrients
Putnam	Boyd Corners Reservoir	Nutrients
Putnam	Croton Falls Reservoir	Nutrients
Putnam	Diverting Reservoir	Nutrients
Putnam	East Branch Reservoir	Nutrients
Putnam	Lake Carmel	Nutrients
Putnam	Middle Branch Reservoir	Nutrients
Putnam	Oscawana Lake	Nutrients
Putnam	Palmer Lake	Nutrients
Putnam	West Branch Reservoir	Nutrients
Queens	Bergen Basin	Nutrients
Queens	Flushing Creek/Bay	Nutrients
Queens	Jamaica Bay, Eastern, and tribs (Queens)	Nutrients
Queens	Kissena Lake	Nutrients
Queens	Meadow Lake	Nutrients
Queens	Willow Lake	Nutrients
Rensselaer	Nassau Lake	Nutrients
Rensselaer	Snyders Lake	Nutrients
Richmond	Grasmere Lake/Bradys Pond	Nutrients
Rockland	Congers Lake, Swartout Lake	Nutrients
Rockland	Rockland Lake	Nutrients
Saratoga	Ballston Lake	Nutrients
Saratoga	Dwaas Kill and tribs	Silt/Sediment
Saratoga	Dwaas Kill and tribs	Nutrients
Saratoga	Lake Lonely	Nutrients
Saratoga	Round Lake	Nutrients
Saratoga	Tribs to Lake Lonely	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Schenectady	Collins Lake	Nutrients
Schenectady	Duane Lake	Nutrients
Schenectady	Mariaville Lake	Nutrients
Schoharie	Engleville Pond	Nutrients
Schoharie	Summit Lake	Nutrients
Seneca	Reeder Creek and tribs	Nutrients
St.Lawrence	Black Lake Outlet/Black Lake	Nutrients
St.Lawrence	Fish Creek and minor tribs	Nutrients
Steuben	Smith Pond	Nutrients
Suffolk	Agawam Lake	Nutrients
Suffolk	Big/Little Fresh Ponds	Nutrients
Suffolk	Canaan Lake	Silt/Sediment
Suffolk	Canaan Lake	Nutrients
Suffolk	Flanders Bay, West/Lower Sawmill Creek	Nutrients
Suffolk	Fresh Pond	Nutrients
Suffolk	Great South Bay, East	Nutrients
Suffolk	Great South Bay, Middle	Nutrients
Suffolk	Great South Bay, West	Nutrients
Suffolk	Lake Ronkonkoma	Nutrients
Suffolk	Long Island Sound, Suffolk County, West	Nutrients
Suffolk	Mattituck (Marratooka) Pond	Nutrients
Suffolk	Meetinghouse/Terrys Creeks and tribs	Nutrients
Suffolk	Mill and Seven Ponds	Nutrients
Suffolk	Millers Pond	Nutrients
Suffolk	Moriches Bay, East	Nutrients
Suffolk	Moriches Bay, West	Nutrients
Suffolk	Peconic River, Lower, and tidal tribs	Nutrients
Suffolk	Quantuck Bay	Nutrients
Suffolk	Shinnecock Bay and Inlet	Nutrients
Suffolk	Tidal tribs to West Moriches Bay	Nutrients
Sullivan	Bodine, Montgomery Lakes	Nutrients
Sullivan	Davies Lake	Nutrients
Sullivan	Evens Lake	Nutrients
Sullivan	Pleasure Lake	Nutrients
Tompkins	Cayuga Lake, Southern End	Nutrients
Tompkins	Cayuga Lake, Southern End	Silt/Sediment
Tompkins	Owasco Inlet, Upper, and tribs	Nutrients
Ulster	Ashokan Reservoir	Silt/Sediment
Ulster	Esopus Creek, Upper, and minor tribs	Silt/Sediment
Warren	Hague Brook and tribs	Silt/Sediment

303(d) Segments Impaired by Construction Related Pollutant(s)

Warren	Huddle/Finkle Brooks and tribs	Silt/Sediment
Warren	Indian Brook and tribs	Silt/Sediment
Warren	Lake George	Silt/Sediment
Warren	Tribs to L.George, Village of L George	Silt/Sediment
Washington	Cossayuna Lake	Nutrients
Washington	Lake Champlain, South Bay	Nutrients
Washington	Tribs to L.George, East Shore	Silt/Sediment
Washington	Wood Cr/Champlain Canal and minor tribs	Nutrients
Wayne	Port Bay	Nutrients
Westchester	Amawalk Reservoir	Nutrients
Westchester	Blind Brook, Upper, and tribs	Silt/Sediment
Westchester	Cross River Reservoir	Nutrients
Westchester	Lake Katonah	Nutrients
Westchester	Lake Lincolndale	Nutrients
Westchester	Lake Meahagh	Nutrients
Westchester	Lake Mohegan	Nutrients
Westchester	Lake Shenorock	Nutrients
Westchester	Long Island Sound, Westchester (East)	Nutrients
Westchester	Mamaroneck River, Lower	Silt/Sediment
Westchester	Mamaroneck River, Upper, and minor tribs	Silt/Sediment
Westchester	Muscoot/Upper New Croton Reservoir	Nutrients
Westchester	New Croton Reservoir	Nutrients
Westchester	Peach Lake	Nutrients
Westchester	Reservoir No.1 (Lake Isle)	Nutrients
Westchester	Saw Mill River, Lower, and tribs	Nutrients
Westchester	Saw Mill River, Middle, and tribs	Nutrients
Westchester	Sheldrake River and tribs	Silt/Sediment
Westchester	Sheldrake River and tribs	Nutrients
Westchester	Silver Lake	Nutrients
Westchester	Teatown Lake	Nutrients
Westchester	Titicus Reservoir	Nutrients
Westchester	Truesdale Lake	Nutrients
Westchester	Wallace Pond	Nutrients
Wyoming	Java Lake	Nutrients
Wyoming	Silver Lake	Nutrients

APPENDIX F – List of NYS DEC Regional Offices

Region	Covering the following counties:	Division of Environmental Permits (DEP) Permit Administrators	Division of Water (DOW) Water (SPDES) Program
1	Nassau and Suffolk	50 Circle Road Stony Brook, Ny 11790 Tel. (631) 444-0365	50 Circle Road Stony Brook, Ny 11790-3409 Tel. (631) 444-0405
2	Bronx, Kings, New York, Queens and Richmond	1 Hunters Point Plaza, 47-40 21st St. Long Island City, Ny 11101-5407 Tel. (718) 482-4997	1 Hunters Point Plaza, 47-40 21st St. Long Island City, Ny 11101-5407 Tel. (718) 482-4933
3	Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster and Westchester	21 South Putt Corners Road New Paltz, Ny 12561-1696 Tel. (845) 256-3059	100 Hillside Avenue, Suite 1w White Plains, Ny 10603 Tel. (914) 428 - 2505
4	Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie	1150 North Westcott Road Schenectady, Ny 12306-2014 Tel. (518) 357-2069	1130 North Westcott Road Schenectady, Ny 12306-2014 Tel. (518) 357-2045
5	Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren and Washington	1115 State Route 86, Po Box 296 Ray Brook, Ny 12977-0296 Tel. (518) 897-1234	232 Golf Course Road Warrensburg, Ny 12885-1172 Tel. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROADAVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7070

Appendix B: NYSDEC SPDES General Permit Forms

0644089821

NOTICE OF INTENT

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NYR (for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-20-001

All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

-IMPORTANT-

RETURN THIS FORM TO THE ADDRESS ABOVE

OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

Owner/Operator Contact Person First Name

Owner/Operator Mailing Address

City

State

Zip -

Phone (Owner/Operator) - -

Fax (Owner/Operator) - -

Email (Owner/Operator)

FED TAX ID - (not required for individuals)

Project Site Information

Project/Site Name

Street Address (NOT P.O. BOX)

Side of Street
○ **North** ○ **South** ○ **East** ○ **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)

State: N Y
Zip: -
County
DEC Region

Name of Nearest Cross Street

Distance to Nearest Cross Street (Feet)

Project In Relation to Cross Street
○ **North** ○ **South** ○ **East** ○ **West**

Tax Map Numbers
Section-Block-Parcel

Tax Map Numbers

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

www.dec.ny.gov/imsmaps/stormwater/viewer.htm

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site, go to the tool boxes on the top and choose "i"(identify). Then click on the center of your site and a new window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting)

Y Coordinates (Northing)
4

2. What is the nature of this construction project?

○ **New Construction**

○ **Redevelopment with increase in impervious area**

○ **Redevelopment with no increase in impervious area**

3. Select the predominant land use for both pre and post development conditions.
SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use

- ○ FOREST
- ○ PASTURE/OPEN LAND
- ○ CULTIVATED LAND
- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY
- ○ PARKING LOT
- ○ OTHER

Post-Development Future Land Use

- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION — Number of Lots
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ MUNICIPAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY (water, sewer, gas, etc.)
- ○ PARKING LOT
- ○ CLEARING/GRADING ONLY
- ○ DEMOLITION, NO REDEVELOPMENT
- ○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
- ○ OTHER

***Note**: for gas well drilling, non-high volume hydraulic fractured wells only

4. In accordance with the larger common plan of development or sale, enter the total project site area; the total area to be disturbed; existing impervious area to be disturbed (for redevelopment activities); and the future impervious area constructed within the disturbed area. (Round to the nearest tenth of an acre.)

Total Site Area	**Total Area To Be Disturbed**	**Existing Impervious Area To Be Disturbed**	**Future Impervious Area Within Disturbed Area**
.	.	.	.

5. Do you plan to disturb more than 5 acres of soil at any one time? ○ **Yes** ○ **No**

6. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

A	**B**	**C**	**D**
%	%	%	%

7. Is this a phased project? ○ **Yes** ○ **No**

8. Enter the planned start and end dates of the disturbance activities.

Start Date / / - **End Date** / /

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.

Name

9a. Type of waterbody identified in Question 9?

- ○ Wetland / State Jurisdiction On Site (Answer 9b)
- ○ Wetland / State Jurisdiction Off Site
- ○ Wetland / Federal Jurisdiction On Site (Answer 9b)
- ○ Wetland / Federal Jurisdiction Off Site
- ○ Stream / Creek On Site
- ○ Stream / Creek Off Site
- ○ River On Site
- ○ River Off Site
- ○ Lake On Site
- ○ Lake Off Site
- ○ Other Type On Site
- ○ Other Type Off Site

9b. How was the wetland identified?

- ○ Regulatory Map
- ○ Delineated by Consultant
- ○ Delineated by Army Corps of Engineers
- ○ Other (identify)

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-20-001? ○ **Yes** ○ **No**

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-20-001? ○ **Yes** ○ **No**

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? ○ **Yes** ○ **No**
If no, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey? ○ **Yes** ○ **No**
If Yes, what is the acreage to be disturbed?

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area? ○ **Yes** ○ **No**

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)? ○ Yes ○ No ○ Unknown

16. What is the name of the municipality/entity that owns the separate storm sewer system?

17. Does any runoff from the site enter a sewer classified as a Combined Sewer? ○ Yes ○ No ○ Unknown

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law? ○ Yes ○ No

19. Is this property owned by a state authority, state agency, federal government or local government? ○ Yes ○ No

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.) ○ Yes ○ No

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)? ○ Yes ○ No

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)? ○ Yes ○ No
If No, skip questions 23 and 27-39.

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual? ○ Yes ○ No

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

- ○ **Professional Engineer (P.E.)**
- ○ **Soil and Water Conservation District (SWCD)**
- ○ **Registered Landscape Architect (R.L.A)**
- ○ **Certified Professional in Erosion and Sediment Control (CPESC)**
- ○ **Owner/Operator**
- ○ **Other**

SWPPP Preparer

Contact Name (Last, Space, First)

Mailing Address

City

State Zip -

Phone - -

Fax - -

Email

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-20-001. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First Name **MI**

Last Name

Signature

Date / /

25. Has a construction sequence schedule for the planned management practices been prepared? ○ Yes ○ No

26. Select **all** of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural

- ○ Check Dams
- ○ Construction Road Stabilization
- ○ Dust Control
- ○ Earth Dike
- ○ Level Spreader
- ○ Perimeter Dike/Swale
- ○ Pipe Slope Drain
- ○ Portable Sediment Tank
- ○ Rock Dam
- ○ Sediment Basin
- ○ Sediment Traps
- ○ Silt Fence
- ○ Stabilized Construction Entrance
- ○ Storm Drain Inlet Protection
- ○ Straw/Hay Bale Dike
- ○ Temporary Access Waterway Crossing
- ○ Temporary Stormdrain Diversion
- ○ Temporary Swale
- ○ Turbidity Curtain
- ○ Water bars

Biotechnical

- ○ Brush Matting
- ○ Wattling

Vegetative Measures

- ○ Brush Matting
- ○ Dune Stabilization
- ○ Grassed Waterway
- ○ Mulching
- ○ Protecting Vegetation
- ○ Recreation Area Improvement
- ○ Seeding
- ○ Sodding
- ○ Straw/Hay Bale Dike
- ○ Streambank Protection
- ○ Temporary Swale
- ○ Topsoiling
- ○ Vegetating Waterways

Permanent Structural

- ○ Debris Basin
- ○ Diversion
- ○ Grade Stabilization Structure
- ○ Land Grading
- ○ Lined Waterway (Rock)
- ○ Paved Channel (Concrete)
- ○ Paved Flume
- ○ Retaining Wall
- ○ Riprap Slope Protection
- ○ Rock Outlet Protection
- ○ Streambank Protection

Other

Post-construction Stormwater Management Practice (SMP) Requirements

Important: Completion of Questions 27-39 is not required if response to Question 22 is No.

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.

- ○ **Preservation of Undisturbed Areas**
- ○ **Preservation of Buffers**
- ○ **Reduction of Clearing and Grading**
- ○ **Locating Development in Less Sensitive Areas**
- ○ **Roadway Reduction**
- ○ **Sidewalk Reduction**
- ○ **Driveway Reduction**
- ○ **Cul-de-sac Reduction**
- ○ **Building Footprint Reduction**
- ○ **Parking Reduction**

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).

- ○ All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).
- ○ Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout).

Total WQv Required

| | | | . | | | | **acre-feet**

29. Identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity in Table 1 (See Page 9) that were used to reduce the Total WQv Required(#28).

Also, provide in Table 1 the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use Tables 1 and 2 to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

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Table 1 - Runoff Reduction (RR) Techniques and Standard Stormwater Management Practices (SMPs)

	Total Contributing Area (acres)		Total Contributing Impervious Area(acres)
RR Techniques (Area Reduction)			
○ Conservation of Natural Areas (RR-1) ...	.	and/or	.
○ Sheetflow to Riparian Buffers/Filters Strips (RR-2)	.	and/or	.
○ Tree Planting/Tree Pit (RR-3)	.	and/or	.
○ Disconnection of Rooftop Runoff (RR-4)..	.	and/or	.
RR Techniques (Volume Reduction)			
○ Vegetated Swale (RR-5)			.
○ Rain Garden (RR-6)			.
○ Stormwater Planter (RR-7)			.
○ Rain Barrel/Cistern (RR-8)			.
○ Porous Pavement (RR-9)			.
○ Green Roof (RR-10)			.
Standard SMPs with RRv Capacity			
○ Infiltration Trench (I-1)			.
○ Infiltration Basin (I-2)			.
○ Dry Well (I-3)			.
○ Underground Infiltration System (I-4)			.
○ Bioretention (F-5)			.
○ Dry Swale (O-1)			.
Standard SMPs			
○ Micropool Extended Detention (P-1)			.
○ Wet Pond (P-2)			.
○ Wet Extended Detention (P-3)			.
○ Multiple Pond System (P-4)			.
○ Pocket Pond (P-5)			.
○ Surface Sand Filter (F-1)			.
○ Underground Sand Filter (F-2)			.
○ Perimeter Sand Filter (F-3)			.
○ Organic Filter (F-4)			.
○ Shallow Wetland (W-1)			.
○ Extended Detention Wetland (W-2)			.
○ Pond/Wetland System (W-3)			.
○ Pocket Wetland (W-4)			.
○ Wet Swale (O-2)			.

Table 2 - Alternative SMPs (DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)

Alternative SMP	Total Contributing Impervious Area(acres)
○ Hydrodynamic	.
○ Wet Vault	.
○ Media Filter	.
○ Other	.

Provide the name and manufacturer of the Alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Name

Manufacturer

Note: Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29.

Total RRv provided

. **acre-feet**

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28).

○ **Yes** ○ **No**

If Yes, go to question 36.
If No, go to question 32.

32. Provide the Minimum RRv required based on HSG.
[Minimum RRv Required = (P)(0.95)(Ai)/12, Ai=(S)(Aic)]

Minimum RRv Required

. **acre-feet**

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?

○ **Yes** ○ **No**

If Yes, go to question 33.
Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. Identify the Standard SMPs in Table 1 and, if applicable, the Alternative SMPs in Table 2 that were used to treat the remaining total WQv(=Total WQv Required in 28 - Total RRv Provided in 30).

Also, provide in Table 1 and 2 the total impervious area that contributes runoff to each practice selected.

Note: Use Tables 1 and 2 to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question 29.

WQv Provided

☐☐☐.☐☐☐ **acre-feet**

Note: For the standard SMPs with RRv capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - RRv provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a). ☐☐☐.☐☐☐

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)? ○ **Yes** ○ **No**

If Yes, go to question 36.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

36. Provide the total Channel Protection Storage Volume (CPv) required and provided or select waiver (36a), if applicable.

CPv Required ☐☐☐.☐☐☐ **acre-feet**

CPv Provided ☐☐☐.☐☐☐ **acre-feet**

36a. The need to provide channel protection has been waived because:

○ Site discharges directly to tidal waters or a fifth order or larger stream.

○ Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (37a), if applicable.

Total Overbank Flood Control Criteria (Qp)

Pre-Development ☐☐☐.☐☐☐ **CFS**

Post-development ☐☐☐.☐☐☐ **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development ☐☐☐.☐☐☐ **CFS**

Post-development ☐☐☐.☐☐☐ **CFS**

37a. The need to meet the Qp and Qf criteria has been waived because:

- ○ Site discharges directly to tidal waters or a fifth order or larger stream.
- ○ Downstream analysis reveals that the Qp and Qf controls are not required

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? ○ **Yes** ○ **No**

If Yes, Identify the entity responsible for the long term Operation and Maintenance

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required(#28). (See question 32a) This space can also be used for other pertinent project information.

40. Identify other DEC permits, existing and new, that are required for this project/facility.

- ○ Air Pollution Control
- ○ Coastal Erosion
- ○ Hazardous Waste
- ○ Long Island Wells
- ○ Mined Land Reclamation
- ○ Solid Waste
- ○ Navigable Waters Protection / Article 15
- ○ Water Quality Certificate
- ○ Dam Safety
- ○ Water Supply
- ○ Freshwater Wetlands/Article 24
- ○ Tidal Wetlands
- ○ Wild, Scenic and Recreational Rivers
- ○ Stream Bed or Bank Protection / Article 15
- ○ Endangered or Threatened Species(Incidental Take Permit)
- ○ Individual SPDES
- ○ SPDES Multi-Sector GP NYR
- ○ Other
- ○ None

41. Does this project require a US Army Corps of Engineers Wetland Permit? ○ Yes ○ No
If Yes, Indicate Size of Impact. .

42. Is this project subject to the requirements of a regulated, traditional land use control MS4? ○ Yes ○ No
(If No, skip question 43)

43. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI? ○ Yes ○ No

44. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. NYR

Owner/Operator Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Print First Name **MI**

Print Last Name

Owner/Operator Signature

Date

/ /

NYS Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

*(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)

I. Project Owner/Operator Information	
1. Owner/Operator Name:	Chocolare Sky, LLC
2. Contact Person:	Donald Utschig
3. Street Address:	81 Meyersville Road
4. City/State/Zip:	Chatham, NJ 07928
II. Project Site Information	
5. Project/Site Name:	Stormytown Road Subdivision
6. Street Address:	39 Stormytown Road
7. City/State/Zip:	Ossining, NY 10562
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information	
8. SWPPP Reviewed by:	
9. Title/Position:	
10. Date Final SWPPP Reviewed and Accepted:	
IV. Regulated MS4 Information	
11. Name of MS4:	Town of Ossining
12. MS4 SPDES Permit Identification Number: NYR20A	
13. Contact Person:	
14. Street Address:	
15. City/State/Zip:	
16. Telephone Number:	

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

SWPPP Preparer Certification Form

SPDES General Permit for Stormwater Discharges From Construction Activity (GP-0-20-001)

Project Site Information

Project/Site Name

Stormytown Road Subdivision

Owner/Operator Information

Owner/Operator (Company Name/Private Owner/Municipality Name)

Langan

Certification Statement – SWPPP Preparer

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-20-001. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First name	MI	Last Name
Michael		Finan

Signature

Date

Owner/Operator Certification Form

SPDES General Permit For Stormwater Discharges From Construction Activity (GP-0-20-001)

Project/Site Name: Stormytown Road Subdivision

eNOI Submission Number: ______________________________

eNOI Submitted by: ☐ **Owner/Operator** ☑ **SWPPP Preparer** ☐ **Other**

Certification Statement - Owner/Operator

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Owner/Operator First Name M.I. Last Name

____
Signature

____
Date

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505
(NOTE: Submit completed form to address above)

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity

Please indicate your permit identification number: NYR ___ ___ ___ ___ ___ ___

I. Owner or Operator Information

1. Owner/Operator Name:

2. Street Address:

3. City/State/Zip:

4. Contact Person: | 4a.Telephone:

4b. Contact Person E-Mail:

II. Project Site Information

5. Project/Site Name:

6. Street Address:

7. City/Zip:

8. County:

III. Reason for Termination

9a. □ All disturbed areas have achieved final stabilization in accordance with the general permit and SWPPP. ***Date final stabilization completed** (month/year): ________________________________

9b. □ Permit coverage has been transferred to new owner/operator. Indicate new owner/operator's permit identification number: NYR ____ ____ ____ ____ ____ ____
(Note: Permit coverage can not be terminated by owner identified in I.1. above until new owner/operator obtains coverage under the general permit)

9c. □ Other (Explain on Page 2)

IV. Final Site Information:

10a. Did this construction activity require the development of a SWPPP that includes post-construction stormwater management practices? □ yes □ no (If no, go to question 10f.)

10b. Have all post-construction stormwater management practices included in the final SWPPP been constructed? □ yes □ no (If no, explain on Page 2)

10c. Identify the entity responsible for long-term operation and maintenance of practice(s)?

____

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

10d. Has the entity responsible for long-term operation and maintenance been given a copy of the operation and maintenance plan required by the general permit? □ yes □ no

10e. Indicate the method used to ensure long-term operation and maintenance of the post-construction stormwater management practice(s):

□ Post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality.

□ Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s).

□ For post-construction stormwater management practices that are privately owned, a mechanism is in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the owner or operator's deed of record.

□ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university or hospital), government agency or authority, or public utility; policy and procedures are in place that ensures operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

10f. Provide the total area of impervious surface (i.e. roof, pavement, concrete, gravel, etc.) constructed within the disturbance area? ________________________________ (acres)

11. Is this project subject to the requirements of a regulated, traditional land use control MS4? □ yes □ no

(If Yes, complete section VI - "MS4 Acceptance" statement

V. Additional Information/Explanation:

(Use this section to answer questions 9c. and 10b., if applicable)

VI. MS4 Acceptance - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative (Note: Not required when 9b. is checked -transfer of coverage)

I have determined that it is acceptable for the owner or operator of the construction project identified in question 5 to submit the Notice of Termination at this time.

Printed Name:	
Title/Position:	
Signature:	Date:

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

VII. Qualified Inspector Certification - Final Stabilization:	
I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the general permit, and that all temporary, structural erosion and sediment control measures have been removed. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:
VIII. Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):	
I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:
IX. Owner or Operator Certification	
I hereby certify that this document was prepared by me or under my direction or supervision. My determination, based upon my inquiry of the person(s) who managed the construction activity, or those persons directly responsible for gathering the information, is that the information provided in this document is true, accurate and complete. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.	
Printed Name:	
Title/Position:	
Signature:	Date:

Appendix C: Certification Statements

Owner's/Operator's Certification

"I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted."

Name (please print) ____

Title ______________________________ **Date** ____________

Address ____

Phone ________________ **Email** ________________________

Signature ____

Contractor's Certification

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations."

Contracting Firm Name ____________________

Address ____________________

Phone ____________________ **Fax** ____________________

Name (please print) ____________________

Title ____________________ **Date** ____________________

Signature ____________________

SWPPP Responsibilities ____________________

____

____

____

Trained Individual Name (please print) ____________________

Title ____________________ **Date** ____________________

Signature ____________________

SWPPP Responsibilities ____________________

____

____

Note: All Contractors involved with Stormwater related activities shall sign a Contractor's Certification.

Subcontractor's Certification

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations."

Subcontracting Firm Name ______________________________

Address ______________________________

Phone ______________________________ **Fax** ______________________________

Name (please print) ______________________________

Title ______________________________ **Date** ______________________________

Signature ______________________________

SWPPP Responsibilities ______________________________

____

____

____

Trained Individual Name (please print) ______________________________

Title ______________________________ **Date** ______________________________

Signature ______________________________

SWPPP Responsibilities ______________________________

____

____

Note: All subcontractors involved with Stormwater related activities shall sign a Subcontractor's Certification.

Appendix D: Example Inspection Form

EXAMPLE EROSION CONTROL REPORT

PROJECT NO: ____________ PROJECT NAME: ________________________ DATE: __________

MUNICIPALITY: __________________________ LOCATION: ___________________________

CONTRACTOR: ___________________________ OWNER: _______________________________

DATE OF PREVIOUS INSPECTION: __________ INSPECTOR'S NAME: _____________________

DATE OF MOST RECENT STORM
0.5" OR GREATER: __________ DATE OF INSPECTION: ___________________

LAST RAIN EVENT: _____________________ DEPTH: _________________________________

WEATHER: ______________________________ TEMPERATURE: __________°F__________

SPECIAL NOTES: ____

EROSION CONTROL CHECKLIST

ADDITIONAL ACTION REQUIRED BY PROJECT MANAGER OR PROJECT ENGINEER ☐ YES ☐ NO

PHOTOS OR SKETCHES ATTACHED ☐ ADDITIONAL REMARKS ATTACHED ☐

________________________________ ________________________________

Inspector (print name) **Inspection Date**

________________________________ ________________________________

Qualified Professional (print name) **Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Maintaining Water Quality

Yes No NA

☐ ☐ ☐ Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
☐ ☐ ☐ Is there residue from oil and floating substances, visible oil film, or globules of grease?
☐ ☐ ☐ All disturbance is within the limits of the approved plans.
☐ ☐ ☐ Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions

Yes No NA

☐ ☐ ☐ Is construction site litter and debris appropriately managed?
☐ ☐ ☐ Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
☐ ☐ ☐ Is construction impacting the adjacent properties?
☐ ☐ ☐ Is dust adequately controlled?

2. Temporary Stream Crossing

Yes No NA

☐ ☐ ☐ Maximum diameter pipes necessary to span creek without dredging are installed.
☐ ☐ ☐ Installed non-woven geotextile fabric beneath approaches
☐ ☐ ☐ Is fill composed of aggregate (no earth or soil)?
☐ ☐ ☐ Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

Runoff Control Practices

1. Excavation Dewatering

Yes No NA

☐ ☐ ☐ Upstream and downstream berms (sandbags, inflatable damns, etc.) are installed per plan.
☐ ☐ ☐ Clean water from upstream pool is being pumped to the downstream pool.
☐ ☐ ☐ Sediment laden water from work area is being discharged to a silt-trapping device.
☐ ☐ ☐ Constructed upstream berm with one-foot minimum freeboard.

2. Level Spreader

Yes No NA

☐ ☐ ☐ Installed per plan.
☐ ☐ ☐ Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
☐ ☐ ☐ Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales

Yes No NA

☐ ☐ ☐ Installed per plan with minimum side slopes 2H:1V or flatter.
☐ ☐ ☐ Stabilized by geotextile fabric, seed, or mulch with no erosion occuring.
☐ ☐ ☐ Sediment-laden runoff directed to sediment trapping structure.

4. Stone Check Dam

Yes No NA

☐ ☐ ☐ Is channel stable? (flow is not eroding soil underneath or around the structure).
☐ ☐ ☐ Check is in good condition (rocks in place and no permanent pools behind the structure).
☐ ☐ ☐ Has accumulated sediment been removed?

5. Rock Outlet Protection

Yes No NA

☐ ☐ ☐ Installed per plan.
☐ ☐ ☐ Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes No NA

☐ ☐ ☐ Stockpiles are stabilized with vegetation and/or mulch.
☐ ☐ ☐ Sediment control is installed at the toe of the slope.

2. Revegetation

Yes No NA

☐ ☐ ☐ Temporary seedings and mulch have been applied to idle areas.
☐ ☐ ☐ 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control Practices

1. Stabilized Construction Entrance

Yes No NA

☐ ☐ ☐ Stone is clean enough to effectively remove mud from vehicles.
☐ ☐ ☐ Installed per standards and specifications?
☐ ☐ ☐ Does all traffic use the stabilized entrance to enter and leave the site?
☐ ☐ ☐ Is adequate drainage provided to prevent ponding at entrance?

2. Silt Fence

Yes No NA

☐ ☐ ☐ Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
☐ ☐ ☐ Joints constructed by wrapping the two ends together for continuous support.
☐ ☐ ☐ Fabric buried 6 inches minimum.
☐ ☐ ☐ Posts are stable, fabric is tight and without rips or frayed areas.

Sediment accumulation is ____% of design capacity.

3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices)

Yes	No	NA	
☐	☐	☐	Installed concrete blocks lengthwise so open ends face outward, not upward.
☐	☐	☐	Place wire screen between No. 3 crushed stone and concrete blocks.
☐	☐	☐	Drainage area is 1 acre or less.
☐	☐	☐	Excavated area is 900 cubic feet.
☐	☐	☐	Excavated side slopes should be 2:1.
☐	☐	☐	2" x 4" frame is constructed and structurally sound.
☐	☐	☐	Posts 3-foot maximum spacing between posts.
☐	☐	☐	Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
☐	☐	☐	Posts are stable, fabric is tight and without rips or frayed areas.

Sediment accumulation is ____% of design capacity.

4. Temporary Sediment Trap

Yes	No	NA	
☐	☐	☐	Outlet structure is constructed per the approved plan or drawing.
☐	☐	☐	Geotextile fabric has been placed beneath rock fill.

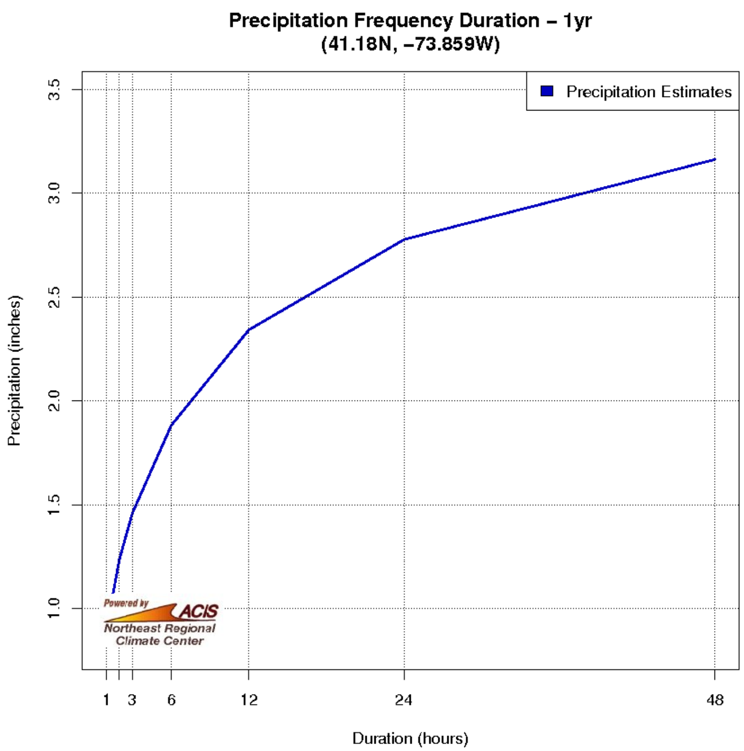
Sediment accumulation is ____% of design capacity.

5. Temporary Sediment Basin

Yes	No	NA	
☐	☐	☐	Basin and outlet structure constructed per the approved plan.
☐	☐	☐	Basin side slopes are stablized with seed/mulch.
☐	☐	☐	Drainage structure is flushed and basin surface restored upon removal of sediment basin facility.

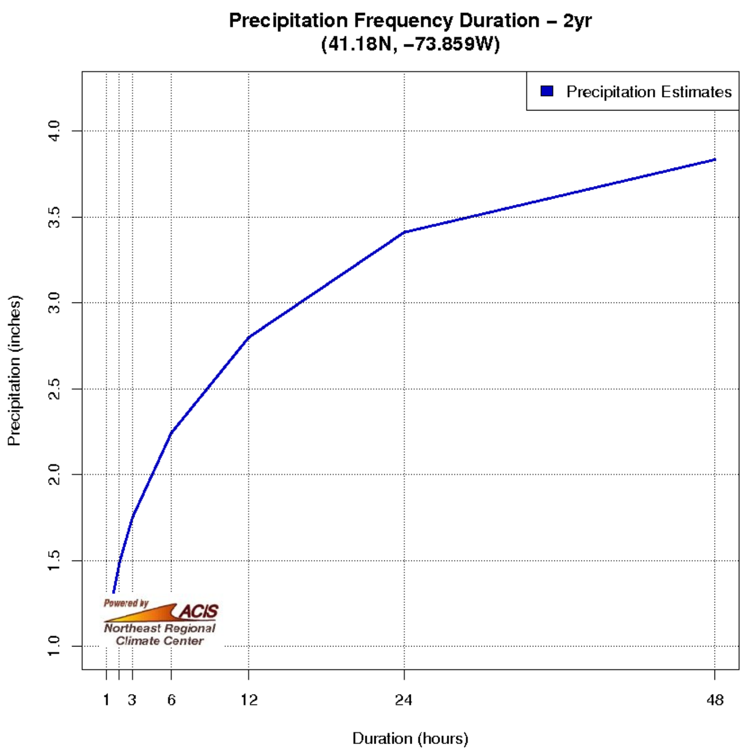
Sediment accumulation is ____% of design capacity.

Appendix E: Design Calculations



Time (hours)	Estimate (inches)
1	0.90
2	1.24
3	1.46
4*	1.60
5*	1.74
6	1.88
7*	1.96
8*	2.04
9*	2.11
10*	2.19
11*	2.27
12	2.34
13*	2.38
14*	2.41
15*	2.45
16*	2.49
17*	2.52
18*	2.56
19*	2.60
20*	2.63
21*	2.67
22*	2.70
23*	2.74
24	2.78
25*	2.79
26*	2.81
27*	2.83
28*	2.84
29*	2.86
30*	2.87
31*	2.89
32*	2.91
33*	2.92
34*	2.94
35*	2.95
36*	2.97
37*	2.99
38*	3.00
39*	3.02
40*	3.03
41*	3.05
42*	3.07
43*	3.08
44*	3.10
45*	3.11
46*	3.13
47*	3.15
48*	3.16

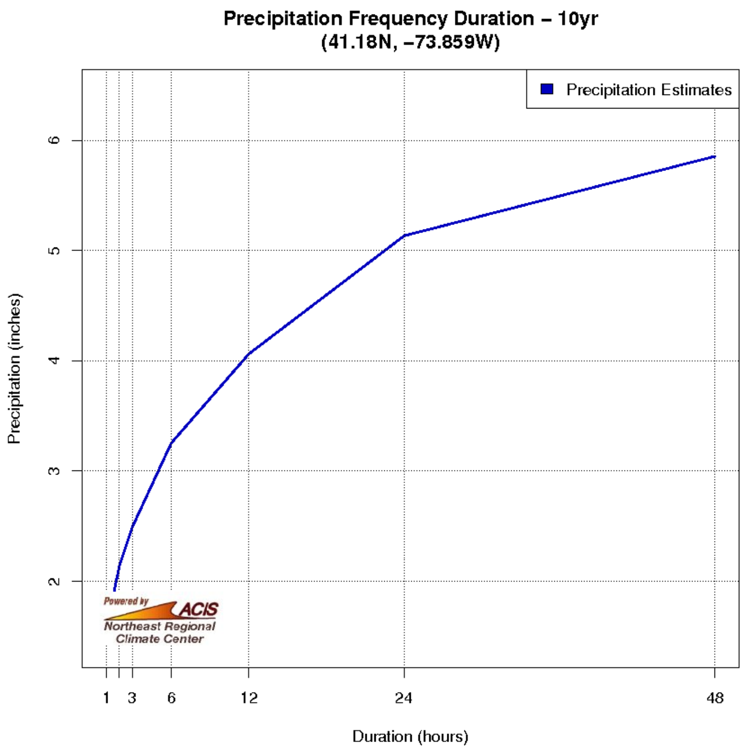
*values for noted rows are estimates



Time (hours)	Estimate (inches)
1	1.10
2	1.49
3	1.75
4*	1.91
5*	2.08
6	2.24
7*	2.34
8*	2.43
9*	2.52
10*	2.61
11*	2.71
12	2.80
13*	2.85
14*	2.90
15*	2.95
16*	3.00
17*	3.05
18*	3.11
19*	3.16
20*	3.21
21*	3.26
22*	3.31
23*	3.36
24	3.41
25*	3.43
26*	3.45
27*	3.46
28*	3.48
29*	3.50
30*	3.52
31*	3.53
32*	3.55
33*	3.57
34*	3.59
35*	3.60
36*	3.62
37*	3.64
38*	3.66
39*	3.68
40*	3.69
41*	3.71
42*	3.73
43*	3.75
44*	3.76
45*	3.78
46*	3.80
47*	3.82
48*	3.83

*values for noted rows are estimates

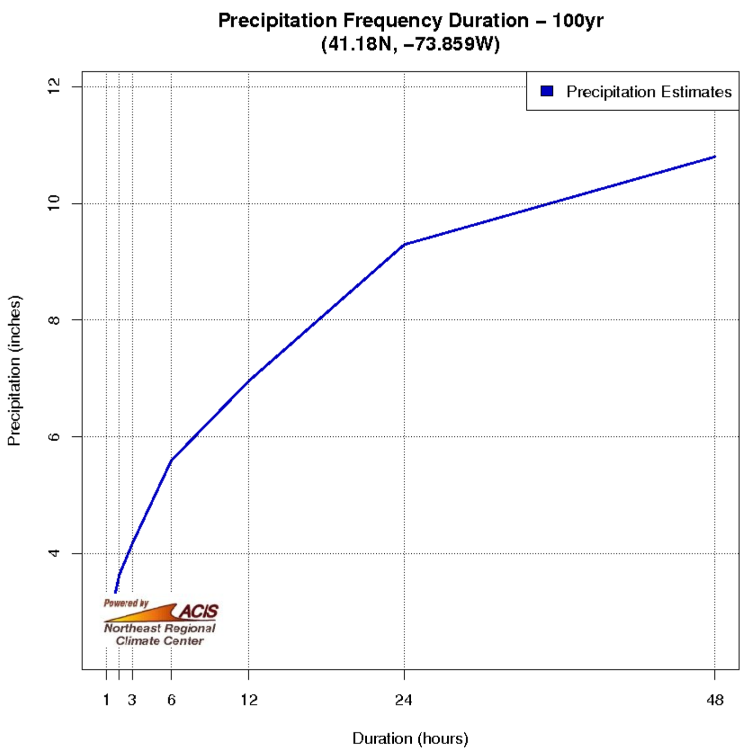
3/25/2021 Precipitation Frequency Duration Curve



Time (hours)	Estimate (inches)
1	1.57
2	2.14
3	2.49
4*	2.75
5*	3.00
6	3.25
7*	3.39
8*	3.52
9*	3.66
10*	3.79
11*	3.93
12	4.06
13*	4.15
14*	4.24
15*	4.33
16*	4.42
17*	4.51
18*	4.60
19*	4.69
20*	4.78
21*	4.87
22*	4.96
23*	5.05
24	5.14
25*	5.17
26*	5.20
27*	5.23
28*	5.26
29*	5.29
30*	5.32
31*	5.35
32*	5.38
33*	5.41
34*	5.44
35*	5.47
36*	5.50
37*	5.53
38*	5.56
39*	5.59
40*	5.62
41*	5.65
42*	5.68
43*	5.71
44*	5.74
45*	5.77
46*	5.80
47*	5.83
48*	5.86

*values for noted rows are estimates

3/25/2021 Precipitation Frequency Duration Curve



Time (hours)	Estimate (inches)
1	2.65
2	3.64
3	4.17
4*	4.64
5*	5.12
6	5.59
7*	5.82
8*	6.05
9*	6.27
10*	6.50
11*	6.73
12	6.96
13*	7.15
14*	7.35
15*	7.54
16*	7.74
17*	7.93
18*	8.13
19*	8.32
20*	8.52
21*	8.71
22*	8.90
23*	9.10
24	9.29
25*	9.36
26*	9.42
27*	9.48
28*	9.55
29*	9.61
30*	9.67
31*	9.73
32*	9.80
33*	9.86
34*	9.92
35*	9.98
36*	10.05
37*	10.11
38*	10.17
39*	10.24
40*	10.30
41*	10.36
42*	10.42
43*	10.49
44*	10.55
45*	10.61
46*	10.67
47*	10.74
48*	10.80

*values for noted rows are estimates

Total Required Water Quality Volume Calculation Worksheet

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(s): DP-1	*Manually enter the information below.*
P= 1.50 *inch*	

Subcatchment Number	Subcatchment Model Number	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Rv	WQv *(ft^3)*	Description
Breakdown of Subcatchments							
1	201	0.22	0.09	40%	0.41	486	Underground Infiltration System
2	202	0.03	0.03	100%	0.95	167	Underground Infiltration System
3	203	0.03	0.03	100%	0.95	167	Underground Infiltration System
4	301	3.33	1.08	32%	0.34	6,205	Infiltration Basin
5							
6							
7							
8							
9							
10							
Subtotal		3.61	1.23	34%	0.36	7,025	Subtotal 1
Total		**3.61**	**1.23**	**34%**	**0.36**	**7,025**	**Initial WQv**

Technique	Total Contributing Area *(Acre)*	Contributing Impervious Area *(Acre)*	Notes
Identify Runoff Reduction Techniques By Area			
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*
Total	**0.00**	**0.00**	

	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Runoff Coefficient Rv	WQv *(ft^3)*
Recalculate WQv after application of Area Reduction Techniques					
Initial WQv	3.61	1.23	34%	0.36	7,025
Subtract Area	0.00	0.00	--	--	--
WQv adjusted after Area Reductions	**3.61**	**1.23**	34%	0.36	7,025
Disconnection of Rooftops		0.00			
Adjusted WQv after Area Reduction and Rooftop Disconnect	3.61	1.23	34%	0.36	**7,025**
WQv reduced by Area Reduction techniques					0

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Subcatchment Summary Table Worksheet

All Subcatchments							
Subcatchment	Subcatchment Model	Total Area	Impervious Cover	Percent Impervious	Runoff Coefficient	WQv	Description
		(Acres)	*(Acres)*	*%*	*Rv*	*(ft^3)*	
1	201	0.22	0.09	0.40	0.41	486	Underground Infiltration System
2	202	0.03	0.03	1.00	0.95	167	Underground Infiltration System
3	203	0.03	0.03	1.00	0.95	167	Underground Infiltration System
4	301	3.33	1.08	0.32	0.34	6,205	Infiltration Basin
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

Runoff Reduction Summary Table Worksheet

Runoff Reduction Volume and Treated Volumes						
Runoff Reduction Techniques/Standard SMPs			Total Contributing Area (acres)	Total Contributing Impervious Area (acres)	WQv Reduced (RRv) cf	WQv Treated cf
Area Reduction	Conservation of Natural Areas	RR-1	0.00	0.00		
	Sheet flow to Riparian Buffers	RR-2	0.00	0.00		
	Sheet flow to Filter Strips		0.00	0.00		
	Tree Planting/Tree Pit	RR-3	0.00	0.00		
	Disconnection of Rooftop Runoff	RR-4		0.00		
Volume Reduction	Vegetated Swale	RR-5	0.00	0.00	0	
	Rain Garden	RR-6	0.00	0.00	0	
	Stormwater Planter	RR-7	0.00	0.00	0	
	Rain Barrel/Cistern	RR-8	0.00	0.00	0	
	Porous Pavement	RR-9	0.00	0.00	0	
	Green Roof (Intensive)	RR-10	0.00	0.00	0	
	Green Roof (Extensive)		0.00	0.00	0	
Standard SMPs w/RRv Capacity	Infiltration Trench	I-1	0.00	0.00	0	0
	Infiltration Basin	I-2	3.33	1.08	6,205	0
	Dry Well	I-3	0.00	0.00	0	0
	Underground Infiltration System	I-4	0.28	0.15	820	0
	Bioretention	F-5	0.00	0.00	0	0
	Infiltration Bioretention		0.00	0.00	0	0
	Dry swale	O-1	0.00	0.00		0
Standard SMPs	Micropool Extended Detention Pond	P-1	0.00	0.00		0
	Wet Pond	P-2	0.00	0.00		0
	Wet Extended Detention Pond	P-3	0.00	0.00		0
	Multiple Pond system	P-4	0.00	0.00		0
	Pocket Pond	P-5	0.00	0.00		0
	Surface Sand Filter	F-1	0.00	0.00		0
	Underground Sand Filter	F-2	0.00	0.00		0
	Perimeter Sand Filter	F-3	0.00	0.00		0
	Organic Filter	F-4	0.00	0.00		0
	Shallow Wetland	W-1	0.00	0.00		0
	Extended Detention Shallow Wetland	W-2	0.00	0.00		0
	Pond/Wetland System	W-3	0.00	0.00		0
	Pocket Wetland	W-4	0.00	0.00		0
	Wet Swale	O-2	0.00	0.00		0
Totals by Area Reduction →			0.00	0.00	0	
Totals by Volume Reduction →			0.00	0.00	0	
Totals by Standard SMP w/RRV →			3.61	1.23	7,025	0
Totals by Standard SMP →			0.00	0.00		0
Totals (Area + Volume + all SMPs) →			**3.61**	**1.23**	**7,025**	**0**

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Minimum Runoff Reduction Volume Worksheet

Minimum Runoff Reduction Volume
1. Construction activities that cannot achieve 100% reduction of the total water quality volume due to site limitation shall direct runoff from all newly constructed impervious areas to a runoff reduction technique or standard stormwater management practice with runoff reduction volume capacity unless infeasible.
2. In no case shall the runoff reduction achieved from the newly constructed impervious areas be less than the minimum runoff reduction (RRv_{min}).
3. The minimum runoff reduction volume is calculated as follows:

$$RRv_{min} = \frac{P * \bar{R}v * Aic * S}{12}$$

Where:

RRv_{min} = Minimum runoff reduction required from impervious area

$\bar{R}v$ = 0.05 + 0.009 (I), where I is 100% impervious

Aic = Total area of new impervious cover

S = Hydrologic Soil Group Specific Reduction Factor

Enter the Soils Data for the site

Soil Group	Acres	S	
A	0.00	55%	*(new impervious area in Type A Soils)*
B	0.55	40%	*(new impervious area in Type B Soils)*
C	0.17	30%	*(new impervious area in Type C Soils)*
D	**0.51**	20%	*(new impervious area in Type D Soils)*
Total Area	1.23		

Calculate the Minimum RRv

Soil Group Speific Reduction Factor (S)	**0.30**		*(weighted average)*
Total Area of New Impervious Cover (Aic)	1.23	*acre*	
Precipitation (P)	1.50	*in*	
Rv	0.95		
Minimum RRv	**1,932**	***ft3***	*(P * Rv x Aic * S)/12*
	0.04	af	

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Notice of Intent Questions Worksheet

#	NOI Question		Reported Value	
			cf	af
28	Total Water Quality Volume (WQv) Required		7,025	*0.161*
30	Total RRV Provided		7,025	*0.161*
31	Is RRv Provided ≥WQv Required?		Yes	
32	Minimum RRv		1,932	*0.044*
32a	Is RRv Provided ≥ Minimum RRv Required?	Yes	*Conditions Met*	
33a	Total WQv Treated		0	*0.000*
34	Sum of Volume Reduced & Treated		7,025	*0.161*
35	Is Sum RRv Provided and WQv Provided ≥WQv Required?	Yes	*Conditions Met*	
Apply Peak Flow Attenuation				
			af	af
36	Channel Protection	*Cpv*	*0.200*	*0.397*
			cfs	cfs
37	Overbank	*Qp*	*17.01*	*16.74*
37	Extreme Flood Control	*Qf*	*43.74*	*39.80*
	Are Quantity Control requirements met?	*yes*	*Plan Completed*	

Infiltration Basin Worksheet

Design Point(s):	**DP-1**							
Enter Site Data For Drainage Area to be Treated by Practice								
Subcatchment Number	**Subcatchment Model Number**	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
4	301	3.33	1.08	0.32	0.34	6,205	1.50	Infiltration Basin
Enter Impervious Area Reduced by Disconnection of Rooftops			0.00	32%	0.34	6,205	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						0	*ft^3*	
Does the contributing area exceed 5 acres?			*no*					
Design Elements Pretreatment Techniques to Prevent Clogging								
Infiltration Rate				4.10	*in/hour*	*Okay*		
Pretreatment Sizing				50	*% WQv*	*25% minimum; 50% if >2 in/hr; 100% if >5in/hour*		
Pretreatment Required Volume				3,102	*ft^3*			
Pretreatment Provided				3,102	*ft^3*			
Pretreatment Techniques utilized				*Other*		*Hydrodynamic separator*		
Design Volume		6,205	*ft^3*	WQv				
Basal Area Required		1,551	*ft^2*	*Infiltration practices shall be designed to exfiltrate the entire WQv through the floor of each practice.*				
Basal Area Provided		2,750	*ft^2*					
Design Depth		4.00	*ft*					
Volume Provided		11,000	*ft^3*	*Storage Volume provided in infiltration basin area (not including pretreatment)*				
Sizing √		OK		*The infiltration basin must provide storage equal to or greater than the WQv of the contributing area.*				
Determine Runoff Reduction								
Runoff Reduction			**6,205**	***ft^3***	***100% of the storage provided in the basin or WQv, whichever is smaller***			
Volume Treated			**0**	***ft^3***	***This is the portion of the WQv that is not reduced/infiltrated***			

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Underground Infiltration System Worksheet

Design Point(s):	DP-1							
Enter Site Data For Drainage Area to be Treated by Practice								
Subcatchment Number	**Subcatchment Model Number**	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
1	201	0.22	0.09	0.40	0.41	486	1.50	Underground Infiltration System
Enter Impervious Area Reduced by Disconnection of Rooftops			0.00	40%	0.41	486	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						0	*ft^3*	
Design Elements **Pretreatment Techniques to Prevent Clogging**								
Infiltration Rate				4.10	*in/hour*	*Okay*		
Pretreatment Sizing				50	*% WQv*	*25% minimum;* *50% if >2 in/hr;* *100% if >5in/hour*		
Pretreatment Required Volume				243	*ft^3*			
Pretreatment Provided				320	*ft^3*			
Pretreatment Techniques utilized				*Other*		*Isolator row*		
Size An Infiltration Basin								
Design Volume		486	*ft^3*	WQv				
Volume Provided		589	*ft^3*	*Storage Volume provided in underground infiltration system (not including pretreatment)*				
Sizing √		OK		*The underground infiltration system must provide storage equal to or greater than the WQv of the contributing area.*				
Determine Runoff Reduction								
Runoff Reduction			**486**	***ft^3***	***100% of the storage provided in the basin or WQv, whichever is smaller***			
Volume Treated			**0**	***ft^3***	***This is the portion of the WQv that is not reduced/infiltrated***			

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Underground Infiltration System Worksheet

Design Point(s):	DP-1							
Enter Site Data For Drainage Area to be Treated by Practice								
Subcatchment Number	**Subcatchment Model Number**	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
2	202	0.03	0.03	1.00	0.95	167	1.50	Underground Infiltration System
Enter Impervious Area Reduced by Disconnection of Rooftops			0.00	100%	0.95	167	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						0	*ft^3*	
Design Elements **Pretreatment Techniques to Prevent Clogging**								
Infiltration Rate				4.10	*in/hour*	*Okay*		
Pretreatment Sizing				50	*% WQv*	*25% minimum;* *50% if >2 in/hr;* *100% if >5in/hour*		
Pretreatment Required Volume				83	*ft^3*			
Pretreatment Provided				320	*ft^3*			
Pretreatment Techniques utilized				*Other*		*Isolator row*		
Size An Infiltration Basin								
Design Volume		167	*ft^3*	WQv				
Volume Provided		320	*ft^3*	*Storage Volume provided in underground infiltration system (not including pretreatment)*				
Sizing √		OK		*The underground infiltration system must provide storage equal to or greater than the WQv of the contributing area.*				
Determine Runoff Reduction								
Runoff Reduction			**167**	***ft^3***	***100% of the storage provided in the basin or WQv, whichever is smaller***			
Volume Treated			**0**	***ft^3***	***This is the portion of the WQv that is not reduced/infiltrated***			

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Underground Infiltration System Worksheet

Design Point(s):	DP-1							
Enter Site Data For Drainage Area to be Treated by Practice								
Subcatchment Number	**Subcatchment Model Number**	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
3	203	0.03	0.03	1.00	0.95	167	1.50	Underground Infiltration System
Enter Impervious Area Reduced by Disconnection of Rooftops			0.00	100%	0.95	167	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						0	*ft^3*	
Design Elements Pretreatment Techniques to Prevent Clogging								
Infiltration Rate				4.10	*in/hour*	*Okay*		
Pretreatment Sizing				50	*% WQv*	*25% minimum; 50% if >2 in/hr; 100% if >5in/hour*		
Pretreatment Required Volume				83	*ft^3*			
Pretreatment Provided				320	*ft^3*			
Pretreatment Techniques utilized				*Other*		*Isolator row*		
Size An Infiltration Basin								
Design Volume		167	*ft^3*	WQv				
Volume Provided		320	*ft^3*	*Storage Volume provided in underground infiltration system (not including pretreatment)*				
Sizing √		OK		*The underground infiltration system must provide storage equal to or greater than the WQv of the contributing area.*				
Determine Runoff Reduction								
Runoff Reduction			**167**	***ft^3***	***100% of the storage provided in the basin or WQv, whichever is smaller***			
Volume Treated			**0**	***ft^3***	***This is the portion of the WQv that is not reduced/infiltrated***			

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Channel Protection Volume Worksheet

Design Point(s):			
Channel Protection Volume			
Area	3.61	*ac*	*0.006 sq. miles*
Curve Number (CN)	79		
Precipitation for 1 yr storm ($P_{1\ yr\ storm}$)	2.78	*in*	
Ia (200 / CN - 2)	0.54		
Ia / $P_{1\ yr\ storm}$	0.19		
S (Ia / 0.2)	2.68		
Time of Concentration	6.00	*min*	*0.100 hours*
Unit peak discharge (q_u)	627	*csm/in*	*from Exhibit 4-III of TR-55*
Ratio of Outflow to Inflow (q_o/q_i)	0.025		*from Figure B.1 of Design Manual*
Unit Volume (V_S/V_r)	0.65		$0.683 - 1.43*(q_o/q_i) + 1.64*(q_o/q_i)^2 - 0.804*(q_o/q_i)^3$
Runoff for 1 yr storm ($Q_{1\ yr\ runoff}$)	1.02	*in*	$(P_{1\ yr\ storm} - 0.2*S)^2/(P_{1\ yr\ storm} + 0.8*S)$
Channel Protection Volume	**8,696**	***cf***	$[((V_s/V_r) * (Q_{1\ yr\ runoff}) * A)/12]*43560$
Average Release Rate over 24 hours	**0.10**	***cfs***	

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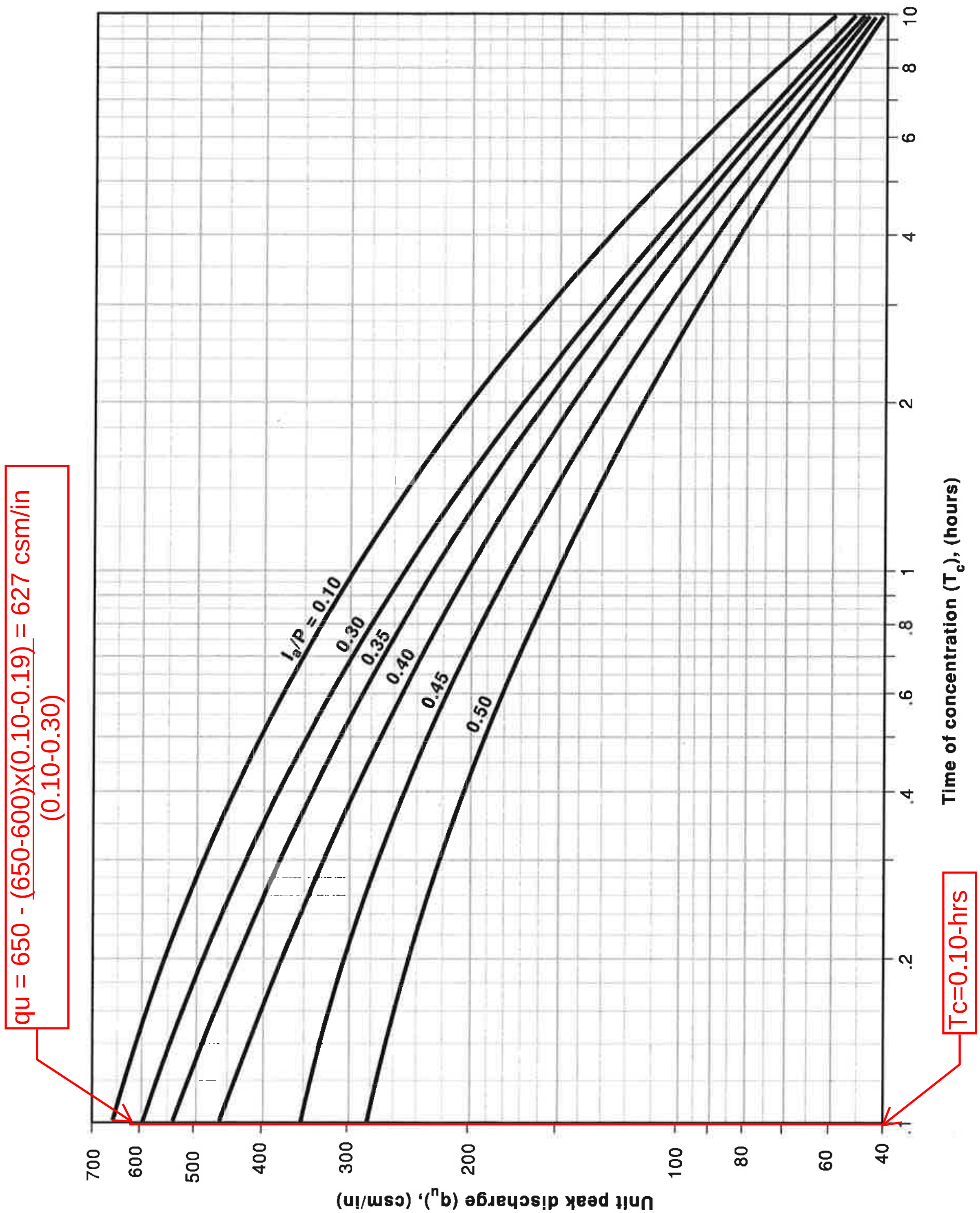
Exhibit 4-III Unit peal discharge (q_u) for NRCS (SCS) type III rainfall distribution



While the TR-55 short-cut method reports to incorporate multiple stage structures, experience has shown that an additional 10-15% storage is required when multiple levels of extended detention are provided.

Figure B.1 Detention Time vs. Discharge Ratios (Source: MDE, 2000)

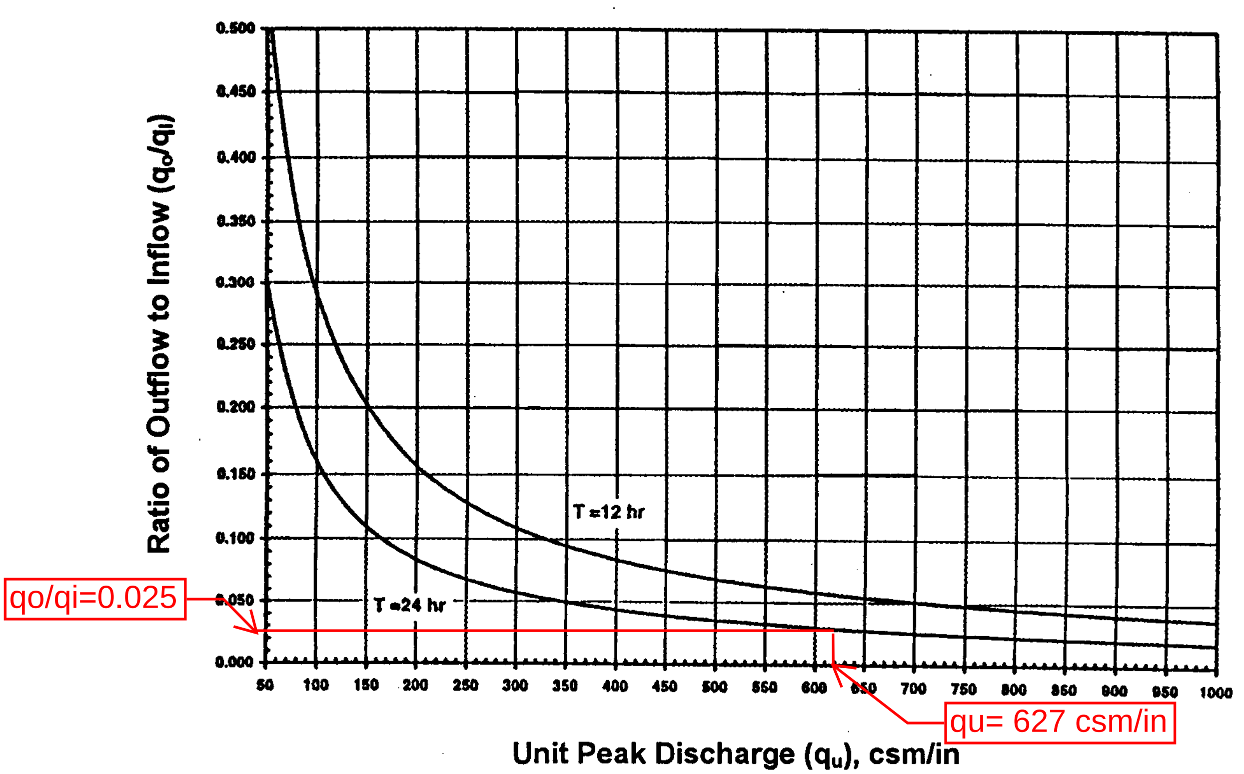
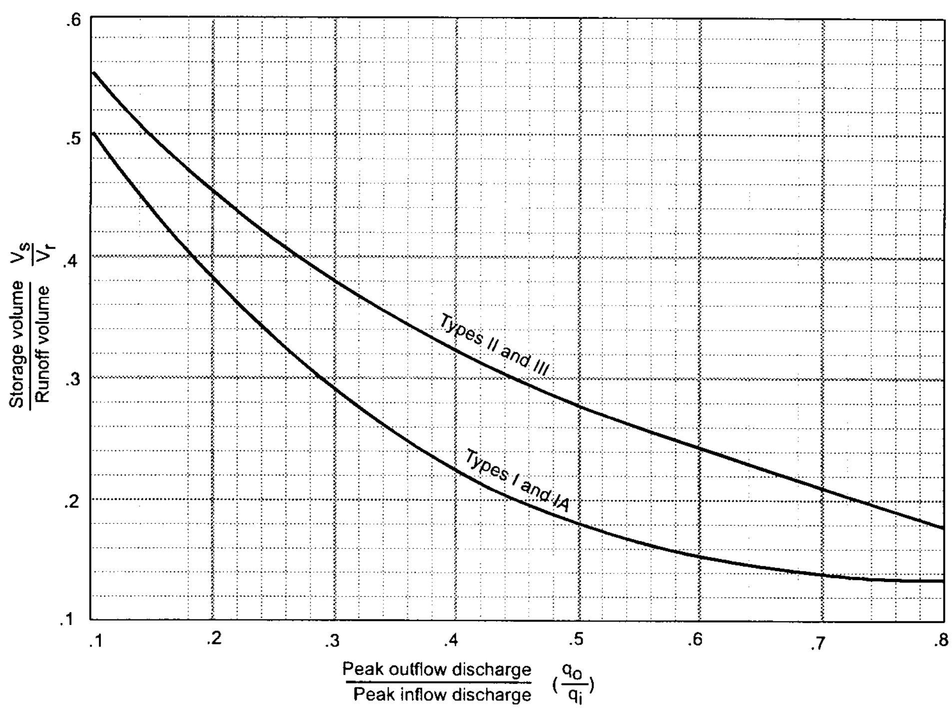
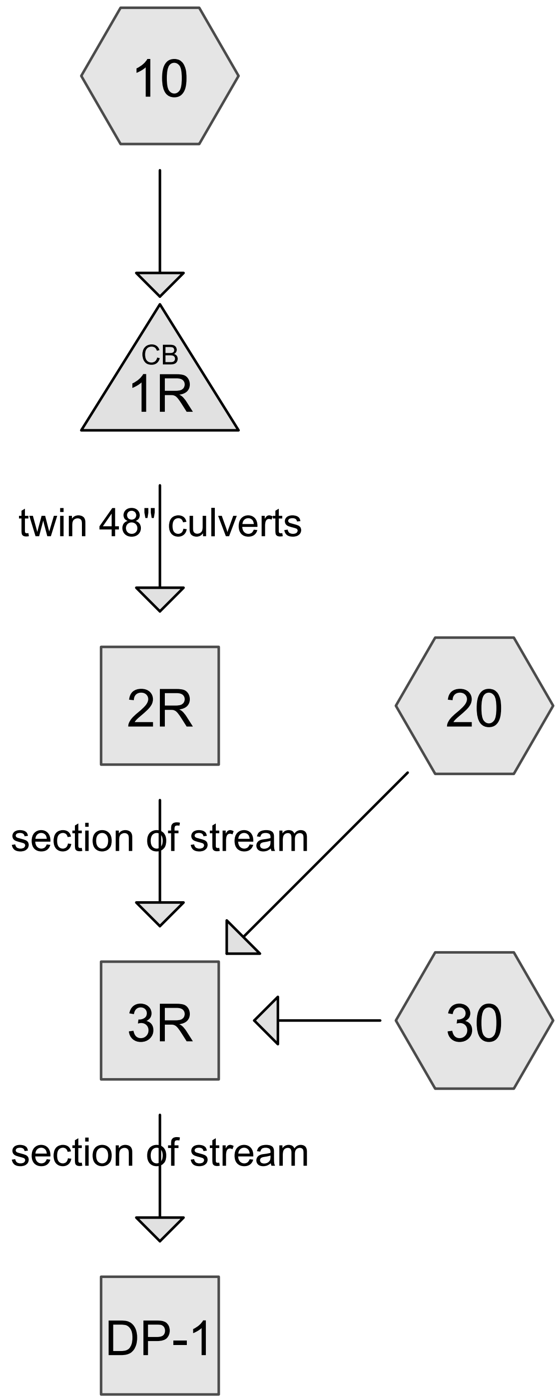
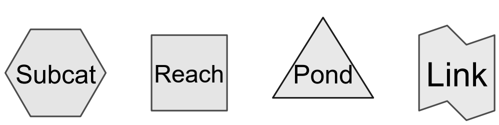


Figure B.2 Approximate Detention Basin Routing For Rainfall Types I, IA, II, and III (Source: NRCS, 1986)



Appendix F: Pre-Development Stormwater Analysis





Routing Diagram for 2021-03-28 Existing
Prepared by Langan Engineering and Environmental Services, Printed 3/29/2021
HydroCAD® 10.00-18 s/n 11011 © 2016 HydroCAD Software Solutions LLC

Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: Runoff Area=1.410 ac 13.48% Impervious Runoff Depth=1.09"
Flow Length=240' Tc=8.6 min CN=80 Runoff=1.57 cfs 0.128 af

Subcatchment20: Runoff Area=2.710 ac 2.21% Impervious Runoff Depth=0.82"
Flow Length=339' Tc=10.2 min CN=75 Runoff=2.07 cfs 0.185 af

Subcatchment30: Runoff Area=3.840 ac 0.00% Impervious Runoff Depth=0.41"
Flow Length=377' Tc=10.9 min CN=65 Runoff=1.01 cfs 0.131 af

Reach 2R: section of stream Avg. Flow Depth=0.11' Max Vel=2.85 fps Inflow=1.57 cfs 0.128 af
n=0.040 L=169.0' S=0.1230 '/' Capacity=634.20 cfs Outflow=1.54 cfs 0.128 af

Reach 3R: section of stream Avg. Flow Depth=0.18' Max Vel=2.66 fps Inflow=4.57 cfs 0.444 af
n=0.040 L=403.0' S=0.0546 '/' Capacity=621.58 cfs Outflow=4.38 cfs 0.444 af

Reach DP-1: Inflow=4.38 cfs 0.444 af
Outflow=4.38 cfs 0.444 af

Pond 1R: twin 48" culverts Peak Elev=299.96' Inflow=1.57 cfs 0.128 af
Outflow=1.57 cfs 0.128 af

Summary for Subcatchment 10:

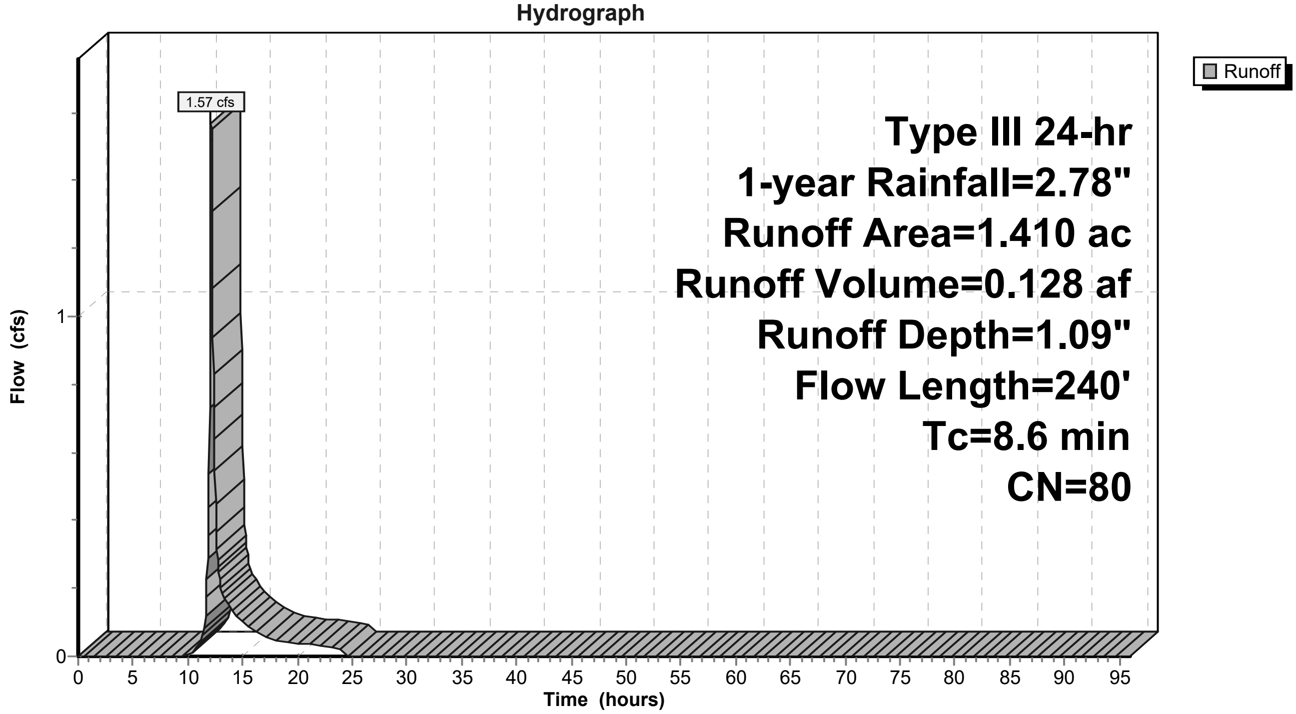
Runoff = 1.57 cfs @ 12.13 hrs, Volume= 0.128 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-year Rainfall=2.78"

Area (ac)	CN	Description
0.110	98	Paved parking, HSG B
0.040	98	Paved parking, HSG D
0.020	85	Gravel roads, HSG B
0.010	91	Gravel roads, HSG D
0.040	98	Roofs, HSG D
0.080	69	50-75% Grass cover, Fair, HSG B
0.450	84	50-75% Grass cover, Fair, HSG D
0.170	60	Woods, Fair, HSG B
0.490	79	Woods, Fair, HSG D
1.410	80	Weighted Average
1.220		86.52% Pervious Area
0.190		13.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.1600	0.16		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.41"
3.1	50	0.0800	0.27		**Sheet Flow, B-C** Grass: Short n= 0.150 P2= 3.41"
0.2	28	0.1400	2.62		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
0.1	112	0.0440	23.98	301.31	**Pipe Channel, D-E** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013 Corrugated PE, smooth interior
8.6	240	Total			

Subcatchment 10:



Summary for Subcatchment 20:

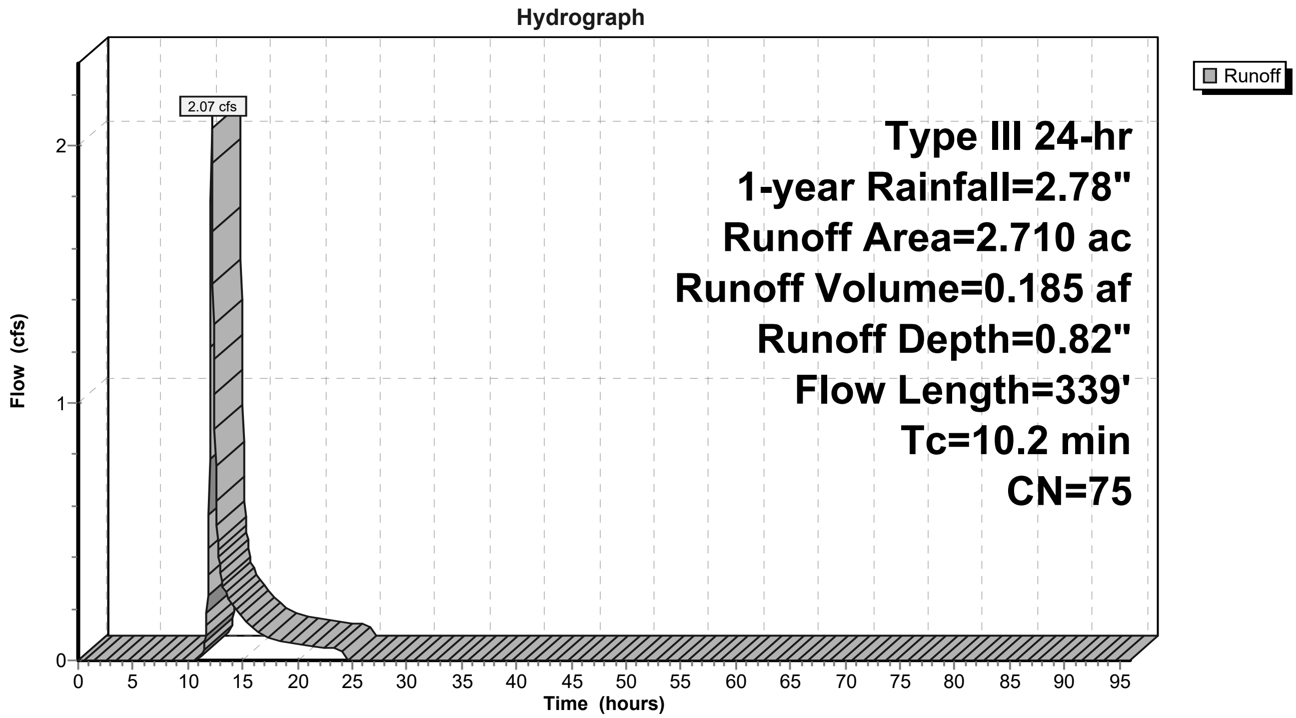
Runoff = 2.07 cfs @ 12.16 hrs, Volume= 0.185 af, Depth= 0.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-year Rainfall=2.78"

Area (ac)	CN	Description
0.020	98	Water Surface, 0% imp, HSG B
0.010	98	Water Surface, 0% imp, HSG D
0.060	98	Roofs, HSG D
0.060	69	50-75% Grass cover, Fair, HSG B
0.590	84	50-75% Grass cover, Fair, HSG D
0.780	60	Woods, Fair, HSG B
1.190	79	Woods, Fair, HSG D
2.710	75	Weighted Average
2.650		97.79% Pervious Area
0.060		2.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.2100	0.21		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.41"
0.8	155	0.3800	3.08		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.3	84	0.0480	1.10		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
10.2	339	Total			

Subcatchment 20:



Summary for Subcatchment 30:

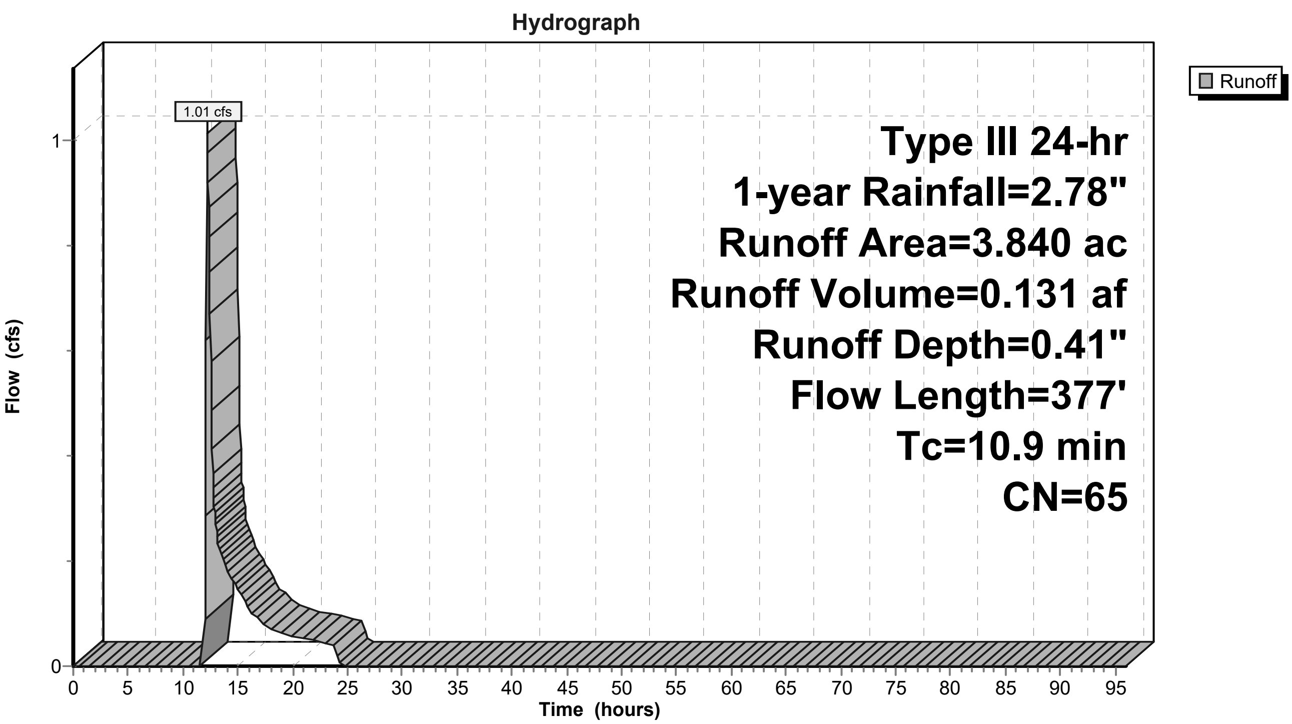
Runoff = 1.01 cfs @ 12.21 hrs, Volume= 0.131 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-year Rainfall=2.78"

Area (ac)	CN	Description
2.540	60	Woods, Fair, HSG B
1.260	73	Woods, Fair, HSG C
0.040	98	Water Surface, 0% imp, HSG B
3.840	65	Weighted Average
3.840		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.1600	0.18		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.41"
1.1	139	0.1800	2.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.7	138	0.3900	3.12		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
10.9	377	Total			

Subcatchment 30:



Summary for Reach 2R: section of stream

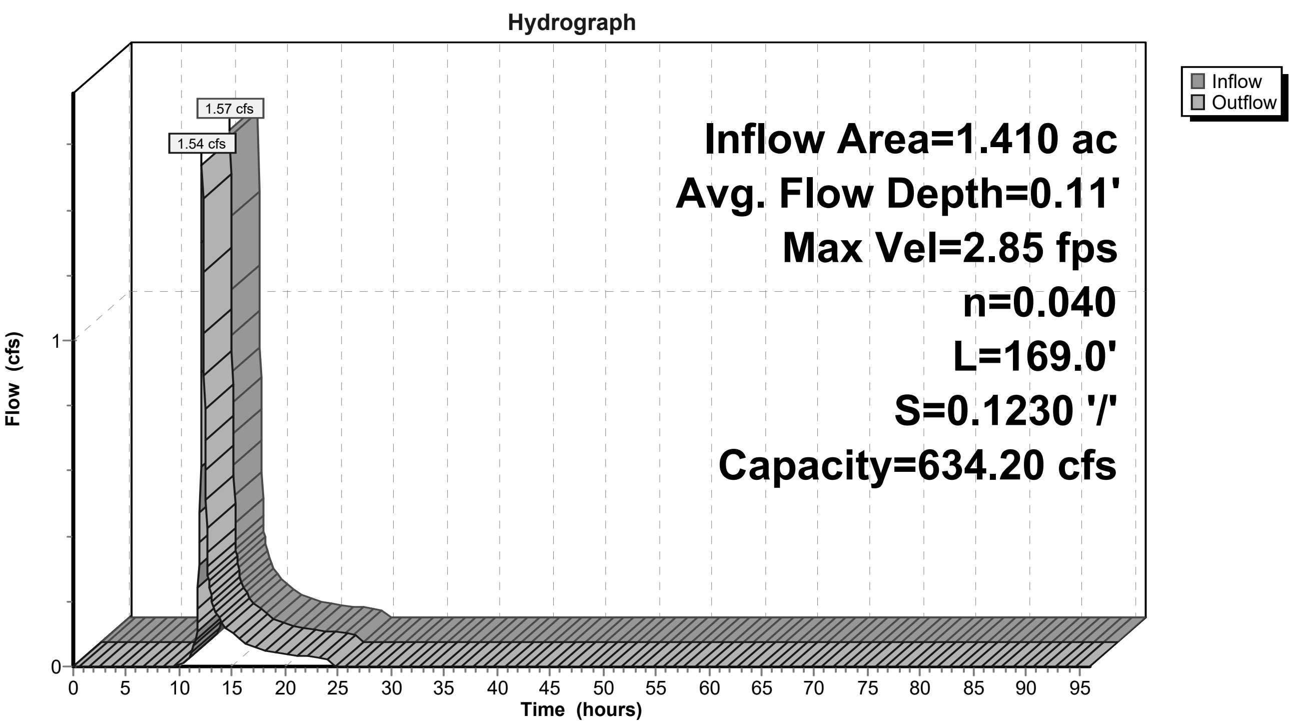
Inflow Area = 1.410 ac, 13.48% Impervious, Inflow Depth = 1.09" for 1-year event
Inflow = 1.57 cfs @ 12.13 hrs, Volume= 0.128 af
Outflow = 1.54 cfs @ 12.16 hrs, Volume= 0.128 af, Atten= 2%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.85 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 2.2 min

Peak Storage= 93 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 3.00' Flow Area= 33.0 sf, Capacity= 634.20 cfs

5.00' x 3.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 17.00'
Length= 169.0' Slope= 0.1230 '/'
Inlet Invert= 286.78', Outlet Invert= 266.00'

Reach 2R: section of stream



Summary for Reach 3R: section of stream

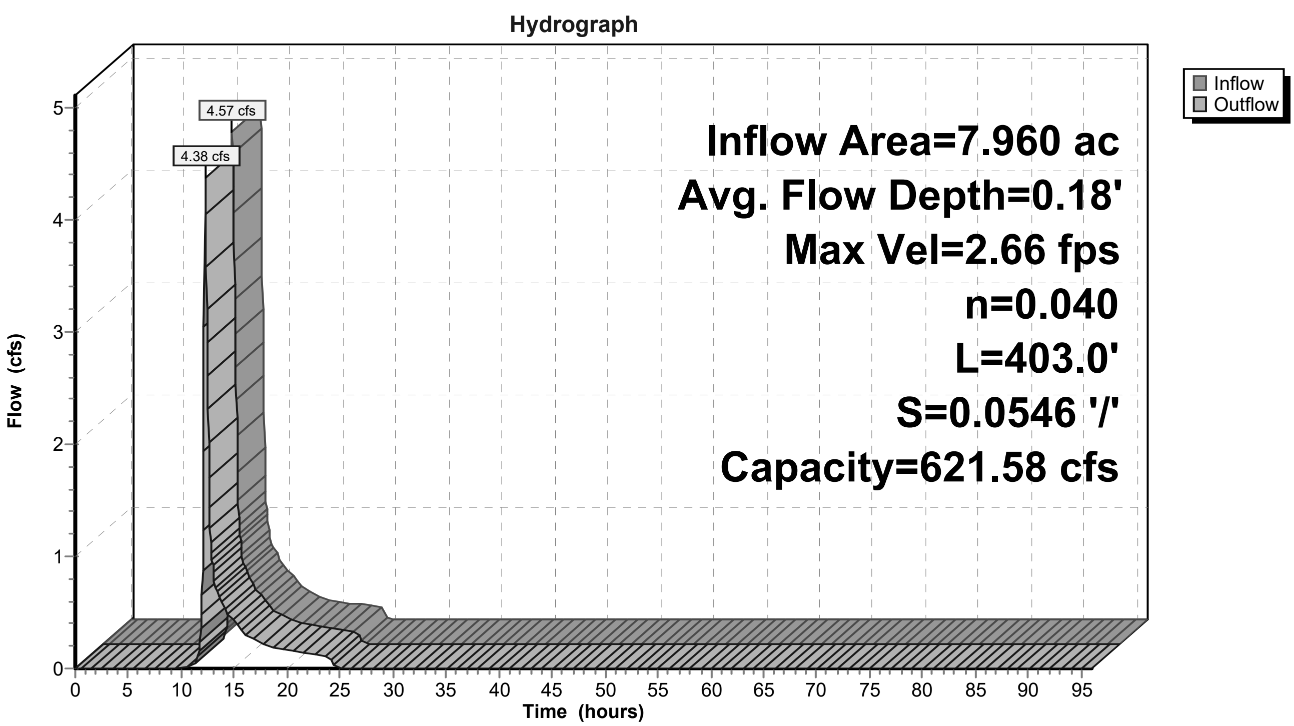
Inflow Area = 7.960 ac, 3.14% Impervious, Inflow Depth = 0.67" for 1-year event
Inflow = 4.57 cfs @ 12.17 hrs, Volume= 0.444 af
Outflow = 4.38 cfs @ 12.25 hrs, Volume= 0.444 af, Atten= 4%, Lag= 4.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.66 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 0.99 fps, Avg. Travel Time= 6.8 min

Peak Storage= 670 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 621.58 cfs

9.00' x 3.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 21.00'
Length= 403.0' Slope= 0.0546 '/'
Inlet Invert= 266.00', Outlet Invert= 244.00'

Reach 3R: section of stream

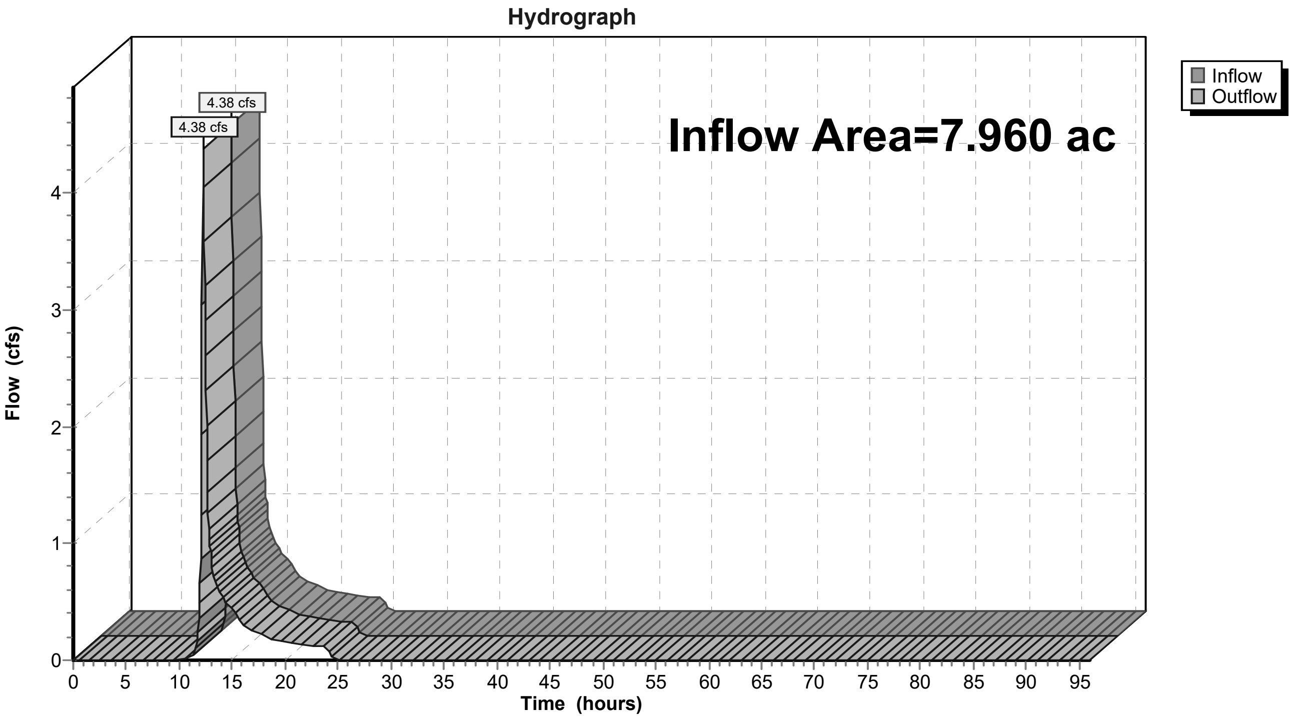


Summary for Reach DP-1:

Inflow Area =	7.960 ac,	3.14% Impervious,	Inflow Depth = 0.67"	for 1-year event	
Inflow =	4.38 cfs @	12.25 hrs,	Volume=	0.444 af	
Outflow =	4.38 cfs @	12.25 hrs,	Volume=	0.444 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Reach DP-1:



Summary for Pond 1R: twin 48" culverts

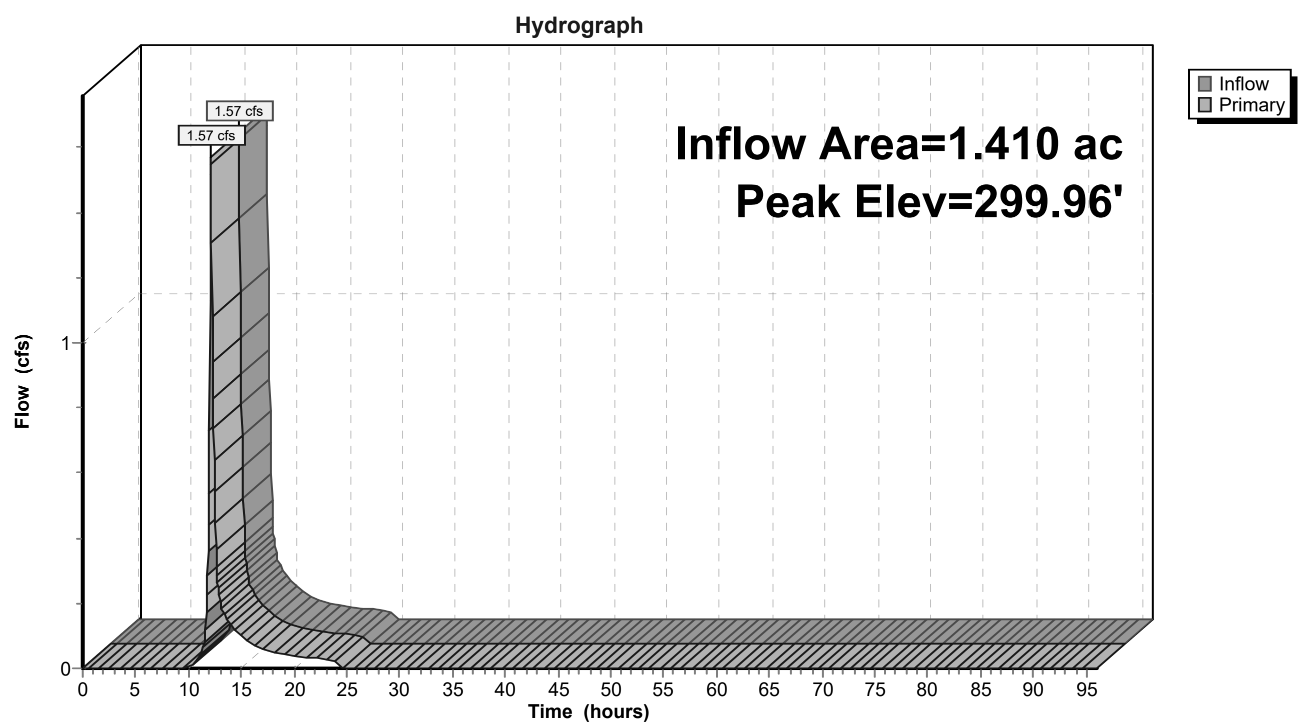
Inflow Area = 1.410 ac, 13.48% Impervious, Inflow Depth = 1.09" for 1-year event
Inflow = 1.57 cfs @ 12.13 hrs, Volume= 0.128 af
Outflow = 1.57 cfs @ 12.13 hrs, Volume= 0.128 af, Atten= 0%, Lag= 0.0 min
Primary = 1.57 cfs @ 12.13 hrs, Volume= 0.128 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 299.96' @ 12.13 hrs
Flood Elev= 316.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	299.55'	**48.0" Round Culvert** L= 182.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 299.55' / 286.78' S= 0.0702 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf
#2	Primary	299.90'	**48.0" Round Culvert** L= 180.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 299.90' / 287.92' S= 0.0666 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

Primary OutFlow Max=1.45 cfs @ 12.13 hrs HW=299.95' (Free Discharge)
1=Culvert (Inlet Controls 1.43 cfs @ 2.16 fps)
2=Culvert (Inlet Controls 0.03 cfs @ 0.78 fps)

Pond 1R: twin 48" culverts



Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: Runoff Area=1.410 ac 13.48% Impervious Runoff Depth=3.02"
Flow Length=240' Tc=8.6 min CN=80 Runoff=4.49 cfs 0.354 af

Subcatchment20: Runoff Area=2.710 ac 2.21% Impervious Runoff Depth=2.56"
Flow Length=339' Tc=10.2 min CN=75 Runoff=6.98 cfs 0.579 af

Subcatchment30: Runoff Area=3.840 ac 0.00% Impervious Runoff Depth=1.75"
Flow Length=377' Tc=10.9 min CN=65 Runoff=6.32 cfs 0.559 af

Reach 2R: section of stream Avg. Flow Depth=0.20' Max Vel=4.17 fps Inflow=4.49 cfs 0.354 af
n=0.040 L=169.0' S=0.1230 '/' Capacity=634.20 cfs Outflow=4.38 cfs 0.354 af

Reach 3R: section of stream Avg. Flow Depth=0.40' Max Vel=4.41 fps Inflow=17.63 cfs 1.492 af
n=0.040 L=403.0' S=0.0546 '/' Capacity=621.58 cfs Outflow=17.01 cfs 1.492 af

Reach DP-1: Inflow=17.01 cfs 1.492 af
Outflow=17.01 cfs 1.492 af

Pond 1R: twin 48" culverts Peak Elev=300.20' Inflow=4.49 cfs 0.354 af
Outflow=4.49 cfs 0.354 af

Summary for Subcatchment 10:

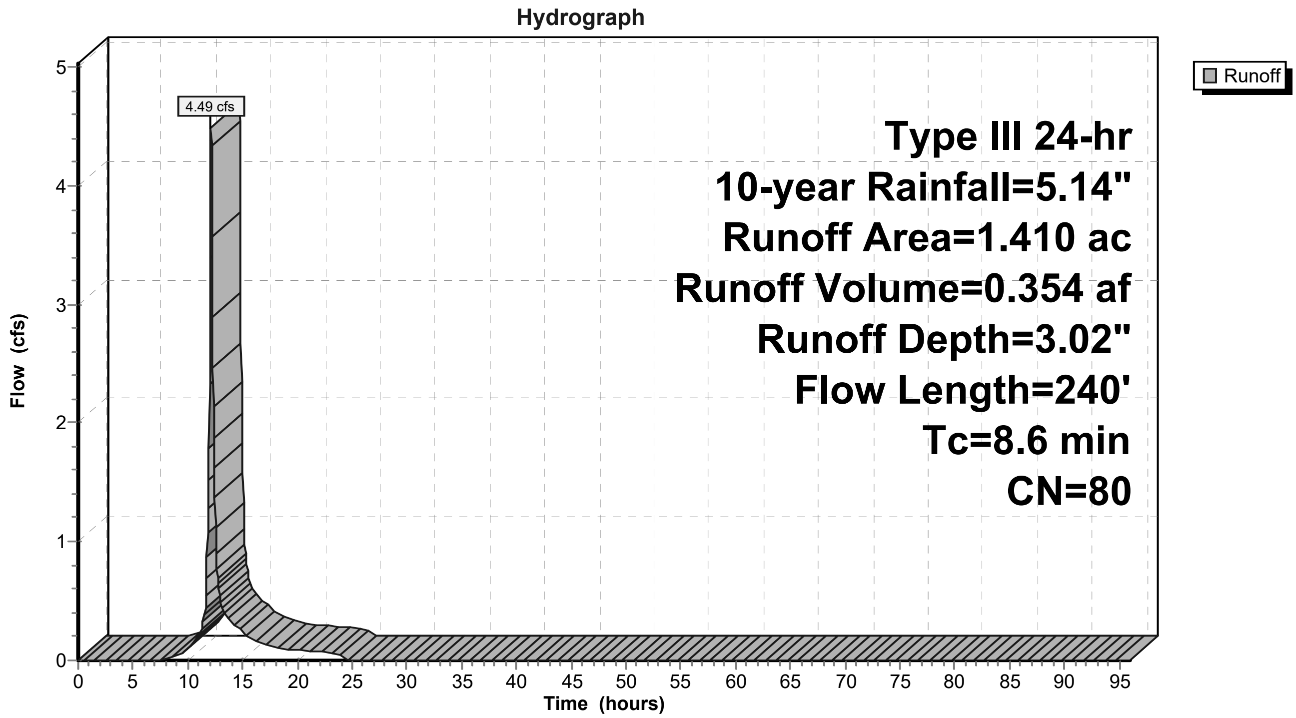
Runoff = 4.49 cfs @ 12.12 hrs, Volume= 0.354 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.14"

Area (ac)	CN	Description
0.110	98	Paved parking, HSG B
0.040	98	Paved parking, HSG D
0.020	85	Gravel roads, HSG B
0.010	91	Gravel roads, HSG D
0.040	98	Roofs, HSG D
0.080	69	50-75% Grass cover, Fair, HSG B
0.450	84	50-75% Grass cover, Fair, HSG D
0.170	60	Woods, Fair, HSG B
0.490	79	Woods, Fair, HSG D
1.410	80	Weighted Average
1.220		86.52% Pervious Area
0.190		13.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.1600	0.16		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.41"
3.1	50	0.0800	0.27		**Sheet Flow, B-C** Grass: Short n= 0.150 P2= 3.41"
0.2	28	0.1400	2.62		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
0.1	112	0.0440	23.98	301.31	**Pipe Channel, D-E** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013 Corrugated PE, smooth interior
8.6	240	Total			

Subcatchment 10:



Summary for Subcatchment 20:

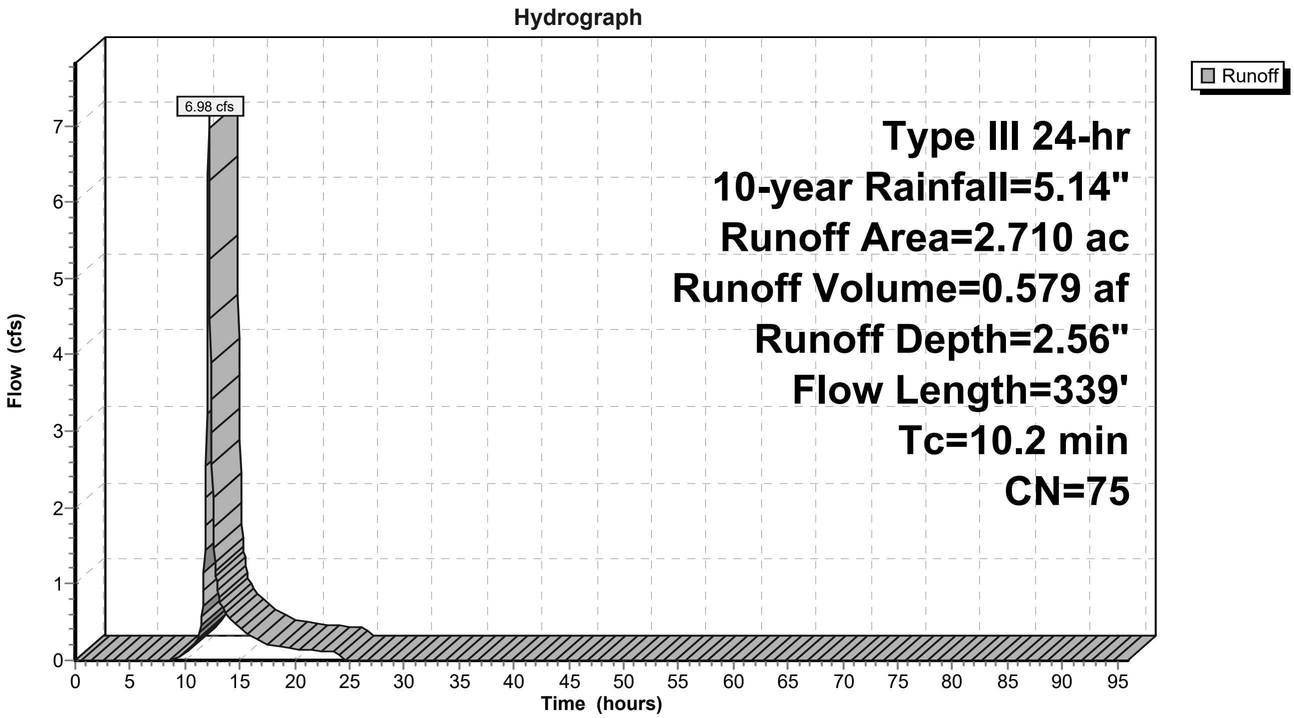
Runoff = 6.98 cfs @ 12.15 hrs, Volume= 0.579 af, Depth= 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.14"

Area (ac)	CN	Description
0.020	98	Water Surface, 0% imp, HSG B
0.010	98	Water Surface, 0% imp, HSG D
0.060	98	Roofs, HSG D
0.060	69	50-75% Grass cover, Fair, HSG B
0.590	84	50-75% Grass cover, Fair, HSG D
0.780	60	Woods, Fair, HSG B
1.190	79	Woods, Fair, HSG D
2.710	75	Weighted Average
2.650		97.79% Pervious Area
0.060		2.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.2100	0.21		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.41"
0.8	155	0.3800	3.08		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.3	84	0.0480	1.10		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
10.2	339	Total			

Subcatchment 20:



Summary for Subcatchment 30:

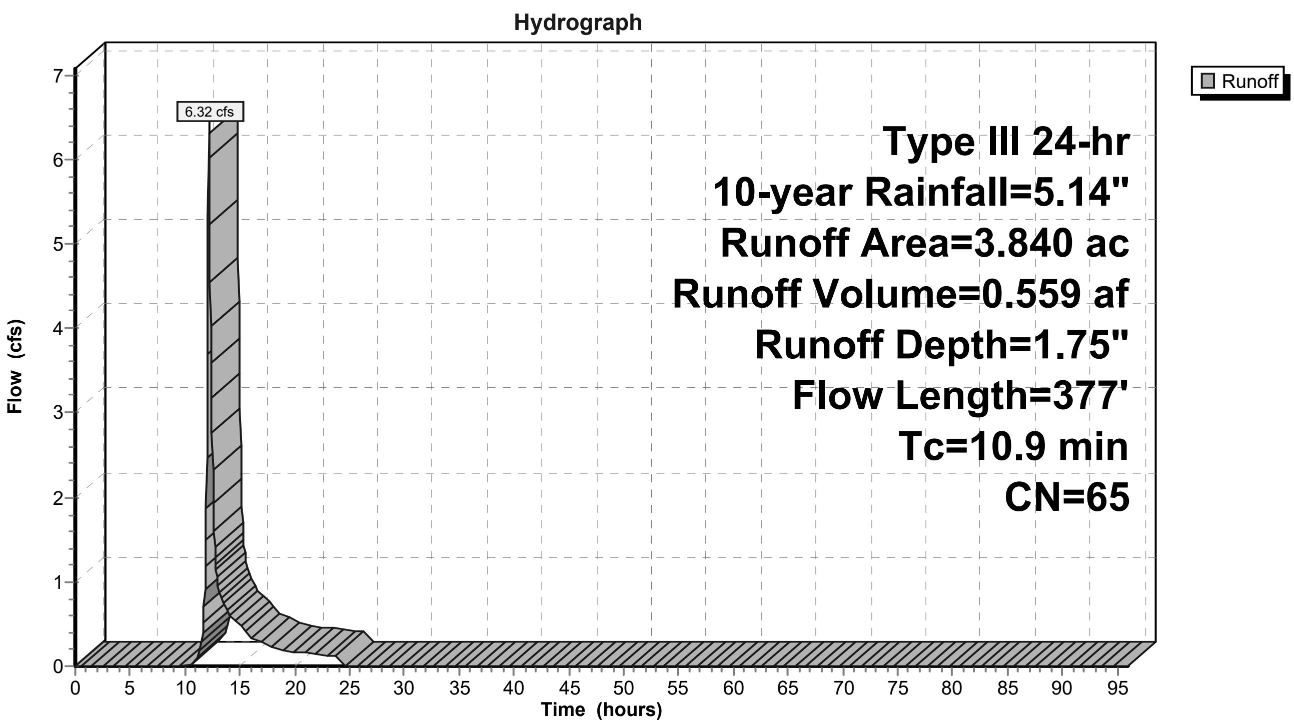
Runoff = 6.32 cfs @ 12.16 hrs, Volume= 0.559 af, Depth= 1.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.14"

Area (ac)	CN	Description
2.540	60	Woods, Fair, HSG B
1.260	73	Woods, Fair, HSG C
0.040	98	Water Surface, 0% imp, HSG B
3.840	65	Weighted Average
3.840		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.1600	0.18		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.41"
1.1	139	0.1800	2.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.7	138	0.3900	3.12		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
10.9	377	Total			

Subcatchment 30:



Summary for Reach 2R: section of stream

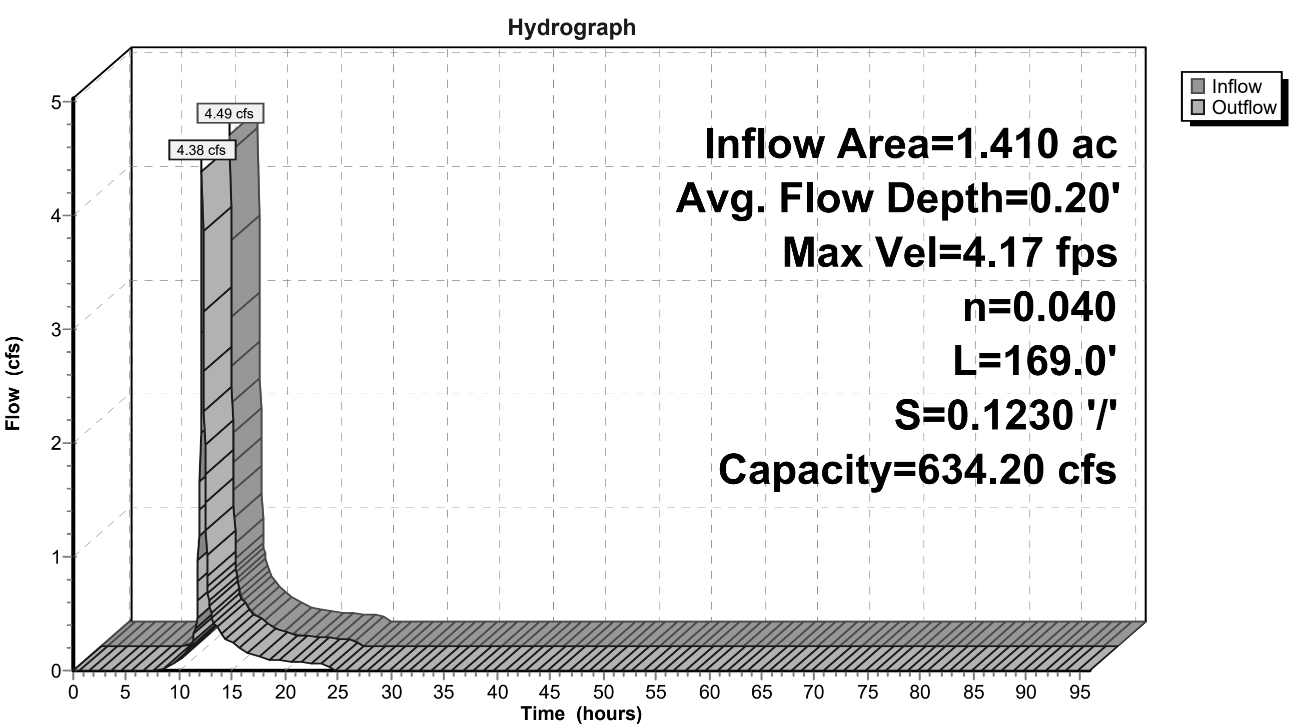
Inflow Area = 1.410 ac, 13.48% Impervious, Inflow Depth = 3.02" for 10-year event
Inflow = 4.49 cfs @ 12.12 hrs, Volume= 0.354 af
Outflow = 4.38 cfs @ 12.15 hrs, Volume= 0.354 af, Atten= 2%, Lag= 1.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.17 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 1.42 fps, Avg. Travel Time= 2.0 min

Peak Storage= 180 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 3.00' Flow Area= 33.0 sf, Capacity= 634.20 cfs

5.00' x 3.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 17.00'
Length= 169.0' Slope= 0.1230 '/'
Inlet Invert= 286.78', Outlet Invert= 266.00'

Reach 2R: section of stream



Summary for Reach 3R: section of stream

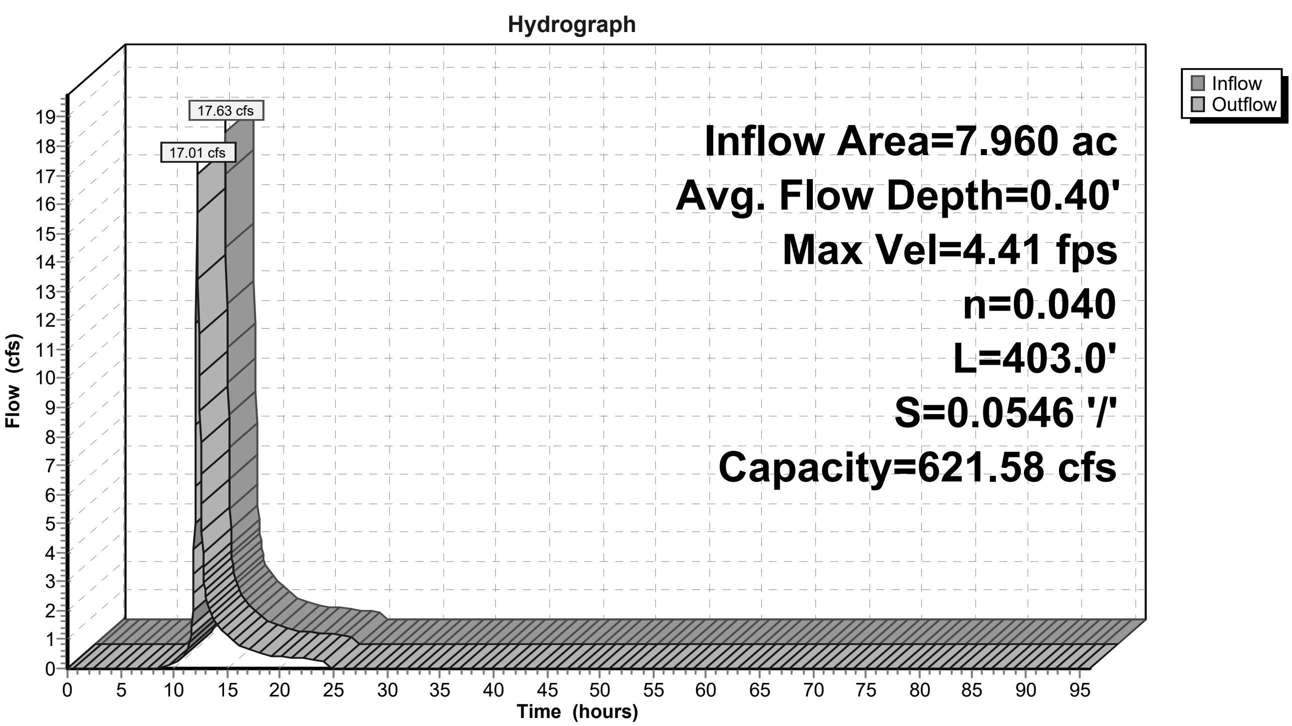
Inflow Area = 7.960 ac, 3.14% Impervious, Inflow Depth = 2.25" for 10-year event
Inflow = 17.63 cfs @ 12.15 hrs, Volume= 1.492 af
Outflow = 17.01 cfs @ 12.20 hrs, Volume= 1.492 af, Atten= 4%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.41 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 5.2 min

Peak Storage= 1,587 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 621.58 cfs

9.00' x 3.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 21.00'
Length= 403.0' Slope= 0.0546 '/'
Inlet Invert= 266.00', Outlet Invert= 244.00'

Reach 3R: section of stream

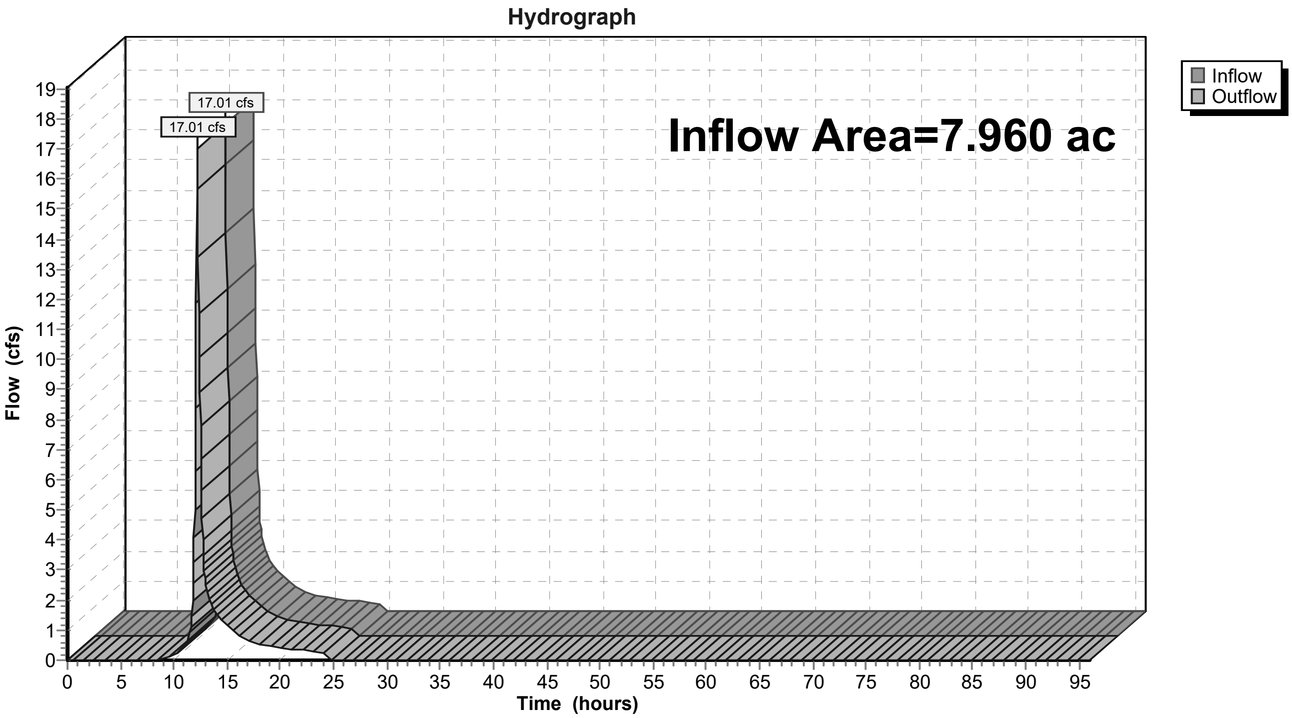


Summary for Reach DP-1:

Inflow Area = 7.960 ac, 3.14% Impervious, Inflow Depth = 2.25" for 10-year event
Inflow = 17.01 cfs @ 12.20 hrs, Volume= 1.492 af
Outflow = 17.01 cfs @ 12.20 hrs, Volume= 1.492 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Reach DP-1:



Summary for Pond 1R: twin 48" culverts

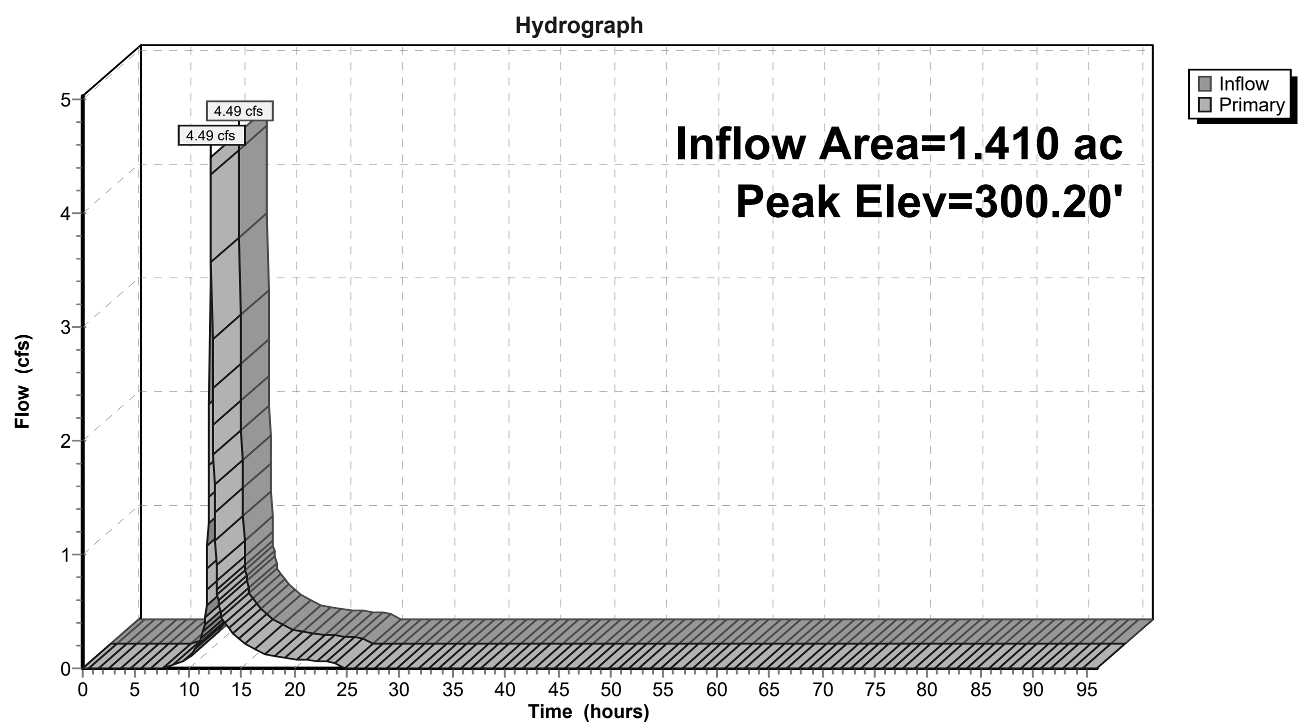
Inflow Area = 1.410 ac, 13.48% Impervious, Inflow Depth = 3.02" for 10-year event
Inflow = 4.49 cfs @ 12.12 hrs, Volume= 0.354 af
Outflow = 4.49 cfs @ 12.12 hrs, Volume= 0.354 af, Atten= 0%, Lag= 0.0 min
Primary = 4.49 cfs @ 12.12 hrs, Volume= 0.354 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 300.20' @ 12.12 hrs
Flood Elev= 316.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	299.55'	**48.0" Round Culvert** L= 182.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 299.55' / 286.78' S= 0.0702 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf
#2	Primary	299.90'	**48.0" Round Culvert** L= 180.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 299.90' / 287.92' S= 0.0666 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

Primary OutFlow Max=4.32 cfs @ 12.12 hrs HW=300.19' (Free Discharge)
1=Culvert (Inlet Controls 3.56 cfs @ 2.73 fps)
2=Culvert (Inlet Controls 0.76 cfs @ 1.84 fps)

Pond 1R: twin 48" culverts



Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10: Runoff Area=1.410 ac 13.48% Impervious Runoff Depth=6.84"
Flow Length=240' Tc=8.6 min CN=80 Runoff=9.98 cfs 0.804 af

Subcatchment20: Runoff Area=2.710 ac 2.21% Impervious Runoff Depth=6.22"
Flow Length=339' Tc=10.2 min CN=75 Runoff=16.82 cfs 1.405 af

Subcatchment30: Runoff Area=3.840 ac 0.00% Impervious Runoff Depth=4.96"
Flow Length=377' Tc=10.9 min CN=65 Runoff=18.82 cfs 1.587 af

Reach 2R: section of stream Avg. Flow Depth=0.32' Max Vel=5.51 fps Inflow=9.98 cfs 0.804 af
n=0.040 L=169.0' S=0.1230 '/' Capacity=634.20 cfs Outflow=9.75 cfs 0.804 af

Reach 3R: section of stream Avg. Flow Depth=0.70' Max Vel=6.18 fps Inflow=45.29 cfs 3.796 af
n=0.040 L=403.0' S=0.0546 '/' Capacity=621.58 cfs Outflow=43.74 cfs 3.796 af

Reach DP-1: Inflow=43.74 cfs 3.796 af
Outflow=43.74 cfs 3.796 af

Pond 1R: twin 48" culverts Peak Elev=300.47' Inflow=9.98 cfs 0.804 af
Outflow=9.98 cfs 0.804 af

Summary for Subcatchment 10:

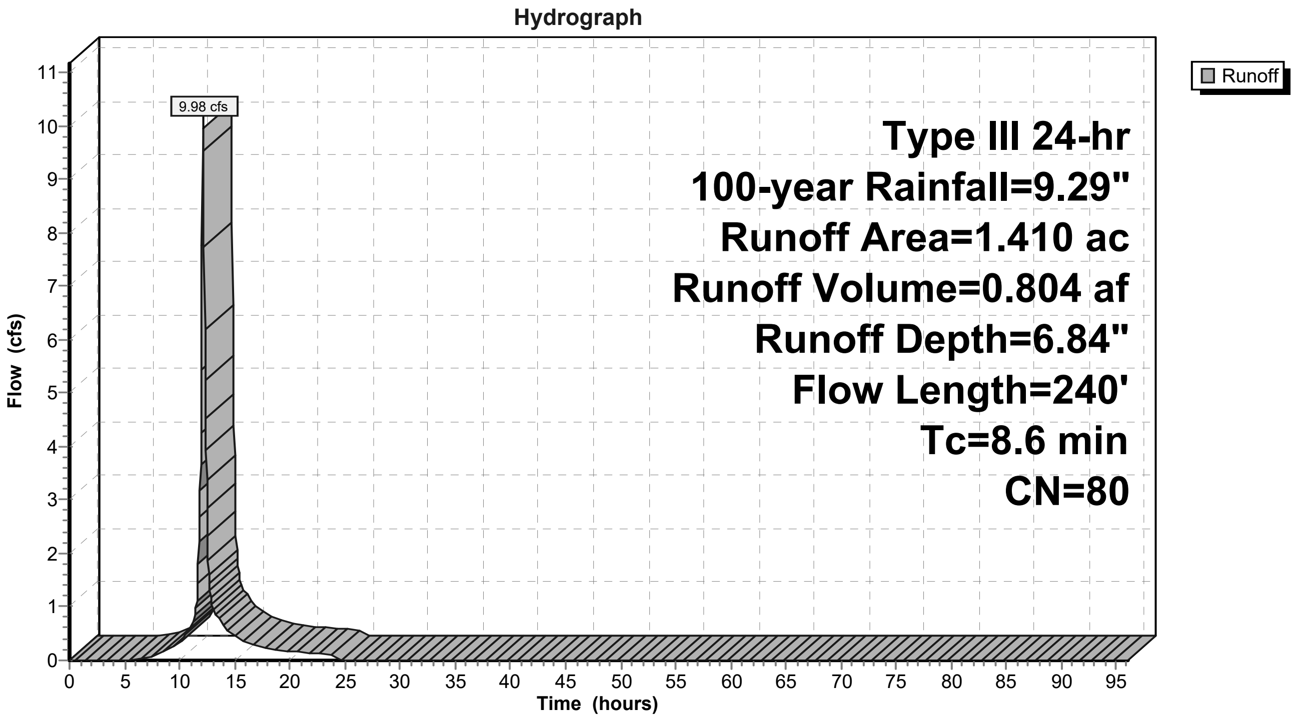
Runoff = 9.98 cfs @ 12.12 hrs, Volume= 0.804 af, Depth= 6.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=9.29"

Area (ac)	CN	Description
0.110	98	Paved parking, HSG B
0.040	98	Paved parking, HSG D
0.020	85	Gravel roads, HSG B
0.010	91	Gravel roads, HSG D
0.040	98	Roofs, HSG D
0.080	69	50-75% Grass cover, Fair, HSG B
0.450	84	50-75% Grass cover, Fair, HSG D
0.170	60	Woods, Fair, HSG B
0.490	79	Woods, Fair, HSG D
1.410	80	Weighted Average
1.220		86.52% Pervious Area
0.190		13.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.1600	0.16		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.41"
3.1	50	0.0800	0.27		**Sheet Flow, B-C** Grass: Short n= 0.150 P2= 3.41"
0.2	28	0.1400	2.62		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
0.1	112	0.0440	23.98	301.31	**Pipe Channel, D-E** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013 Corrugated PE, smooth interior
8.6	240	Total			

Subcatchment 10:



Summary for Subcatchment 20:

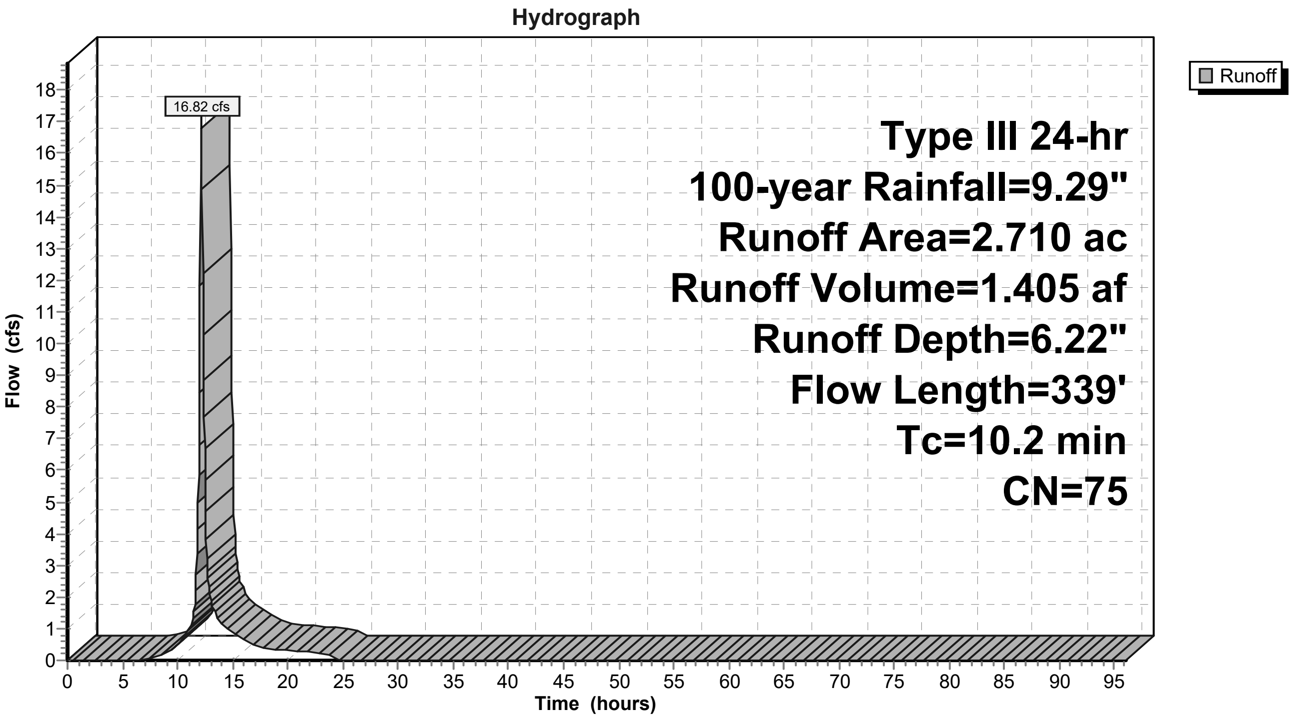
Runoff = 16.82 cfs @ 12.14 hrs, Volume= 1.405 af, Depth= 6.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=9.29"

Area (ac)	CN	Description
0.020	98	Water Surface, 0% imp, HSG B
0.010	98	Water Surface, 0% imp, HSG D
0.060	98	Roofs, HSG D
0.060	69	50-75% Grass cover, Fair, HSG B
0.590	84	50-75% Grass cover, Fair, HSG D
0.780	60	Woods, Fair, HSG B
1.190	79	Woods, Fair, HSG D
2.710	75	Weighted Average
2.650		97.79% Pervious Area
0.060		2.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.2100	0.21		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.41"
0.8	155	0.3800	3.08		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.3	84	0.0480	1.10		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
10.2	339	Total			

Subcatchment 20:



Summary for Subcatchment 30:

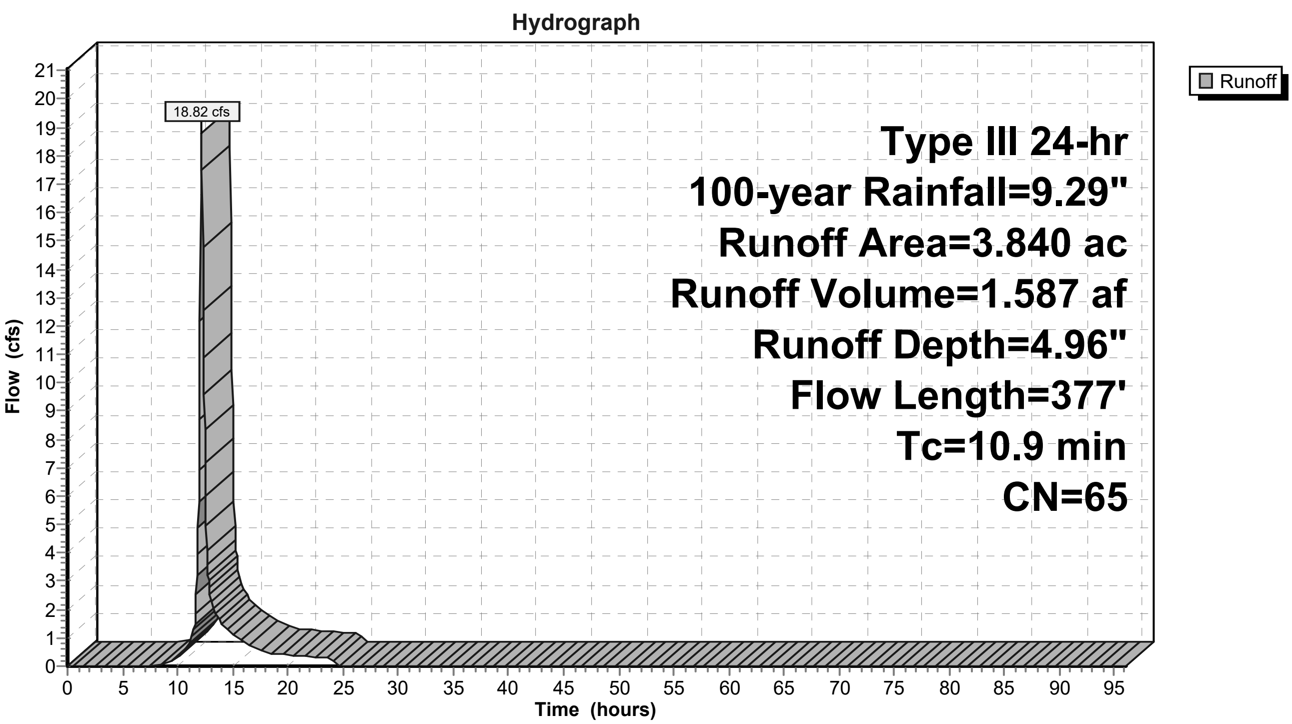
Runoff = 18.82 cfs @ 12.16 hrs, Volume= 1.587 af, Depth= 4.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=9.29"

Area (ac)	CN	Description
2.540	60	Woods, Fair, HSG B
1.260	73	Woods, Fair, HSG C
0.040	98	Water Surface, 0% imp, HSG B
3.840	65	Weighted Average
3.840		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	100	0.1600	0.18		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.41"
1.1	139	0.1800	2.12		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.7	138	0.3900	3.12		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
10.9	377	Total			

Subcatchment 30:



Summary for Reach 2R: section of stream

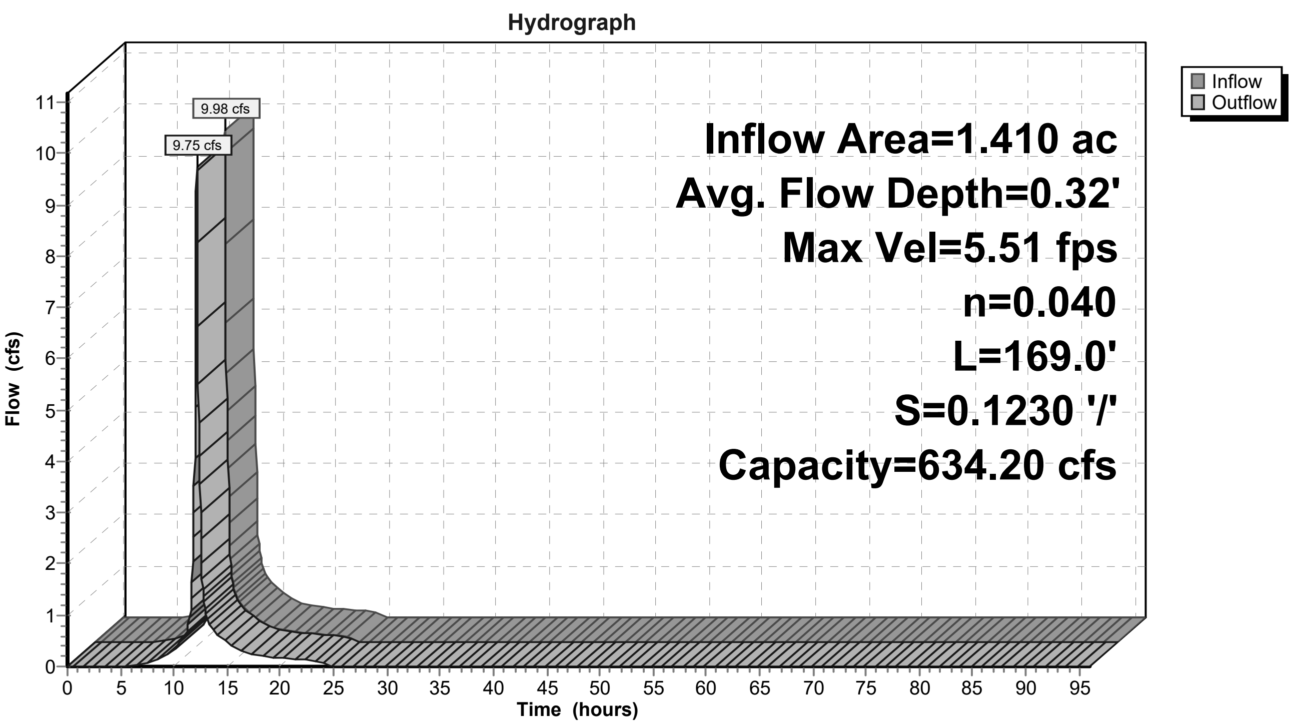
Inflow Area = 1.410 ac, 13.48% Impervious, Inflow Depth = 6.84" for 100-year event
Inflow = 9.98 cfs @ 12.12 hrs, Volume= 0.804 af
Outflow = 9.75 cfs @ 12.14 hrs, Volume= 0.804 af, Atten= 2%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.51 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.62 fps, Avg. Travel Time= 1.7 min

Peak Storage= 301 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 3.00' Flow Area= 33.0 sf, Capacity= 634.20 cfs

5.00' x 3.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 17.00'
Length= 169.0' Slope= 0.1230 '/'
Inlet Invert= 286.78', Outlet Invert= 266.00'

Reach 2R: section of stream



Summary for Reach 3R: section of stream

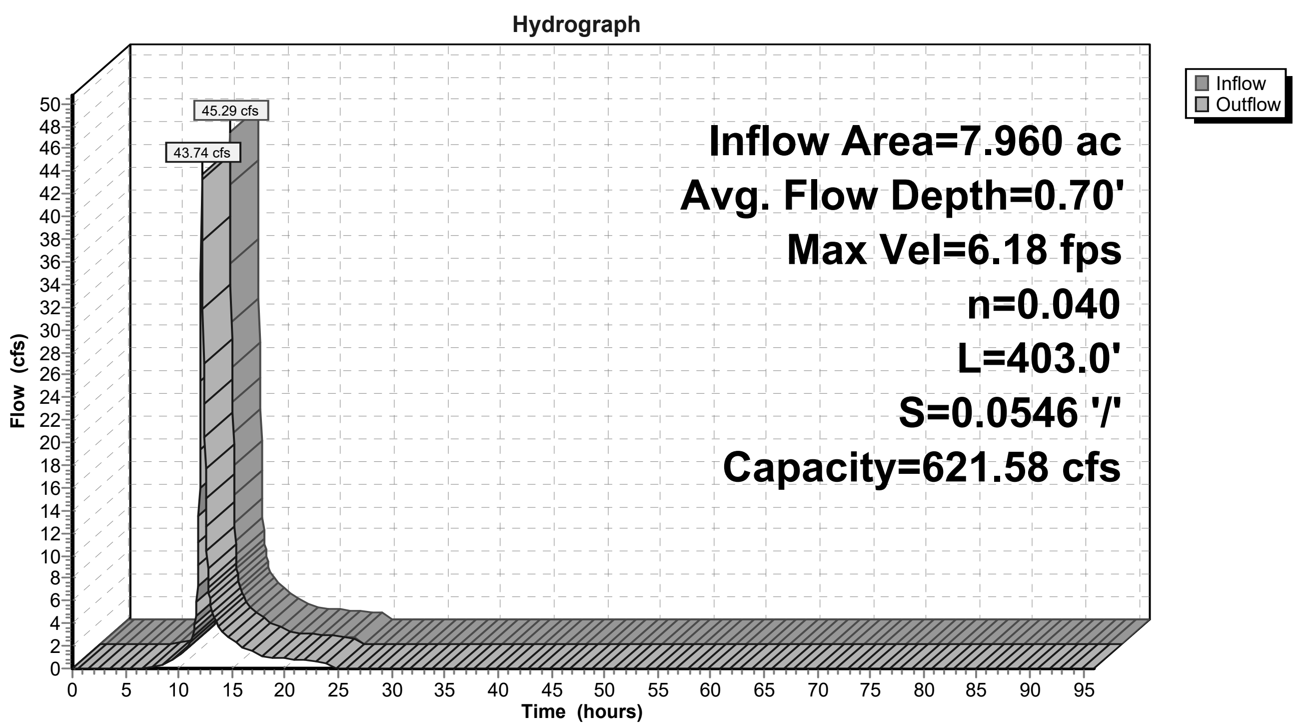
Inflow Area = 7.960 ac, 3.14% Impervious, Inflow Depth = 5.72" for 100-year event
Inflow = 45.29 cfs @ 12.15 hrs, Volume= 3.796 af
Outflow = 43.74 cfs @ 12.18 hrs, Volume= 3.796 af, Atten= 3%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.18 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.66 fps, Avg. Travel Time= 4.0 min

Peak Storage= 2,942 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.70'
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 621.58 cfs

9.00' x 3.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 21.00'
Length= 403.0' Slope= 0.0546 '/'
Inlet Invert= 266.00', Outlet Invert= 244.00'

Reach 3R: section of stream

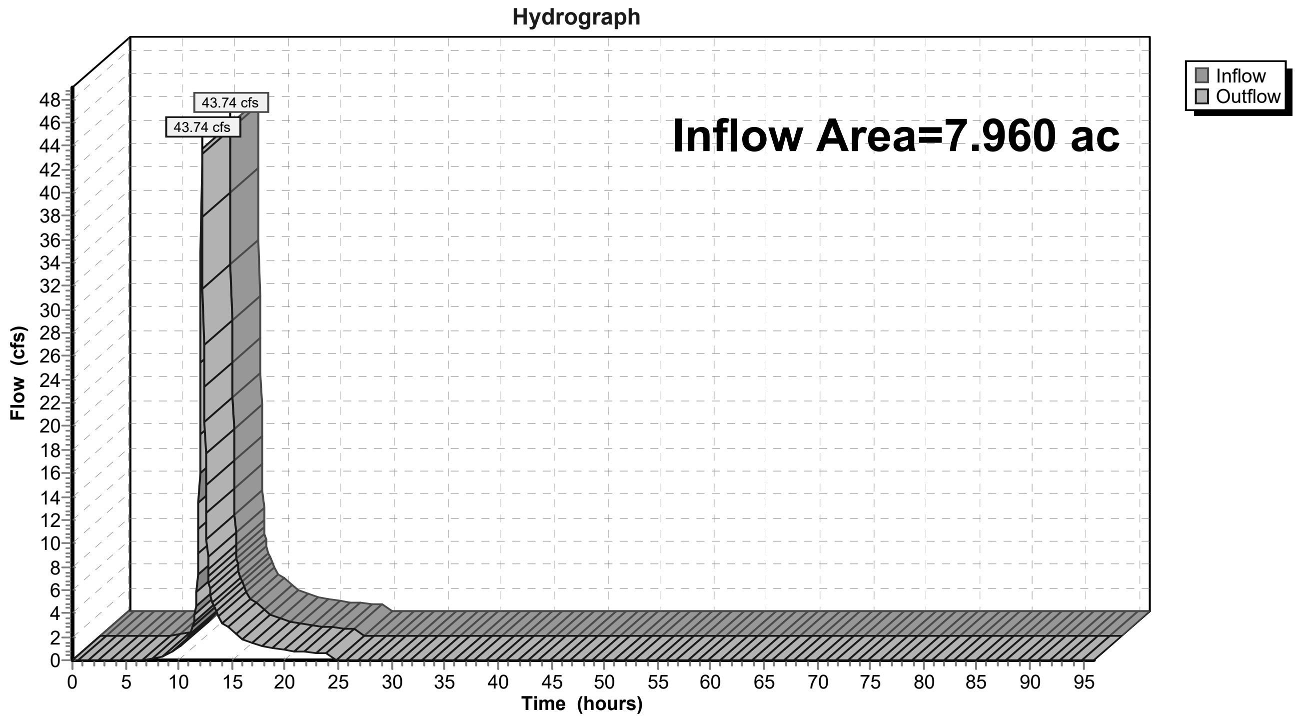


Summary for Reach DP-1:

Inflow Area = 7.960 ac, 3.14% Impervious, Inflow Depth = 5.72" for 100-year event
Inflow = 43.74 cfs @ 12.18 hrs, Volume= 3.796 af
Outflow = 43.74 cfs @ 12.18 hrs, Volume= 3.796 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Reach DP-1:



Summary for Pond 1R: twin 48" culverts

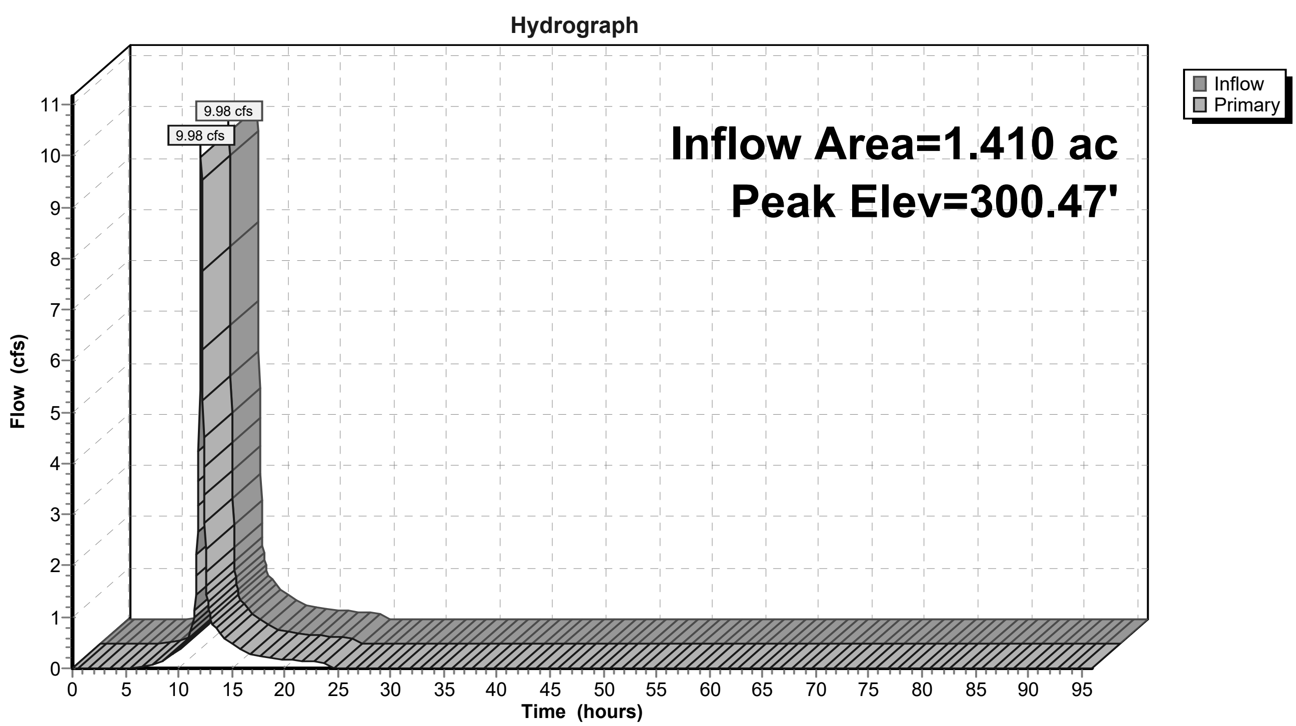
Inflow Area = 1.410 ac, 13.48% Impervious, Inflow Depth = 6.84" for 100-year event
Inflow = 9.98 cfs @ 12.12 hrs, Volume= 0.804 af
Outflow = 9.98 cfs @ 12.12 hrs, Volume= 0.804 af, Atten= 0%, Lag= 0.0 min
Primary = 9.98 cfs @ 12.12 hrs, Volume= 0.804 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 300.47' @ 12.12 hrs
Flood Elev= 316.05'

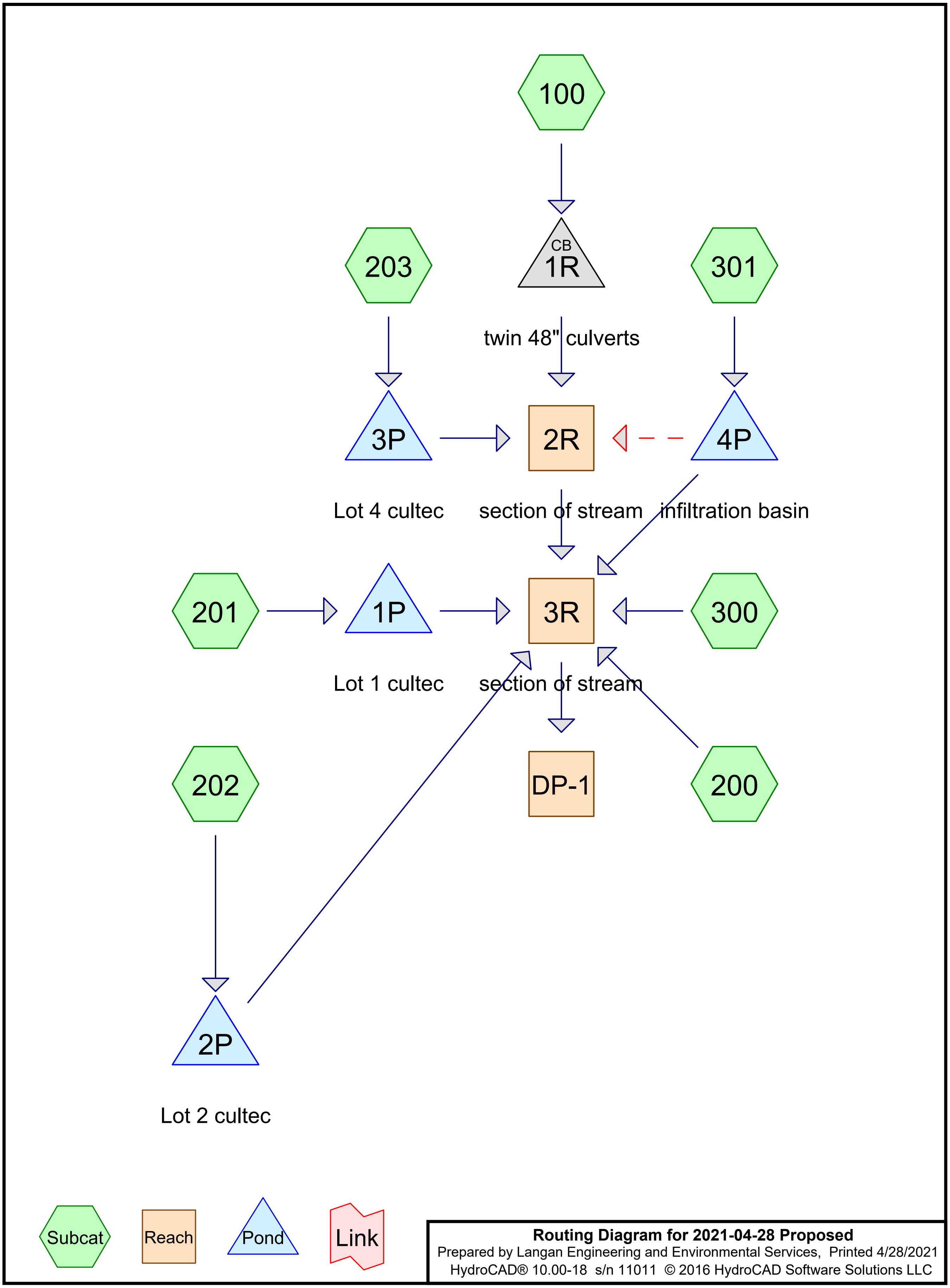
Device	Routing	Invert	Outlet Devices
#1	Primary	299.55'	**48.0" Round Culvert** L= 182.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 299.55' / 286.78' S= 0.0702 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf
#2	Primary	299.90'	**48.0" Round Culvert** L= 180.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 299.90' / 287.92' S= 0.0666 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

Primary OutFlow Max=9.60 cfs @ 12.12 hrs HW=300.46' (Free Discharge)
1=Culvert (Inlet Controls 6.92 cfs @ 3.24 fps)
2=Culvert (Inlet Controls 2.68 cfs @ 2.54 fps)

Pond 1R: twin 48" culverts



Appendix G: Post-Development Stormwater Analysis


100
CB
1R
203
301
twin 48" culverts
3P
2R
4P
Lot 4 cultec
section of stream
infiltration basin
201
1P
3R
300
Lot 1 cultec
section of stream
202
DP-1
200
2P
Lot 2 cultec
Subcat
Reach
Pond
Link
Routing Diagram for 2021-04-28 Proposed
Prepared by Langan Engineering and Environmental Services, Printed 4/28/2021
HydroCAD® 10.00-18 s/n 11011 © 2016 HydroCAD Software Solutions LLC

Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment100: Runoff Area=0.900 ac 21.11% Impervious Runoff Depth=1.09"
Flow Length=271' Tc=10.2 min CN=80 Runoff=0.96 cfs 0.082 af

Subcatchment200: Runoff Area=1.640 ac 1.83% Impervious Runoff Depth=0.87"
Flow Length=339' Tc=6.0 min CN=76 Runoff=1.55 cfs 0.119 af

Subcatchment201: Runoff Area=0.210 ac 38.10% Impervious Runoff Depth=1.55"
Tc=6.0 min CN=87 Runoff=0.37 cfs 0.027 af

Subcatchment202: Runoff Area=0.030 ac 100.00% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=98 Runoff=0.08 cfs 0.006 af

Subcatchment203: Runoff Area=0.030 ac 100.00% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=98 Runoff=0.08 cfs 0.006 af

Subcatchment300: Runoff Area=1.820 ac 0.55% Impervious Runoff Depth=0.38"
Flow Length=506' Tc=13.2 min CN=64 Runoff=0.39 cfs 0.057 af

Subcatchment301: Runoff Area=3.340 ac 32.63% Impervious Runoff Depth=0.97"
Tc=6.0 min CN=78 Runoff=3.61 cfs 0.271 af

Reach 2R: section of stream Avg. Flow Depth=0.08' Max Vel=2.36 fps Inflow=0.96 cfs 0.082 af
n=0.040 L=169.0' S=0.1230 '/' Capacity=634.20 cfs Outflow=0.93 cfs 0.082 af

Reach 3R: section of stream Avg. Flow Depth=0.13' Max Vel=2.18 fps Inflow=2.71 cfs 0.297 af
n=0.040 L=403.0' S=0.0546 '/' Capacity=621.58 cfs Outflow=2.62 cfs 0.297 af

Reach DP-1: Inflow=2.62 cfs 0.297 af
Outflow=2.62 cfs 0.297 af

Pond 1P: Lot 1 cultec Peak Elev=301.21' Storage=187 cf Inflow=0.37 cfs 0.027 af
Discarded=0.04 cfs 0.020 af Primary=0.24 cfs 0.007 af Outflow=0.28 cfs 0.027 af

Pond 1R: twin 48" culverts Peak Elev=299.88' Inflow=0.96 cfs 0.082 af
Outflow=0.96 cfs 0.082 af

Pond 2P: Lot 2 cultec Peak Elev=310.70' Storage=37 cf Inflow=0.08 cfs 0.006 af
Discarded=0.03 cfs 0.006 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.006 af

Pond 3P: Lot 4 cultec Peak Elev=291.70' Storage=37 cf Inflow=0.08 cfs 0.006 af
Discarded=0.03 cfs 0.006 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.006 af

Pond 4P: infiltration basin Peak Elev=295.19' Storage=3,833 cf Inflow=3.61 cfs 0.271 af
Discarded=0.35 cfs 0.240 af Primary=0.55 cfs 0.032 af Secondary=0.00 cfs 0.000 af Outflow=0.90 cfs 0.271 af

Total Runoff Area = 7.970 ac Runoff Volume = 0.569 af Average Runoff Depth = 0.86"
81.68% Pervious = 6.510 ac 18.32% Impervious = 1.460 ac

Summary for Subcatchment 100:

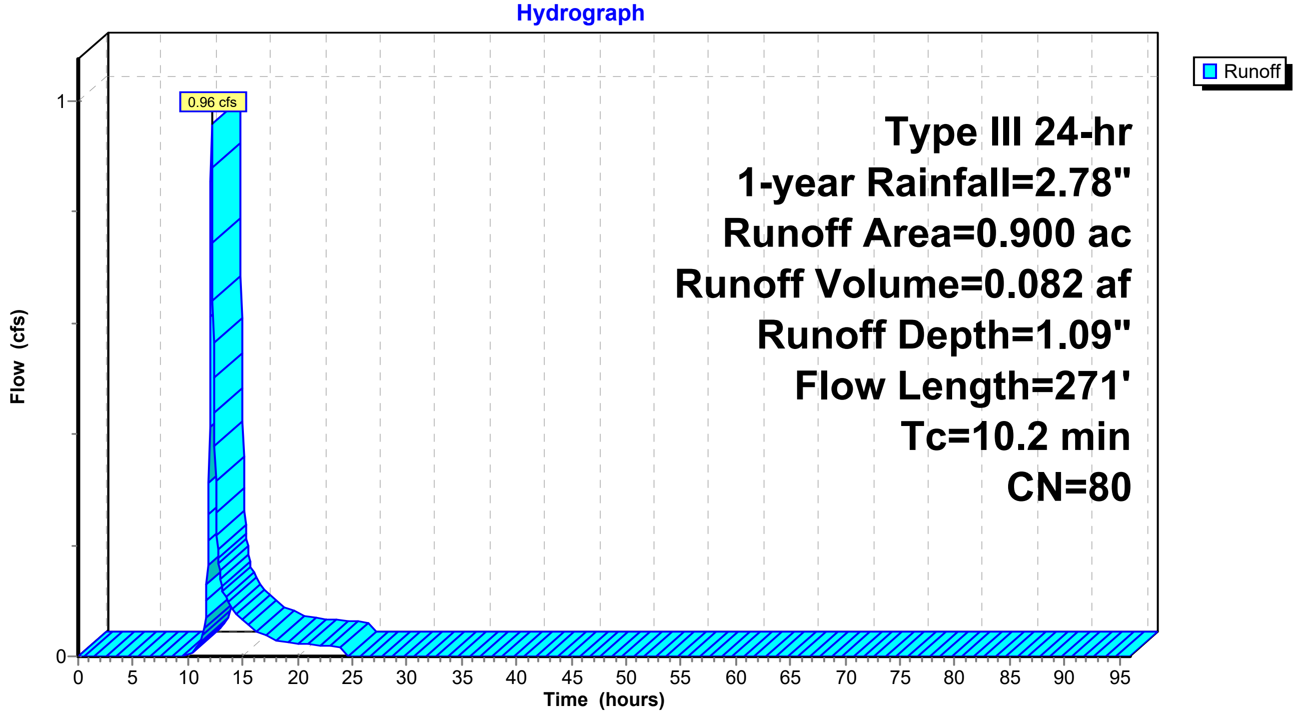
Runoff = 0.96 cfs @ 12.15 hrs, Volume= 0.082 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-year Rainfall=2.78"

Area (ac)	CN	Description
0.150	98	Paved parking, HSG B
0.020	85	Gravel roads, HSG B
0.010	91	Gravel roads, HSG D
0.040	98	Roofs, HSG D
0.130	69	50-75% Grass cover, Fair, HSG B
0.130	80	>75% Grass cover, Good, HSG D
0.110	60	Woods, Fair, HSG B
0.310	79	Woods, Fair, HSG D
0.900	80	Weighted Average
0.710		78.89% Pervious Area
0.190		21.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.1400	0.17		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.41"
0.5	59	0.0680	1.83		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.1	112	0.0440	23.98	301.31	**Pipe Channel, C-D** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013 Corrugated PE, smooth interior
10.2	271	Total			

Subcatchment 100:



Summary for Subcatchment 200:

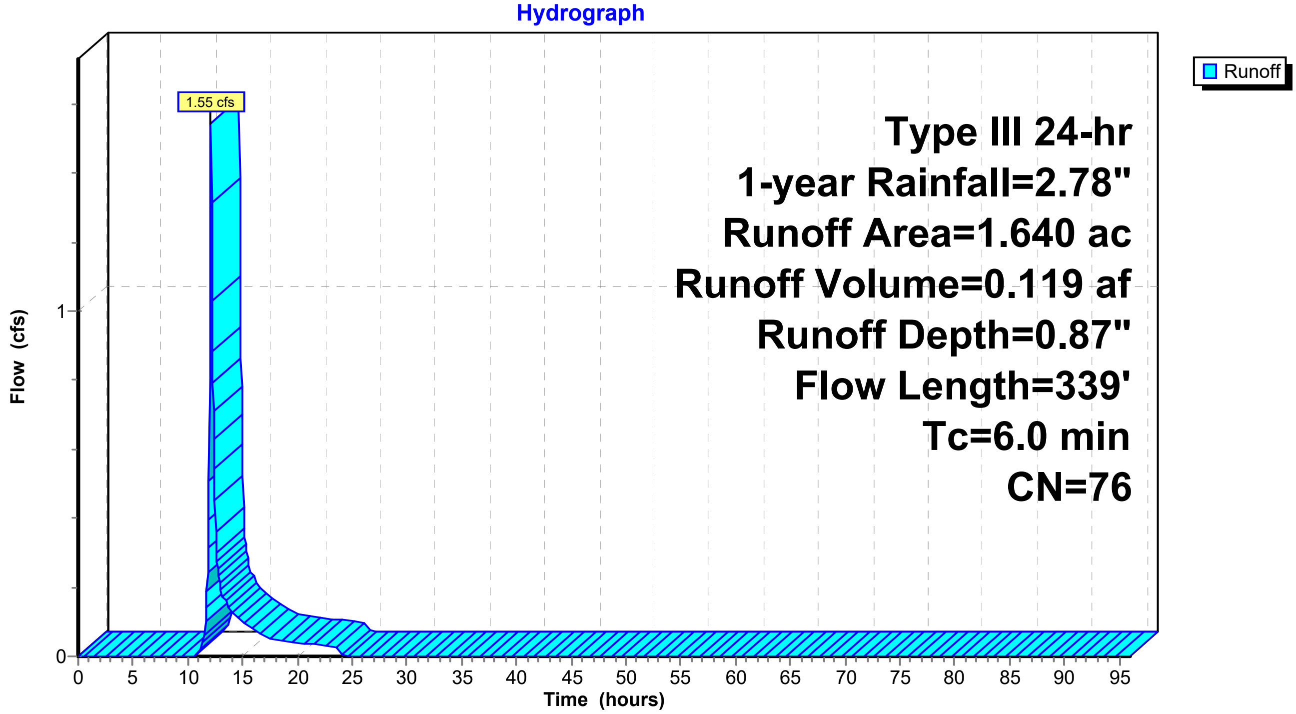
Runoff = 1.55 cfs @ 12.10 hrs, Volume= 0.119 af, Depth= 0.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-year Rainfall=2.78"

Area (ac)	CN	Description
0.020	98	Water Surface, 0% imp, HSG B
0.010	98	Water Surface, 0% imp, HSG D
0.030	98	Roofs, HSG D
0.090	61	>75% Grass cover, Good, HSG B
0.720	80	>75% Grass cover, Good, HSG D
0.280	60	Woods, Fair, HSG B
0.490	79	Woods, Fair, HSG D
1.640	76	Weighted Average
1.610		98.17% Pervious Area
0.030		1.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	100	0.2100	0.45		**Sheet Flow, A-B**
					Grass: Short n= 0.150 P2= 3.41"
0.1	29	0.3800	4.32		**Shallow Concentrated Flow, B-C**
					Short Grass Pasture Kv= 7.0 fps
0.7	126	0.3800	3.08		**Shallow Concentrated Flow, C-D**
					Woodland Kv= 5.0 fps
1.3	84	0.0480	1.10		**Shallow Concentrated Flow, D-E**
					Woodland Kv= 5.0 fps
5.8	339	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 200:



Summary for Subcatchment 201:

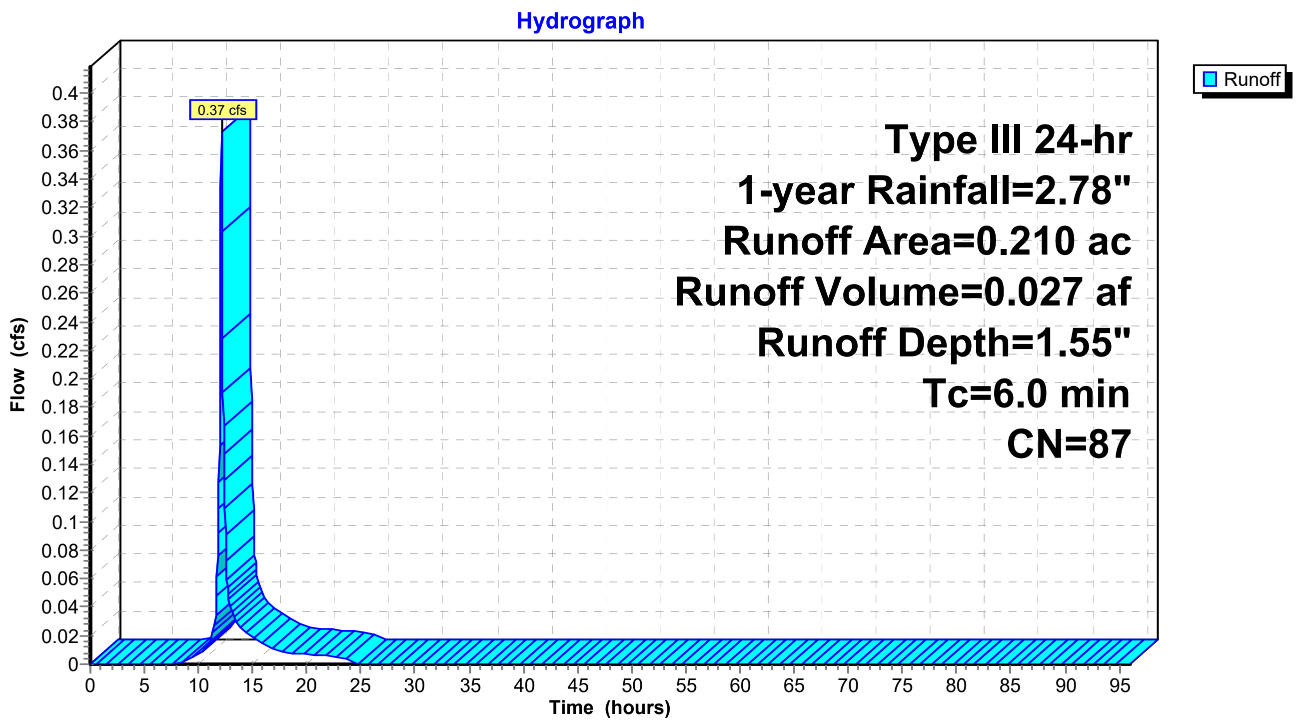
Runoff = 0.37 cfs @ 12.09 hrs, Volume= 0.027 af, Depth= 1.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-year Rainfall=2.78"

Area (ac)	CN	Description
0.050	98	Paved parking, HSG D
0.030	98	Roofs, HSG D
0.130	80	>75% Grass cover, Good, HSG D
0.210	87	Weighted Average
0.130		61.90% Pervious Area
0.080		38.10% Impervious Area

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

Subcatchment 201:



Summary for Subcatchment 202:

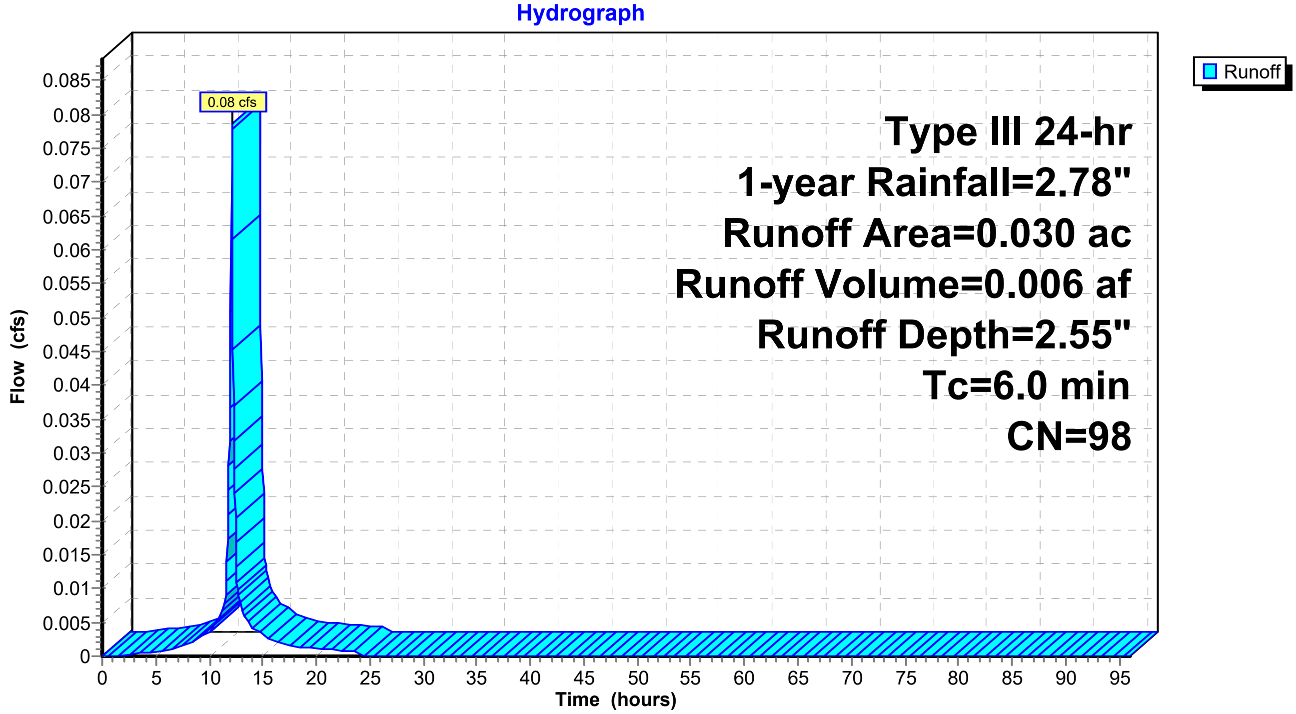
Runoff = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-year Rainfall=2.78"

Area (ac)	CN	Description
0.030	98	Roofs, HSG D
0.030		100.00% Impervious Area

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

Subcatchment 202:



Summary for Subcatchment 203:

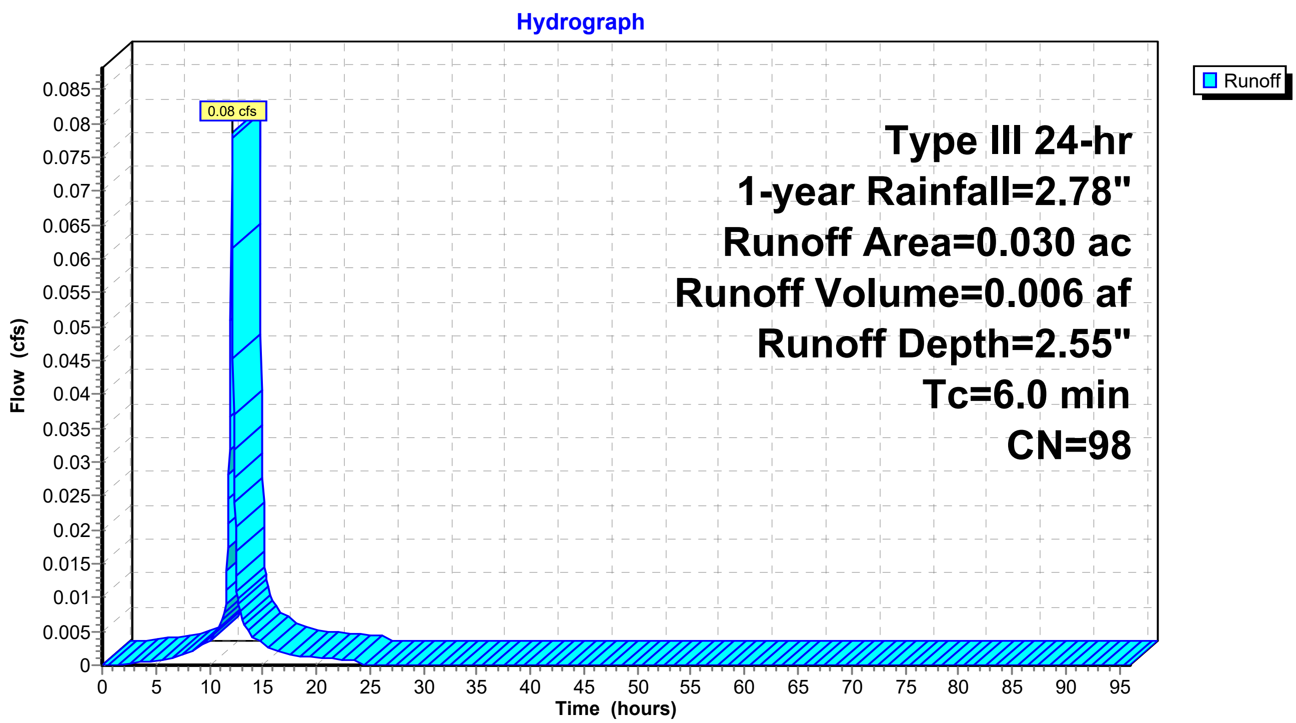
Runoff = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-year Rainfall=2.78"

Area (ac)	CN	Description
0.030	98	Roofs, HSG D
0.030		100.00% Impervious Area

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

Subcatchment 203:



Summary for Subcatchment 300:

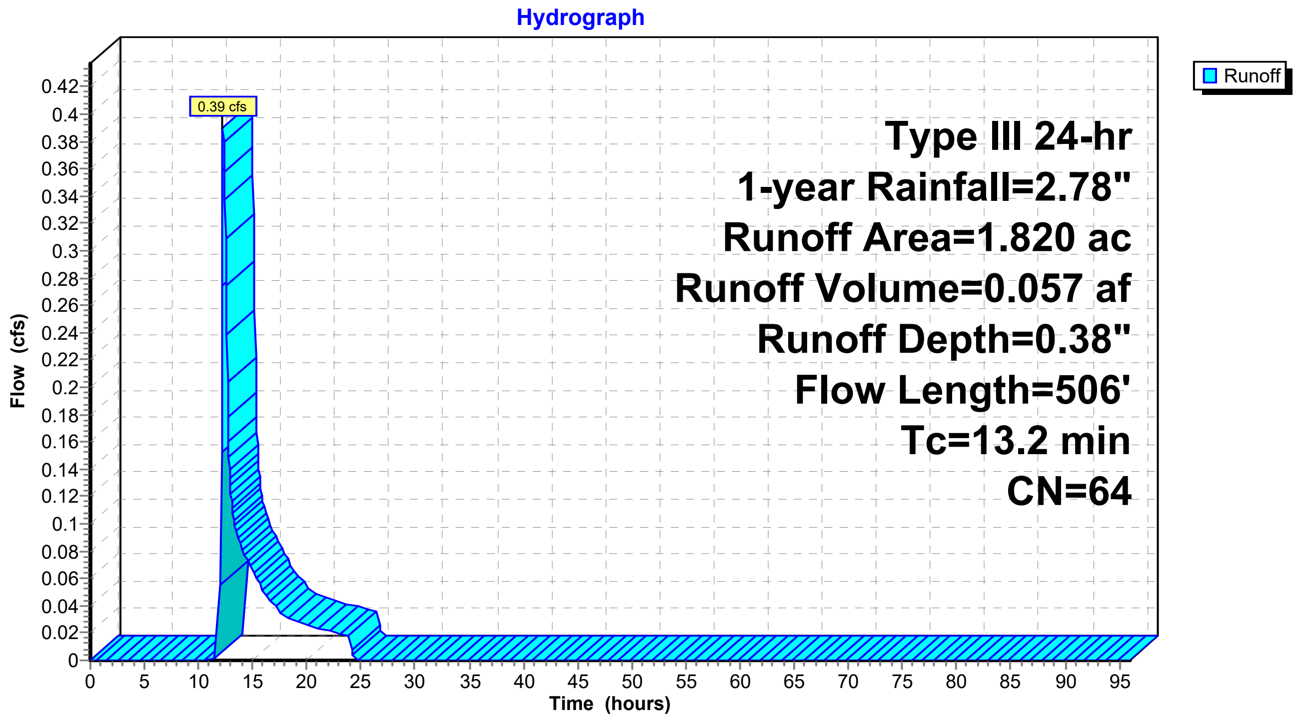
Runoff = 0.39 cfs @ 12.27 hrs, Volume= 0.057 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-year Rainfall=2.78"

Area (ac)	CN	Description
1.110	60	Woods, Fair, HSG B
0.390	73	Woods, Fair, HSG C
0.040	98	Water Surface, 0% imp, HSG B
0.250	61	>75% Grass cover, Good, HSG B
0.020	74	>75% Grass cover, Good, HSG C
0.010	98	Paved parking, HSG B
1.820	64	Weighted Average
1.810		99.45% Pervious Area
0.010		0.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	100	0.1200	0.16		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.41"
2.1	245	0.1500	1.94		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.9	161	0.3300	2.87		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
13.2	506	Total			

Subcatchment 300:



Summary for Subcatchment 301:

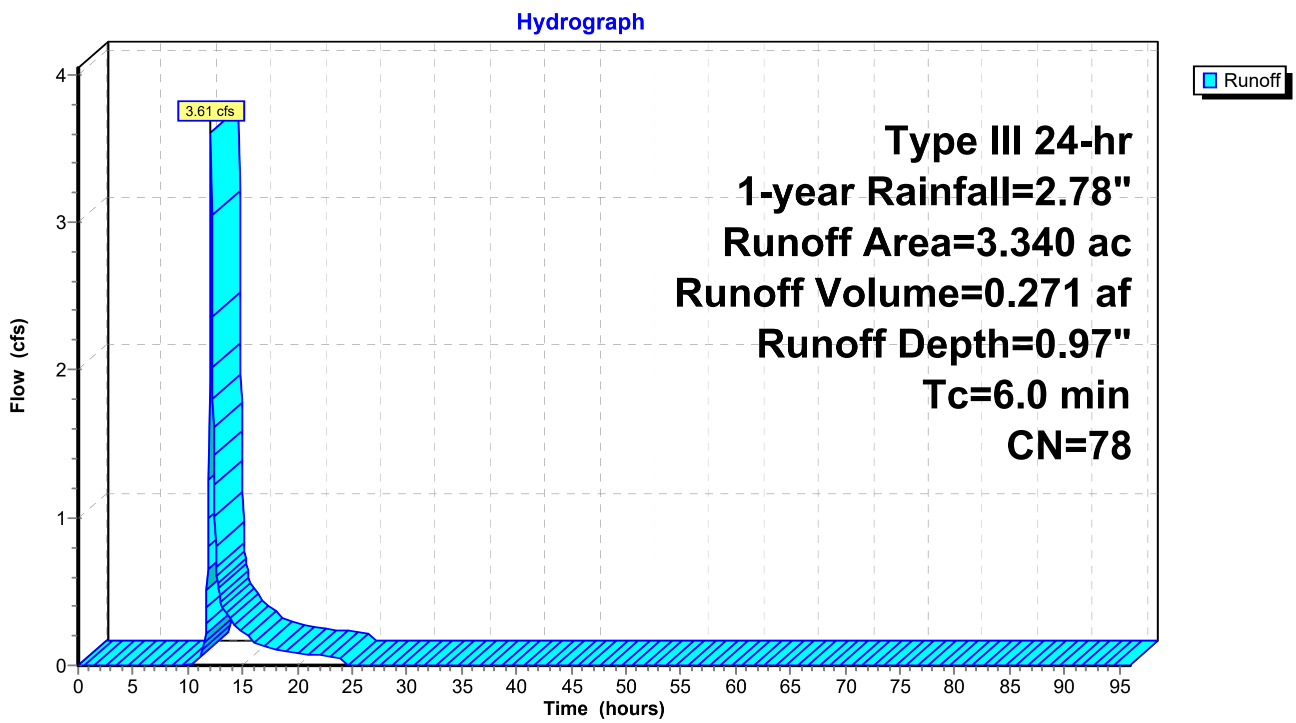
Runoff = 3.61 cfs @ 12.10 hrs, Volume= 0.271 af, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 1-year Rainfall=2.78"

Area (ac)	CN	Description
0.470	98	Paved parking, HSG B
0.100	98	Paved parking, HSG C
0.360	98	Paved parking, HSG D
0.080	98	Roofs, HSG B
0.080	98	Roofs, HSG C
0.250	60	Woods, Fair, HSG B
0.150	73	Woods, Fair, HSG C
0.120	79	Woods, Fair, HSG D
0.890	61	>75% Grass cover, Good, HSG B
0.530	74	>75% Grass cover, Good, HSG C
0.310	80	>75% Grass cover, Good, HSG D
3.340	78	Weighted Average
2.250		67.37% Pervious Area
1.090		32.63% Impervious Area

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

Subcatchment 301:



Summary for Reach 2R: section of stream

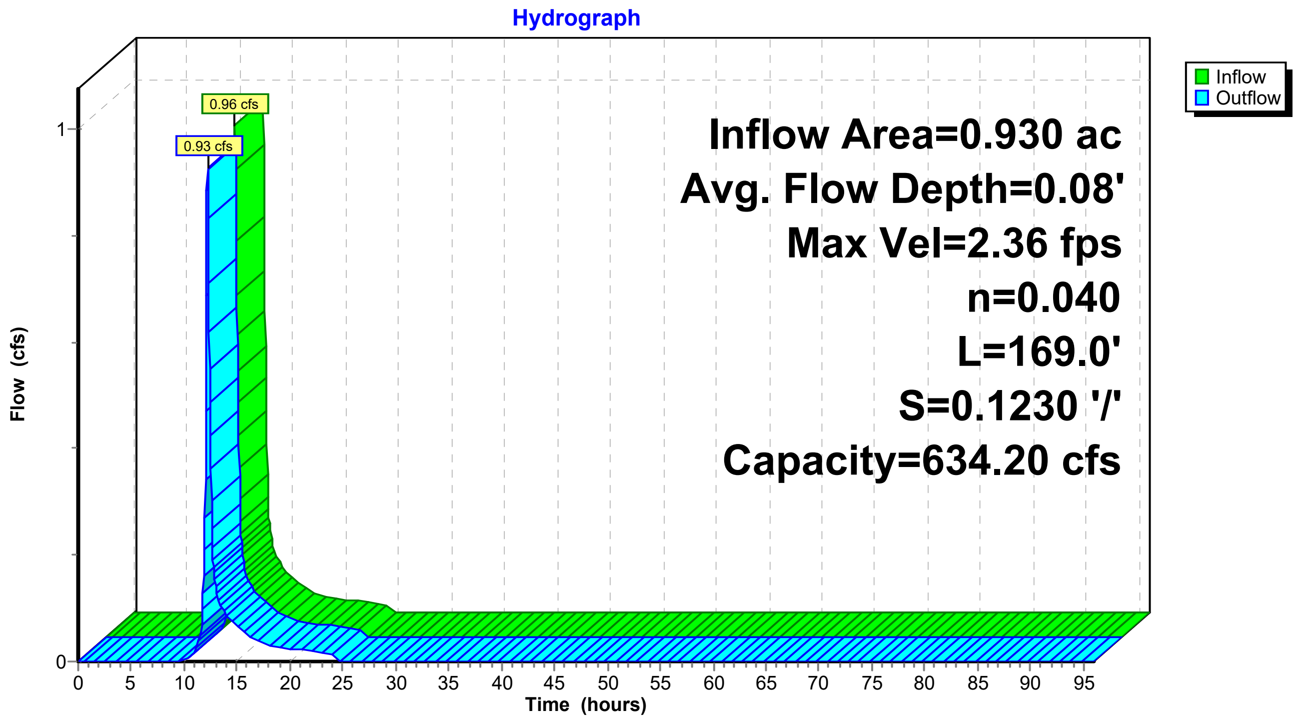
Inflow Area = 0.930 ac, 23.66% Impervious, Inflow Depth = 1.05" for 1-year event
Inflow = 0.96 cfs @ 12.15 hrs, Volume= 0.082 af
Outflow = 0.93 cfs @ 12.19 hrs, Volume= 0.082 af, Atten= 3%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.36 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.28 fps, Avg. Travel Time= 2.2 min

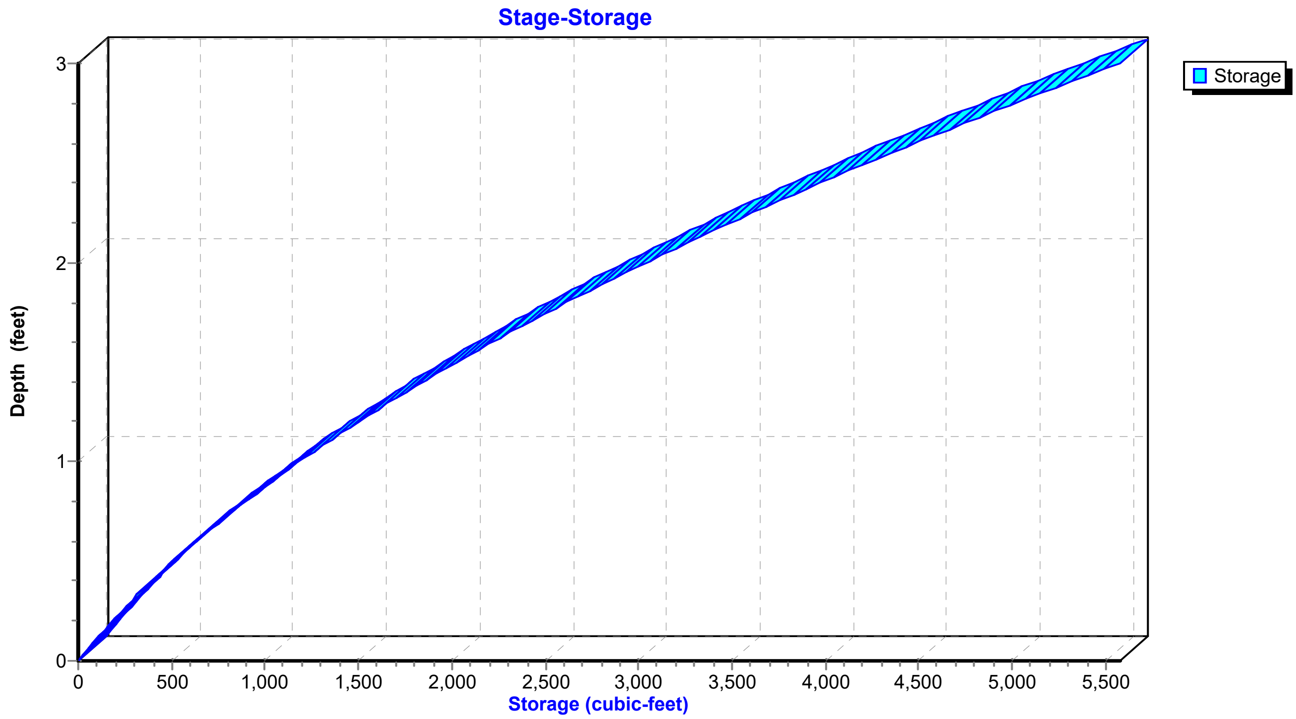
Peak Storage= 68 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 3.00' Flow Area= 33.0 sf, Capacity= 634.20 cfs

5.00' x 3.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 17.00'
Length= 169.0' Slope= 0.1230 '/'
Inlet Invert= 286.78', Outlet Invert= 266.00'

Reach 2R: section of stream



Reach 2R: section of stream



Stage-Area-Storage for Reach 2R: section of stream

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
286.78	0.0	0	289.38	26.5	4,482
286.83	0.3	43	289.43	27.3	4,613
286.88	0.5	88	289.48	28.1	4,746
286.93	0.8	134	289.53	28.9	4,880
286.98	1.1	183	289.58	29.7	5,016
287.03	1.4	232	289.63	30.5	5,154
287.08	1.7	284	289.68	31.3	5,293
287.13	2.0	337	289.73	32.2	5,434
287.18	2.3	392	289.78	**33.0**	**5,577**
287.23	2.7	449			
287.28	3.0	507			
287.33	3.4	567			
287.38	3.7	629			
287.43	4.1	692			
287.48	4.5	757			
287.53	4.9	824			
287.58	5.3	892			
287.63	5.7	963			
287.68	6.1	1,034			
287.73	6.6	1,108			
287.78	7.0	1,183			
287.83	7.5	1,260			
287.88	7.9	1,339			
287.93	8.4	1,419			
287.98	8.9	1,501			
288.03	9.4	1,584			
288.08	9.9	1,670			
288.13	10.4	1,757			
288.18	10.9	1,846			
288.23	11.5	1,936			
288.28	12.0	2,028			
288.33	12.6	2,122			
288.38	13.1	2,217			
288.43	13.7	2,314			
288.48	14.3	2,413			
288.53	14.9	2,514			
288.58	15.5	2,616			
288.63	16.1	2,720			
288.68	16.7	2,826			
288.73	17.4	2,933			
288.78	18.0	3,042			
288.83	18.7	3,153			
288.88	19.3	3,265			
288.93	20.0	3,379			
288.98	20.7	3,495			
289.03	21.4	3,612			
289.08	22.1	3,732			
289.13	22.8	3,852			
289.18	23.5	3,975			
289.23	24.3	4,099			
289.28	25.0	4,225			
289.33	25.8	4,353			

Summary for Reach 3R: section of stream

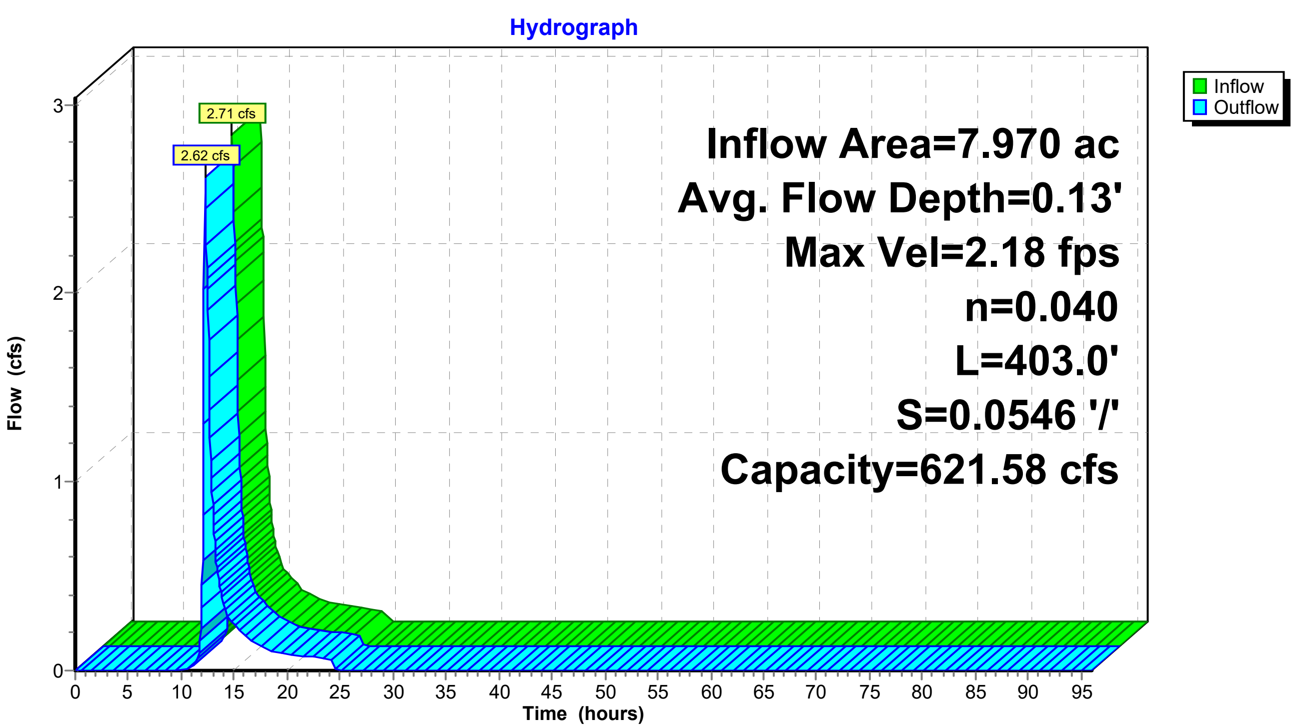
Inflow Area = 7.970 ac, 18.32% Impervious, Inflow Depth = 0.45" for 1-year event
Inflow = 2.71 cfs @ 12.15 hrs, Volume= 0.297 af
Outflow = 2.62 cfs @ 12.24 hrs, Volume= 0.297 af, Atten= 3%, Lag= 5.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.18 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.93 fps, Avg. Travel Time= 7.2 min

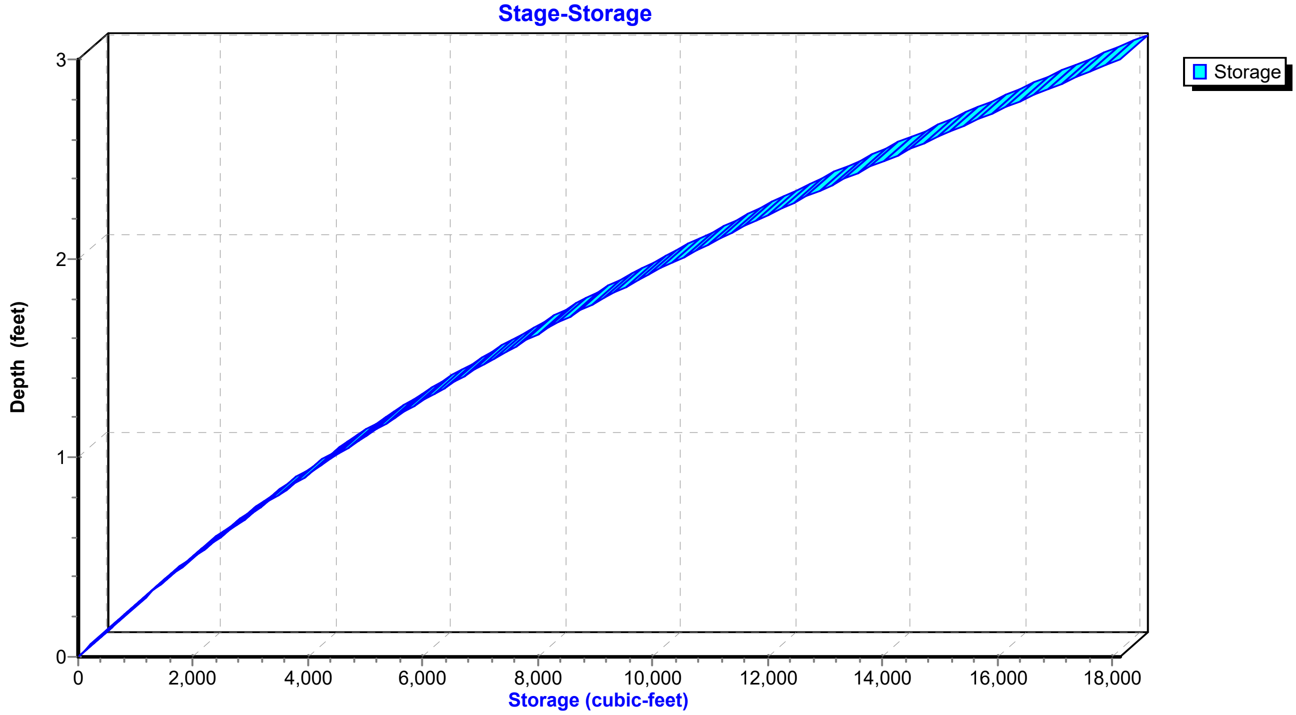
Peak Storage= 484 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.13'
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 621.58 cfs

9.00' x 3.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 21.00'
Length= 403.0' Slope= 0.0546 '/'
Inlet Invert= 266.00', Outlet Invert= 244.00'

Reach 3R: section of stream



Reach 3R: section of stream



Stage-Area-Storage for Reach 3R: section of stream

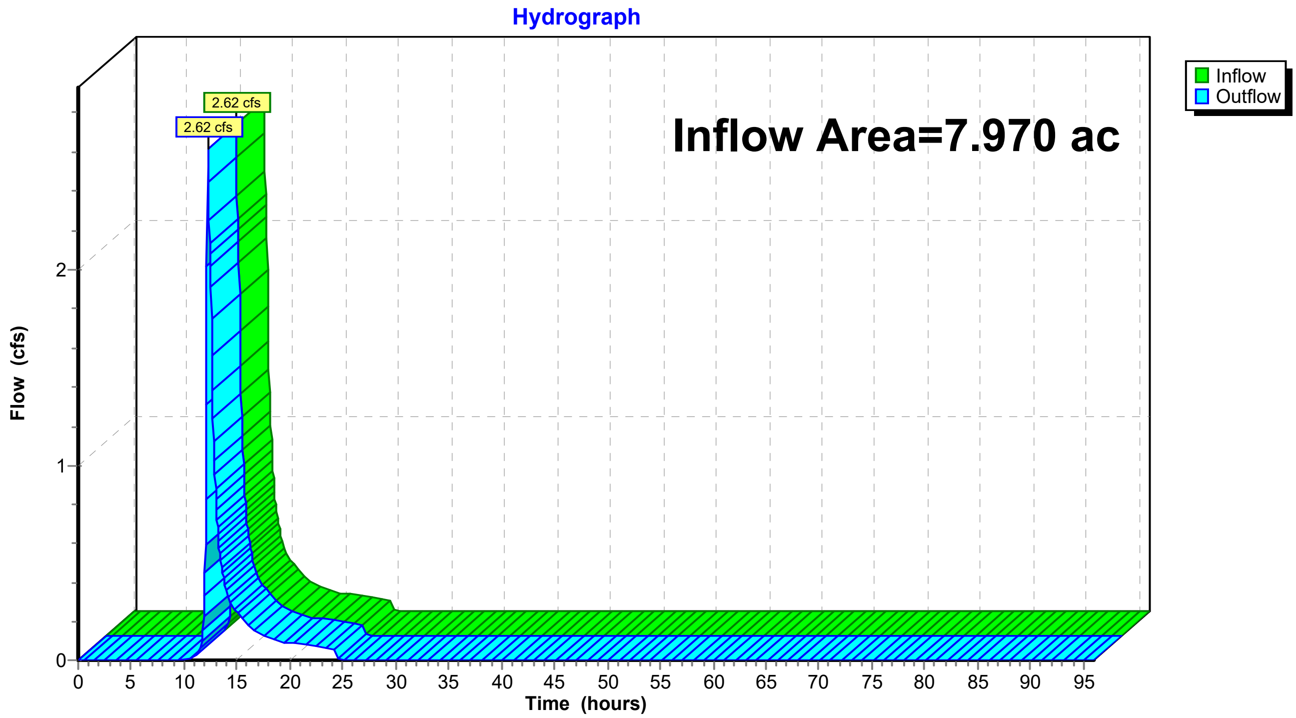
Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
266.00	0.0	0
266.05	0.5	184
266.10	0.9	371
266.15	1.4	562
266.20	1.9	758
266.25	2.4	957
266.30	2.9	1,161
266.35	3.4	1,368
266.40	3.9	1,580
266.45	4.5	1,795
266.50	5.0	2,015
266.55	5.6	2,239
266.60	6.1	2,466
266.65	6.7	2,698
266.70	7.3	2,934
266.75	7.9	3,174
266.80	8.5	3,418
266.85	9.1	3,665
266.90	9.7	3,917
266.95	10.4	4,173
267.00	11.0	4,433
267.05	11.7	4,697
267.10	12.3	4,965
267.15	13.0	5,237
267.20	13.7	5,513
267.25	14.4	5,793
267.30	15.1	6,077
267.35	15.8	6,365
267.40	16.5	6,658
267.45	17.3	6,954
267.50	18.0	7,254
267.55	18.8	7,558
267.60	19.5	7,867
267.65	20.3	8,179
267.70	21.1	8,495
267.75	21.9	8,816
267.80	22.7	9,140
267.85	23.5	9,469
267.90	24.3	9,801
267.95	25.2	10,137
268.00	26.0	10,478
268.05	26.9	10,823
268.10	27.7	11,171
268.15	28.6	11,524
268.20	29.5	11,881
268.25	30.4	12,241
268.30	31.3	12,606
268.35	32.2	12,975
268.40	33.1	13,347
268.45	34.1	13,724
268.50	35.0	14,105
268.55	36.0	14,490
268.60	36.9	14,879
268.65	37.9	15,272
268.70	38.9	15,669
268.75	39.9	16,070
268.80	40.9	16,475
268.85	41.9	16,884
268.90	42.9	17,297
268.95	44.0	17,714
269.00	**45.0**	**18,135**

Summary for Reach DP-1:

Inflow Area =	7.970 ac,	18.32% Impervious,	Inflow Depth = 0.45"	for 1-year event	
Inflow =	2.62 cfs @	12.24 hrs,	Volume=	0.297 af	
Outflow =	2.62 cfs @	12.24 hrs,	Volume=	0.297 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Reach DP-1:



Summary for Pond 1P: Lot 1 cultec

Inflow Area = 0.210 ac, 38.10% Impervious, Inflow Depth = 1.55" for 1-year event
Inflow = 0.37 cfs @ 12.09 hrs, Volume= 0.027 af
Outflow = 0.28 cfs @ 12.17 hrs, Volume= 0.027 af, Atten= 26%, Lag= 4.9 min
Discarded = 0.04 cfs @ 11.70 hrs, Volume= 0.020 af
Primary = 0.24 cfs @ 12.17 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 301.21' @ 12.17 hrs Surf.Area= 429 sf Storage= 187 cf

Plug-Flow detention time= 14.1 min calculated for 0.027 af (100% of inflow)
Center-of-Mass det. time= 14.1 min (839.0 - 825.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	300.40'	153 cf	**6.33'W x 24.50'L x 3.54'H Field A** 550 cf Overall - 168 cf Embedded = 382 cf x 40.0% Voids
#2A	300.90'	168 cf	**Cultec R-330XLHD** x 3 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
#3B	300.40'	253 cf	**11.17'W x 24.50'L x 3.54'H Field B** 969 cf Overall - 335 cf Embedded = 634 cf x 40.0% Voids
#4B	300.90'	335 cf	**Cultec R-330XLHD** x 6 Inside #3 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 2 rows
		909 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	300.90'	**6.0" Round Culvert** L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 300.90' / 300.00' S= 0.0346 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Discarded	300.40'	**4.100 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.70 hrs HW=300.45' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.23 cfs @ 12.17 hrs HW=301.20' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.23 cfs @ 1.86 fps)

Pond 1P: Lot 1 cultec - 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

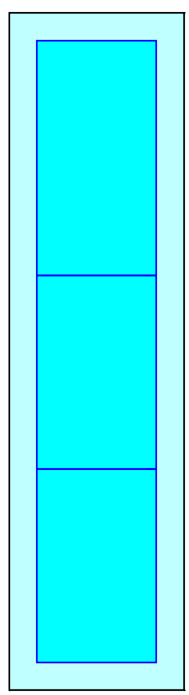
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

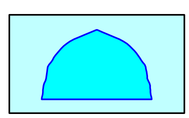
3 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 167.6 cf Chamber Storage

549.5 cf Field - 167.6 cf Chambers = 381.9 cf Stone x 40.0% Voids = 152.8 cf Stone Storage

Chamber Storage + Stone Storage = 320.4 cf = 0.007 af
Overall Storage Efficiency = 58.3%
Overall System Size = 24.50' x 6.33' x 3.54'

3 Chambers
20.4 cy Field
14.1 cy Stone





Pond 1P: Lot 1 cultec - Chamber Wizard Field B

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 2 rows

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

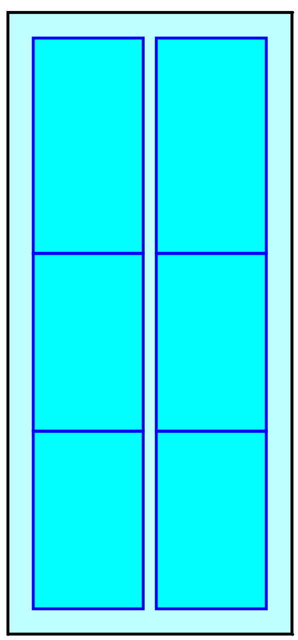
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.17' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

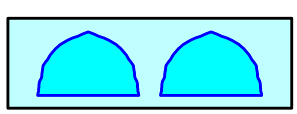
6 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 2 Rows = 335.3 cf Chamber Storage

968.9 cf Field - 335.3 cf Chambers = 633.6 cf Stone x 40.0% Voids = 253.5 cf Stone Storage

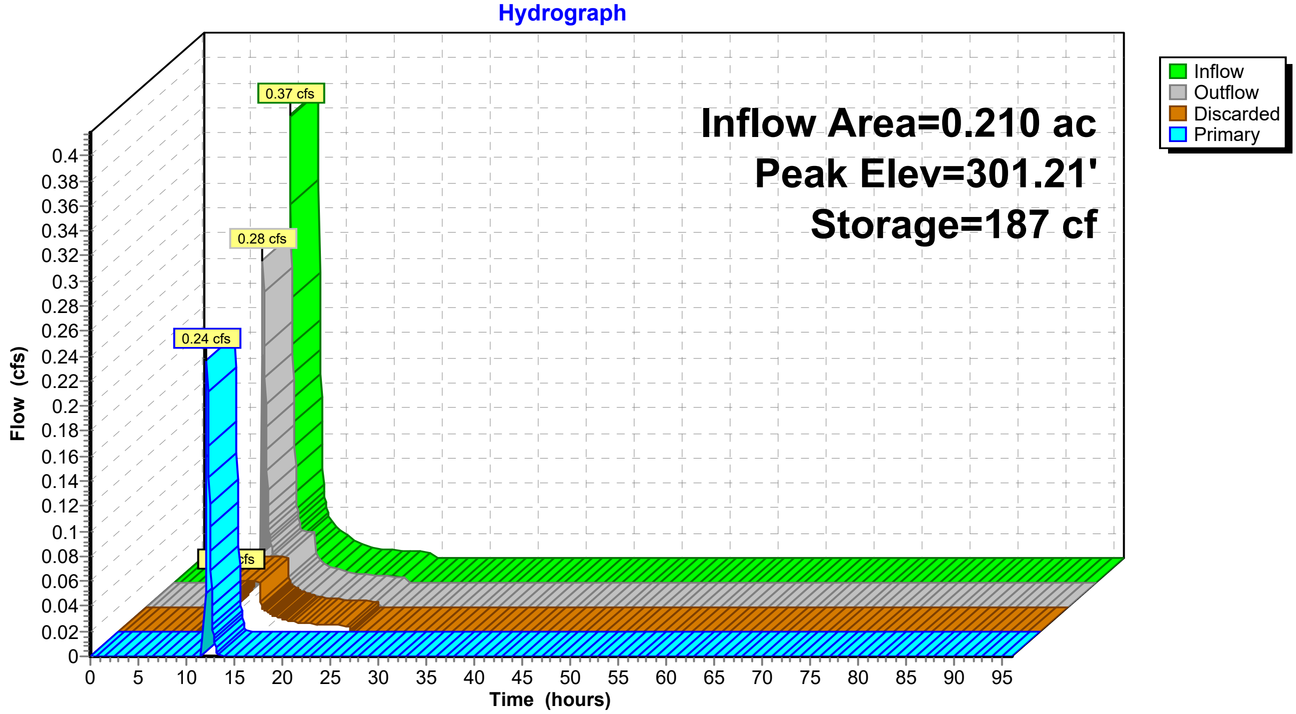
Chamber Storage + Stone Storage = 588.8 cf = 0.014 af
Overall Storage Efficiency = 60.8%
Overall System Size = 24.50' x 11.17' x 3.54'

6 Chambers
35.9 cy Field
23.5 cy Stone

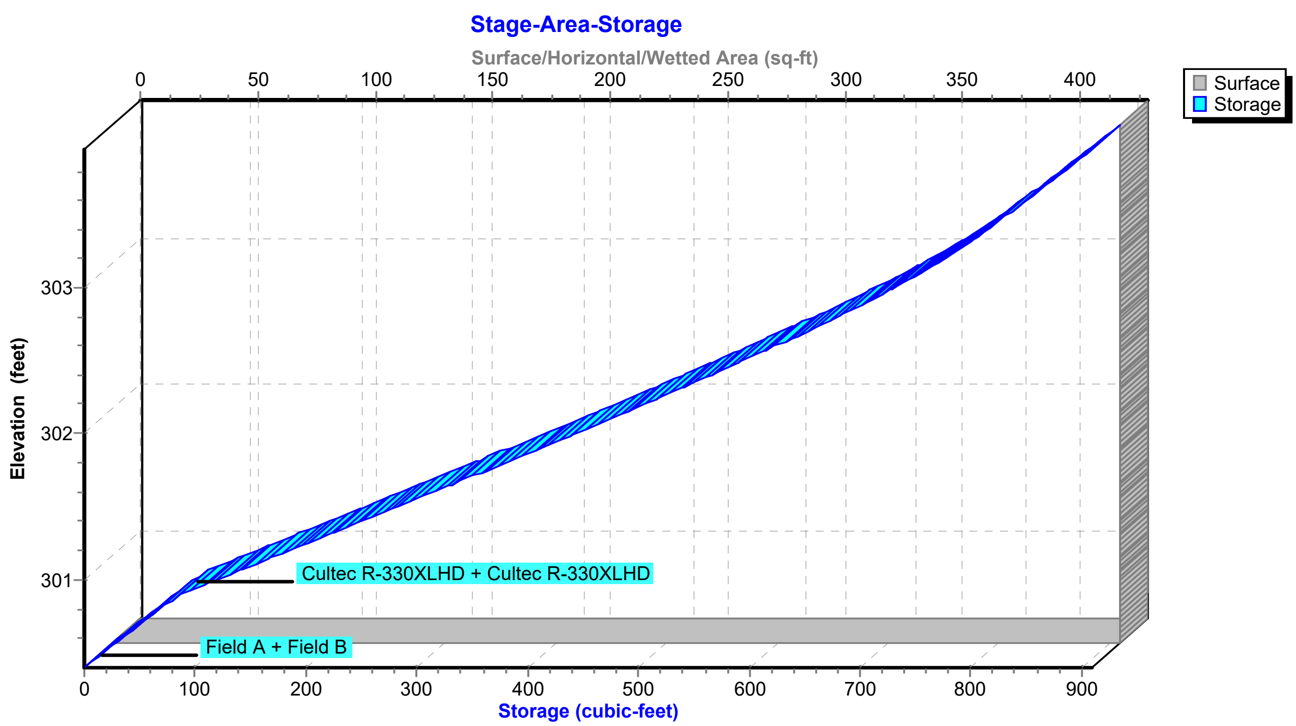




Pond 1P: Lot 1 cultec



Pond 1P: Lot 1 cultec



Stage-Area-Storage for Pond 1P: Lot 1 cultec

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
300.40	**429**	0	303.00	429	732
300.45	429	9	303.05	429	744
300.50	429	17	303.10	429	756
300.55	429	26	303.15	429	767
300.60	429	34	303.20	429	778
300.65	429	43	303.25	429	788
300.70	429	51	303.30	429	798
300.75	429	60	303.35	429	807
300.80	429	69	303.40	429	816
300.85	429	77	303.45	429	825
300.90	429	86	303.50	429	833
300.95	429	102	303.55	429	842
301.00	429	119	303.60	429	851
301.05	429	136	303.65	429	859
301.10	429	152	303.70	429	868
301.15	429	168	303.75	429	876
301.20	429	185	303.80	429	885
301.25	429	201	303.85	429	893
301.30	429	218	303.90	429	**902**
301.35	429	234			
301.40	429	251			
301.45	429	267			
301.50	429	283			
301.55	429	299			
301.60	429	316			
301.65	429	332			
301.70	429	347			
301.75	429	363			
301.80	429	379			
301.85	429	395			
301.90	429	411			
301.95	429	427			
302.00	429	443			
302.05	429	459			
302.10	429	474			
302.15	429	490			
302.20	429	505			
302.25	429	521			
302.30	429	536			
302.35	429	551			
302.40	429	566			
302.45	429	581			
302.50	429	595			
302.55	429	610			
302.60	429	624			
302.65	429	638			
302.70	429	652			
302.75	429	666			
302.80	429	680			
302.85	429	693			
302.90	429	706			
302.95	429	719			

Summary for Pond 1R: twin 48" culverts

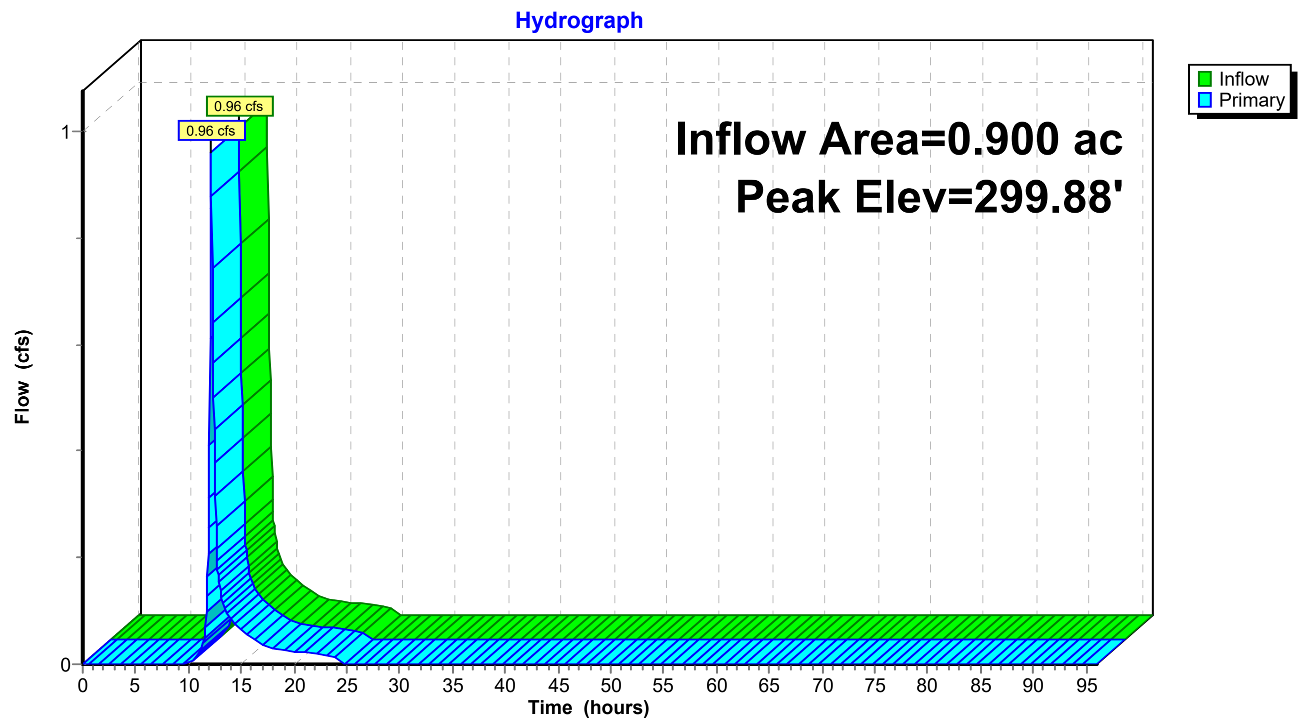
Inflow Area = 0.900 ac, 21.11% Impervious, Inflow Depth = 1.09" for 1-year event
Inflow = 0.96 cfs @ 12.15 hrs, Volume= 0.082 af
Outflow = 0.96 cfs @ 12.15 hrs, Volume= 0.082 af, Atten= 0%, Lag= 0.0 min
Primary = 0.96 cfs @ 12.15 hrs, Volume= 0.082 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 299.88' @ 12.15 hrs
Flood Elev= 316.05'

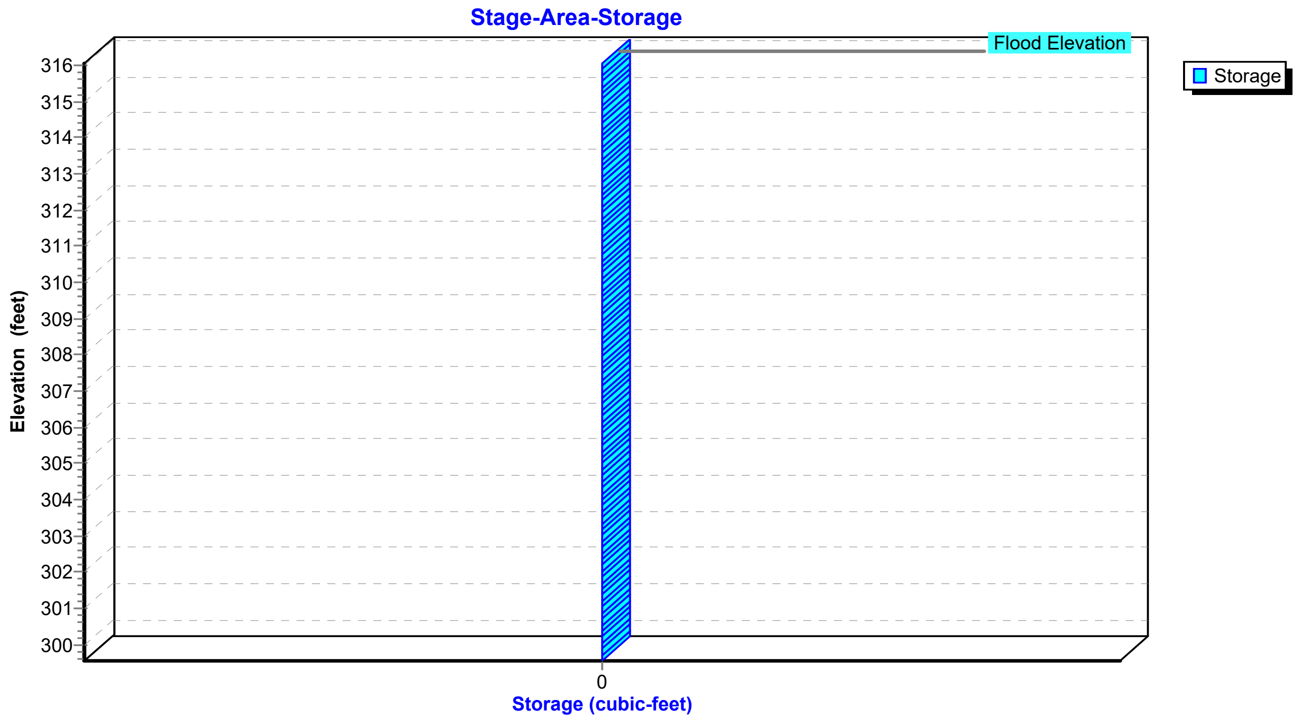
Device	Routing	Invert	Outlet Devices
#1	Primary	299.55'	**48.0" Round Culvert** L= 182.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 299.55' / 286.78' S= 0.0702 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf
#2	Primary	299.90'	**48.0" Round Culvert** L= 180.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 299.90' / 287.92' S= 0.0666 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

Primary OutFlow Max=0.95 cfs @ 12.15 hrs HW=299.88' (Free Discharge)
1=Culvert (Inlet Controls 0.95 cfs @ 1.95 fps)
2=Culvert (Controls 0.00 cfs)

Pond 1R: twin 48" culverts



Pond 1R: twin 48" culverts



Stage-Area-Storage for Pond 1R: twin 48" culverts

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
299.55	**0**	309.95	0
299.75	0	310.15	0
299.95	0	310.35	0
300.15	0	310.55	0
300.35	0	310.75	0
300.55	0	310.95	0
300.75	0	311.15	0
300.95	0	311.35	0
301.15	0	311.55	0
301.35	0	311.75	0
301.55	0	311.95	0
301.75	0	312.15	0
301.95	0	312.35	0
302.15	0	312.55	0
302.35	0	312.75	0
302.55	0	312.95	0
302.75	0	313.15	0
302.95	0	313.35	0
303.15	0	313.55	0
303.35	0	313.75	0
303.55	0	313.95	0
303.75	0	314.15	0
303.95	0	314.35	0
304.15	0	314.55	0
304.35	0	314.75	0
304.55	0	314.95	0
304.75	0	315.15	0
304.95	0	315.35	0
305.15	0	315.55	0
305.35	0	315.75	0
305.55	0	315.95	0
305.75	0		
305.95	0		
306.15	0		
306.35	0		
306.55	0		
306.75	0		
306.95	0		
307.15	0		
307.35	0		
307.55	0		
307.75	0		
307.95	0		
308.15	0		
308.35	0		
308.55	0		
308.75	0		
308.95	0		
309.15	0		
309.35	0		
309.55	0		
309.75	0		

Summary for Pond 2P: Lot 2 cultec

```
Inflow Area =      0.030 ac,100.00% Impervious,  Inflow Depth =  2.55"   for  1-year event
Inflow      =     0.08 cfs @  12.09 hrs,  Volume=        0.006 af
Outflow     =     0.03 cfs @  11.95 hrs,  Volume=        0.006 af,  Atten= 63%,  Lag= 0.0 min
Discarded   =     0.03 cfs @  11.95 hrs,  Volume=        0.006 af
Primary     =     0.00 cfs @   0.00 hrs,  Volume=        0.000 af
```

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 310.70' @ 12.33 hrs Surf.Area= 310 sf Storage= 37 cf

Plug-Flow detention time= 6.6 min calculated for 0.006 af (100% of inflow)
Center-of-Mass det. time= 6.6 min (766.0 - 759.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	310.40'	153 cf	**6.33'W x 24.50'L x 3.54'H Field A** 550 cf Overall - 168 cf Embedded = 382 cf x 40.0% Voids
#2A	310.90'	168 cf	**Cultec R-330XLHD** x 3 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
#3B	310.40'	153 cf	**6.33'W x 24.50'L x 3.54'H Field B** 550 cf Overall - 168 cf Embedded = 382 cf x 40.0% Voids
#4B	310.90'	168 cf	**Cultec R-330XLHD** x 3 Inside #3 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
		641 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	310.90'	**6.0" Round Culvert** L= 21.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 310.90' / 310.00' S= 0.0429 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Discarded	310.40'	**4.100 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 11.95 hrs HW=310.44' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=310.40' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)

Pond 2P: Lot 2 cultec - 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

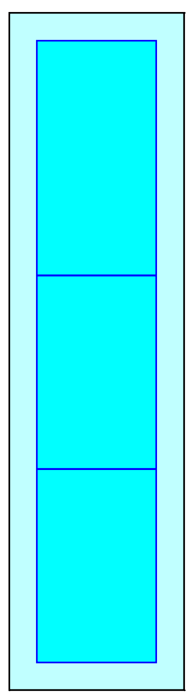
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

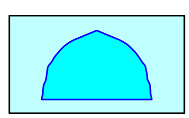
3 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 167.6 cf Chamber Storage

549.5 cf Field - 167.6 cf Chambers = 381.9 cf Stone x 40.0% Voids = 152.8 cf Stone Storage

Chamber Storage + Stone Storage = 320.4 cf = 0.007 af
Overall Storage Efficiency = 58.3%
Overall System Size = 24.50' x 6.33' x 3.54'

3 Chambers
20.4 cy Field
14.1 cy Stone





Pond 2P: Lot 2 cultec - Chamber Wizard Field B

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

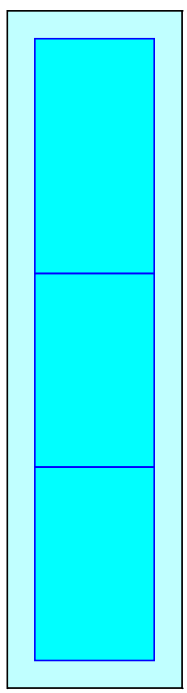
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

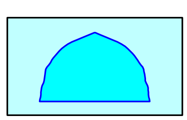
3 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 167.6 cf Chamber Storage

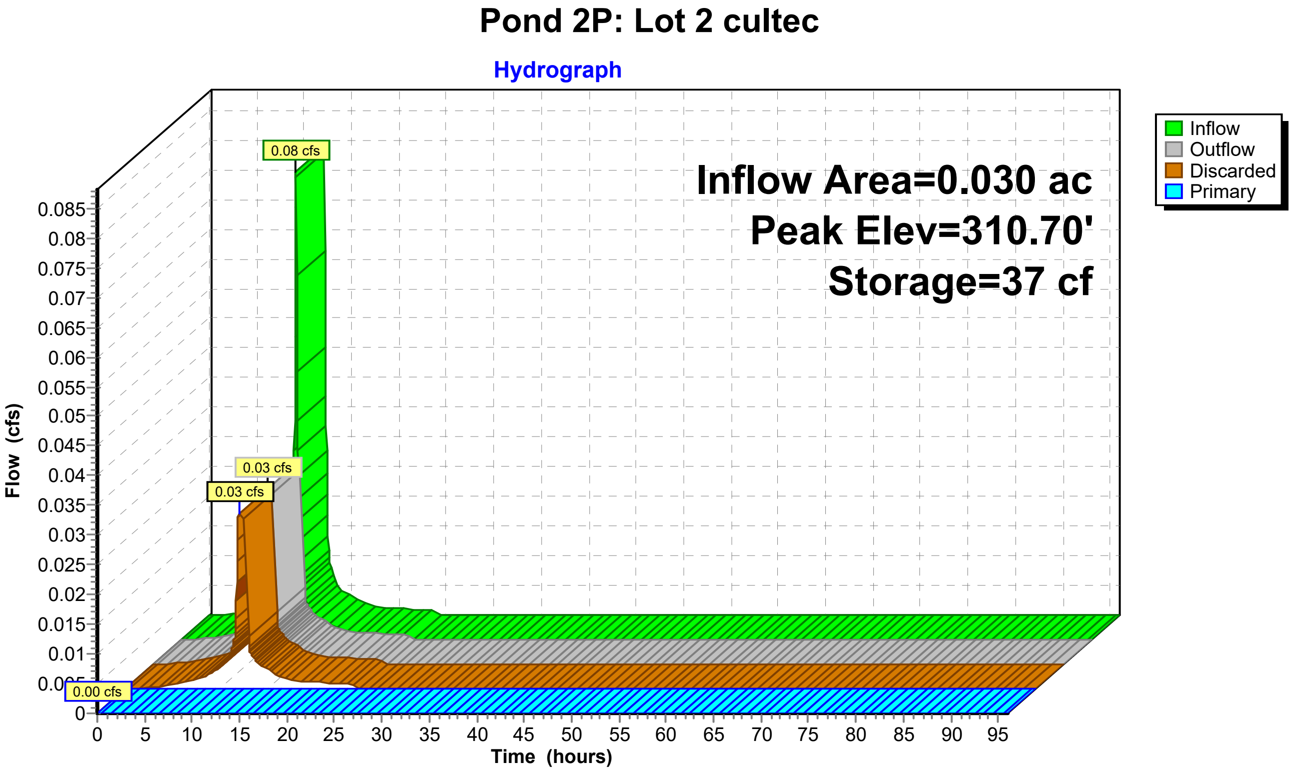
549.5 cf Field - 167.6 cf Chambers = 381.9 cf Stone x 40.0% Voids = 152.8 cf Stone Storage

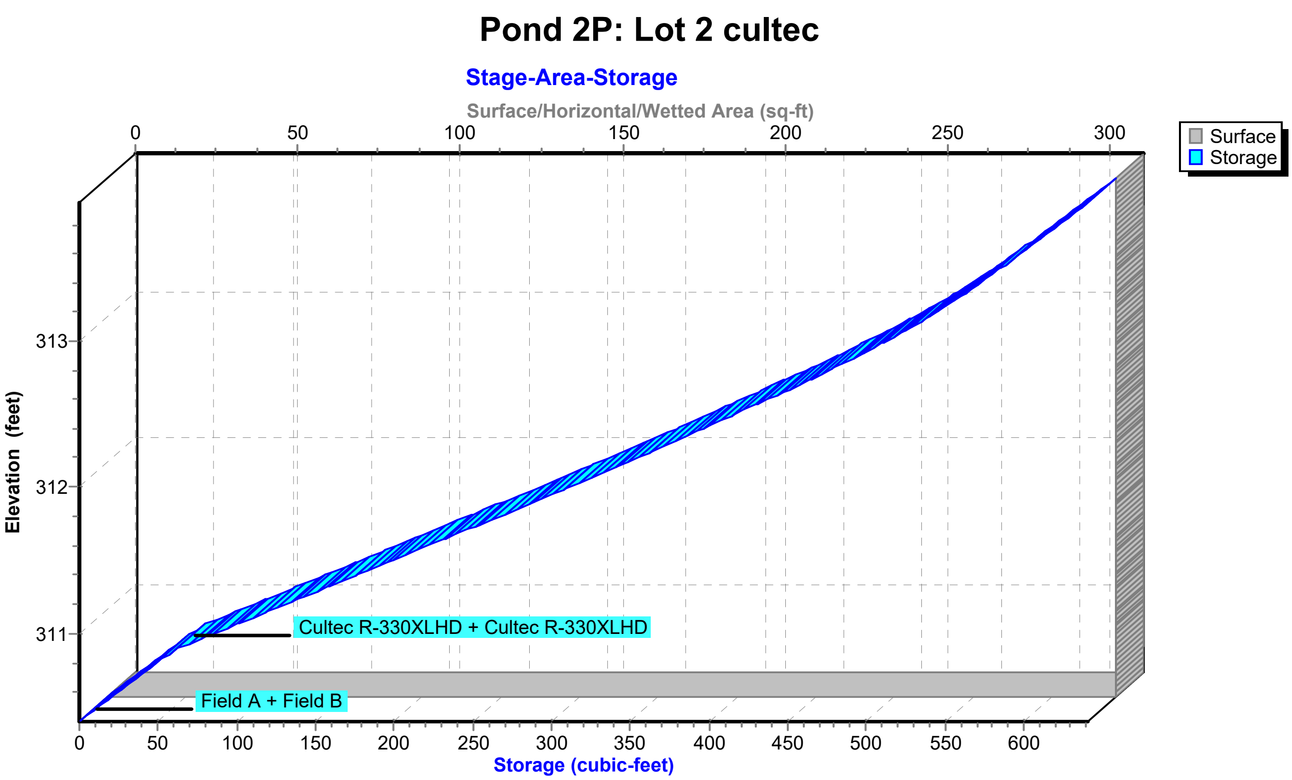
Chamber Storage + Stone Storage = 320.4 cf = 0.007 af
Overall Storage Efficiency = 58.3%
Overall System Size = 24.50' x 6.33' x 3.54'

3 Chambers
20.4 cy Field
14.1 cy Stone






Pond 2P: Lot 2 cultec
Hydrograph
Inflow
Outflow
Discarded
Primary
Inflow Area=0.030 ac
Peak Elev=310.70'
Storage=37 cf
0.08 cfs
0.03 cfs
0.03 cfs
0.00 cfs
Flow (cfs)
Time (hours)
0.085
0.08
0.075
0.07
0.065
0.06
0.055
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95


Pond 2P: Lot 2 cultec
Stage-Area-Storage
Surface/Horizontal/Wetted Area (sq-ft)
0 50 100 150 200 250 300
Surface
Storage
Elevation (feet)
313
312
311
Cultec R-330XLHD + Cultec R-330XLHD
Field A + Field B
0 50 100 150 200 250 300 350 400 450 500 550 600
Storage (cubic-feet)

Stage-Area-Storage for Pond 2P: Lot 2 cultec

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
310.40	**310**	0	313.00	310	513
310.45	310	6	313.05	310	522
310.50	310	12	313.10	310	530
310.55	310	19	313.15	310	538
310.60	310	25	313.20	310	546
310.65	310	31	313.25	310	553
310.70	310	37	313.30	310	560
310.75	310	43	313.35	310	567
310.80	310	50	313.40	310	574
310.85	310	56	313.45	310	580
310.90	310	62	313.50	310	586
310.95	310	74	313.55	310	592
311.00	310	85	313.60	310	598
311.05	310	97	313.65	310	605
311.10	310	108	313.70	310	611
311.15	310	120	313.75	310	617
311.20	310	131	313.80	310	623
311.25	310	143	313.85	310	629
311.30	310	154	313.90	310	**636**
311.35	310	165			
311.40	310	177			
311.45	310	188			
311.50	310	200			
311.55	310	211			
311.60	310	222			
311.65	310	233			
311.70	310	244			
311.75	310	256			
311.80	310	267			
311.85	310	278			
311.90	310	289			
311.95	310	300			
312.00	310	311			
312.05	310	322			
312.10	310	333			
312.15	310	344			
312.20	310	355			
312.25	310	365			
312.30	310	376			
312.35	310	386			
312.40	310	397			
312.45	310	407			
312.50	310	418			
312.55	310	428			
312.60	310	438			
312.65	310	448			
312.70	310	457			
312.75	310	467			
312.80	310	477			
312.85	310	486			
312.90	310	495			
312.95	310	504			

Summary for Pond 3P: Lot 4 cultec

Inflow Area =	0.030 ac,100.00% Impervious,	Inflow Depth = 2.55"	for 1-year event	
Inflow =	0.08 cfs @	12.09 hrs, Volume=	0.006 af	
Outflow =	0.03 cfs @	11.95 hrs, Volume=	0.006 af,	Atten= 63%, Lag= 0.0 min
Discarded =	0.03 cfs @	11.95 hrs, Volume=	0.006 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 291.70' @ 12.33 hrs Surf.Area= 310 sf Storage= 37 cf

Plug-Flow detention time= 6.6 min calculated for 0.006 af (100% of inflow)
Center-of-Mass det. time= 6.6 min (766.0 - 759.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	291.40'	153 cf	**6.33'W x 24.50'L x 3.54'H Field A**
			550 cf Overall - 168 cf Embedded = 382 cf x 40.0% Voids
#2A	291.90'	168 cf	**Cultec R-330XLHD** x 3 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
#3B	291.40'	153 cf	**6.33'W x 24.50'L x 3.54'H Field B**
			550 cf Overall - 168 cf Embedded = 382 cf x 40.0% Voids
#4B	291.90'	168 cf	**Cultec R-330XLHD** x 3 Inside #3
			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
		641 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	291.90'	**6.0" Round Culvert**
			L= 20.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 291.90' / 291.00' S= 0.0450 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Discarded	291.40'	**4.100 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 11.95 hrs HW=291.44' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=291.40' (Free Discharge)
└─**1=Culvert** (Controls 0.00 cfs)

Pond 3P: Lot 4 cultec - 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

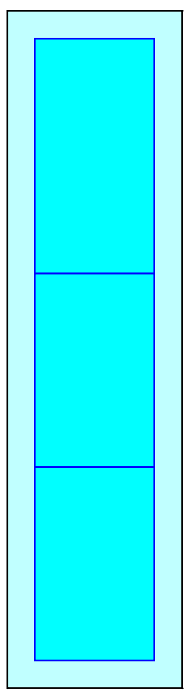
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

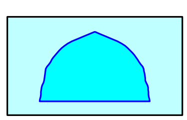
3 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 167.6 cf Chamber Storage

549.5 cf Field - 167.6 cf Chambers = 381.9 cf Stone x 40.0% Voids = 152.8 cf Stone Storage

Chamber Storage + Stone Storage = 320.4 cf = 0.007 af
Overall Storage Efficiency = 58.3%
Overall System Size = 24.50' x 6.33' x 3.54'

3 Chambers
20.4 cy Field
14.1 cy Stone





Pond 3P: Lot 4 cultec - Chamber Wizard Field B

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

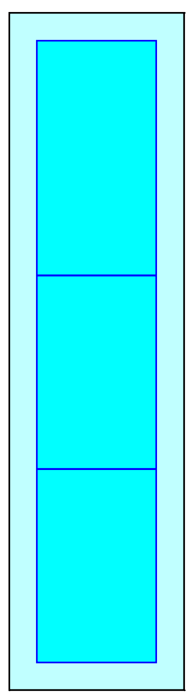
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

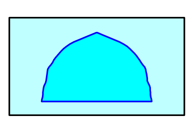
3 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 167.6 cf Chamber Storage

549.5 cf Field - 167.6 cf Chambers = 381.9 cf Stone x 40.0% Voids = 152.8 cf Stone Storage

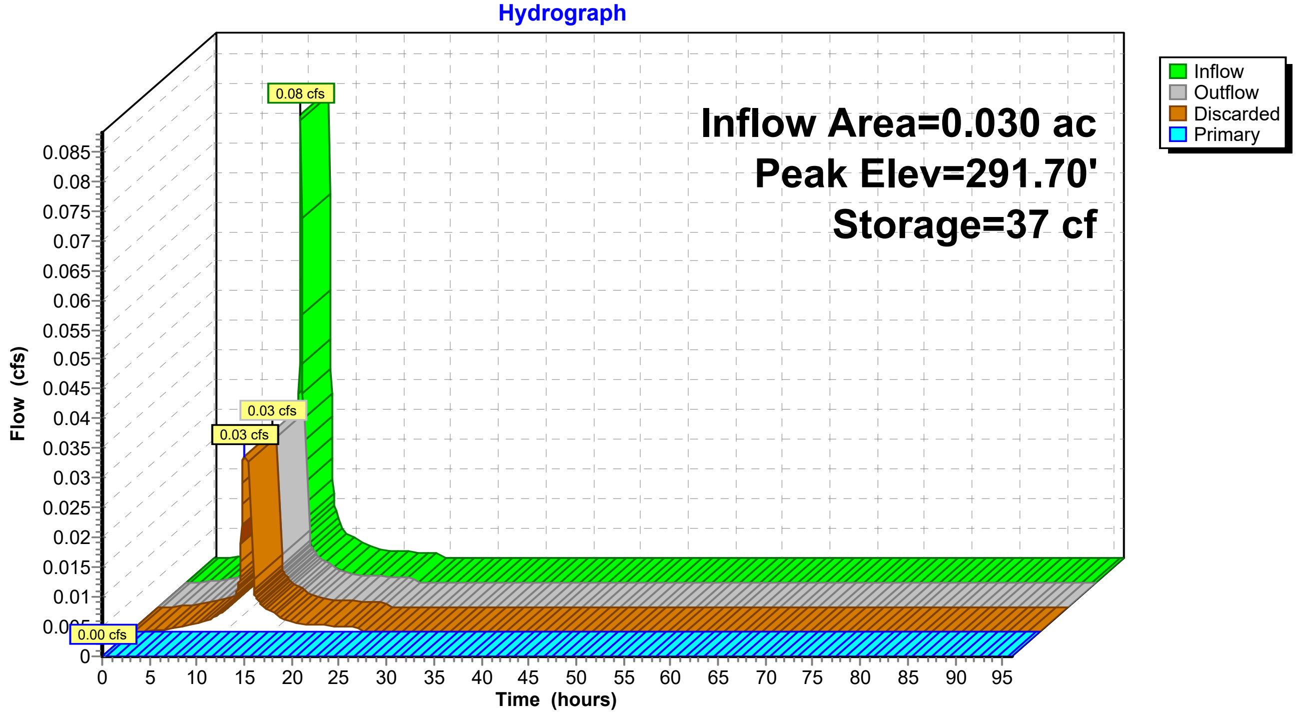
Chamber Storage + Stone Storage = 320.4 cf = 0.007 af
Overall Storage Efficiency = 58.3%
Overall System Size = 24.50' x 6.33' x 3.54'

3 Chambers
20.4 cy Field
14.1 cy Stone

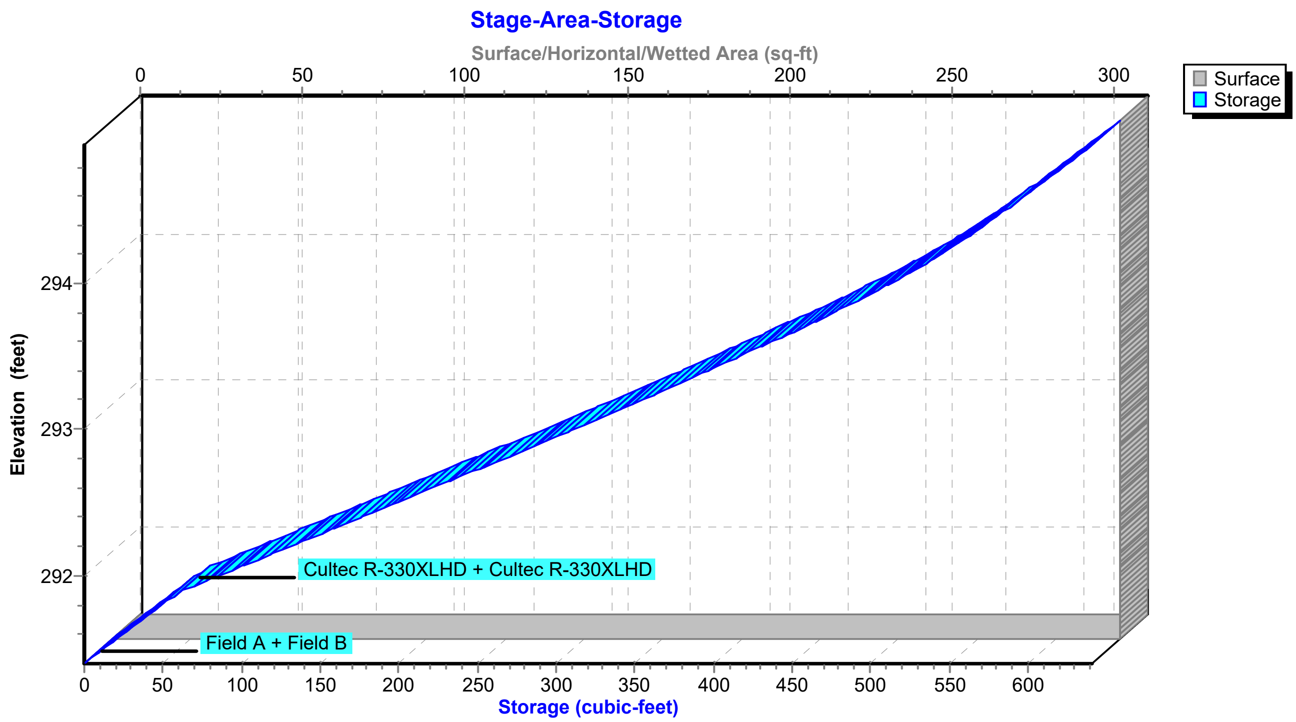




Pond 3P: Lot 4 cultec



Pond 3P: Lot 4 cultec



Stage-Area-Storage for Pond 3P: Lot 4 cultec

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
291.40	**310**	0	294.00	310	513
291.45	310	6	294.05	310	522
291.50	310	12	294.10	310	530
291.55	310	19	294.15	310	538
291.60	310	25	294.20	310	546
291.65	310	31	294.25	310	553
291.70	310	37	294.30	310	560
291.75	310	43	294.35	310	567
291.80	310	50	294.40	310	574
291.85	310	56	294.45	310	580
291.90	310	62	294.50	310	586
291.95	310	74	294.55	310	592
292.00	310	85	294.60	310	598
292.05	310	97	294.65	310	605
292.10	310	108	294.70	310	611
292.15	310	120	294.75	310	617
292.20	310	131	294.80	310	623
292.25	310	143	294.85	310	629
292.30	310	154	294.90	310	**636**
292.35	310	165			
292.40	310	177			
292.45	310	188			
292.50	310	200			
292.55	310	211			
292.60	310	222			
292.65	310	233			
292.70	310	244			
292.75	310	256			
292.80	310	267			
292.85	310	278			
292.90	310	289			
292.95	310	300			
293.00	310	311			
293.05	310	322			
293.10	310	333			
293.15	310	344			
293.20	310	355			
293.25	310	365			
293.30	310	376			
293.35	310	386			
293.40	310	397			
293.45	310	407			
293.50	310	418			
293.55	310	428			
293.60	310	438			
293.65	310	448			
293.70	310	457			
293.75	310	467			
293.80	310	477			
293.85	310	486			
293.90	310	495			
293.95	310	504			

Summary for Pond 4P: infiltration basin

Inflow Area = 3.340 ac, 32.63% Impervious, Inflow Depth = 0.97" for 1-year event
Inflow = 3.61 cfs @ 12.10 hrs, Volume= 0.271 af
Outflow = 0.90 cfs @ 12.53 hrs, Volume= 0.271 af, Atten= 75%, Lag= 25.9 min
Discarded = 0.35 cfs @ 12.53 hrs, Volume= 0.240 af
Primary = 0.55 cfs @ 12.53 hrs, Volume= 0.032 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 295.19' @ 12.53 hrs Surf.Area= 3,675 sf Storage= 3,833 cf
Flood Elev= 298.00' Surf.Area= 5,955 sf Storage= 17,305 cf

Plug-Flow detention time= 88.2 min calculated for 0.271 af (100% of inflow)
Center-of-Mass det. time= 88.1 min (945.4 - 857.2)

Volume	Invert	Avail.Storage	Storage Description
#1	294.00'	17,305 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
294.00	2,750	0	0
296.00	4,300	7,050	7,050
298.00	5,955	10,255	17,305

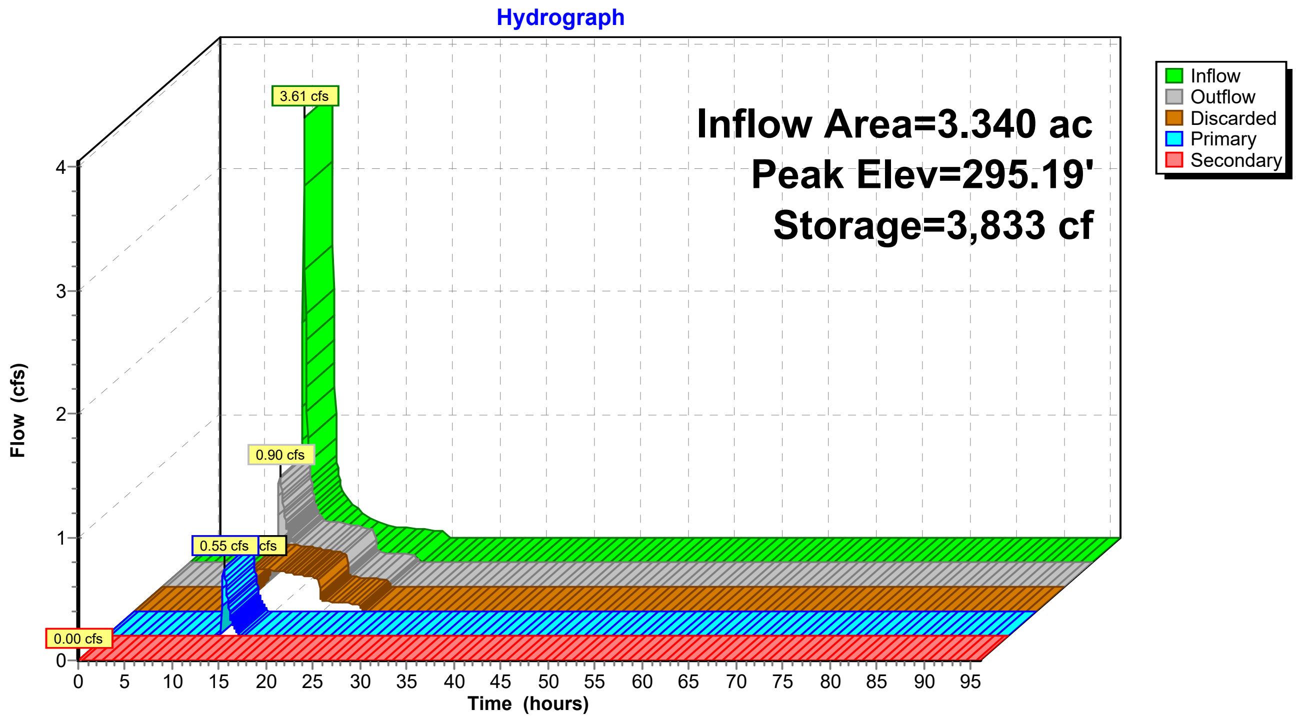
Device	Routing	Invert	Outlet Devices
#1	Primary	290.40'	**15.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 290.40' / 288.00' S= 0.1500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	295.00'	**24.0" W x 6.0" H Vert. Slot** C= 0.600
#3	Device 1	296.00'	**30.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	297.00'	**162.0 deg x 10.0' long x 1.00' rise Emergency spillway** Cv= 2.47 (C= 3.09)
#5	Discarded	294.00'	**4.100 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.35 cfs @ 12.53 hrs HW=295.19' (Free Discharge)
└─**5=Exfiltration** (Exfiltration Controls 0.35 cfs)

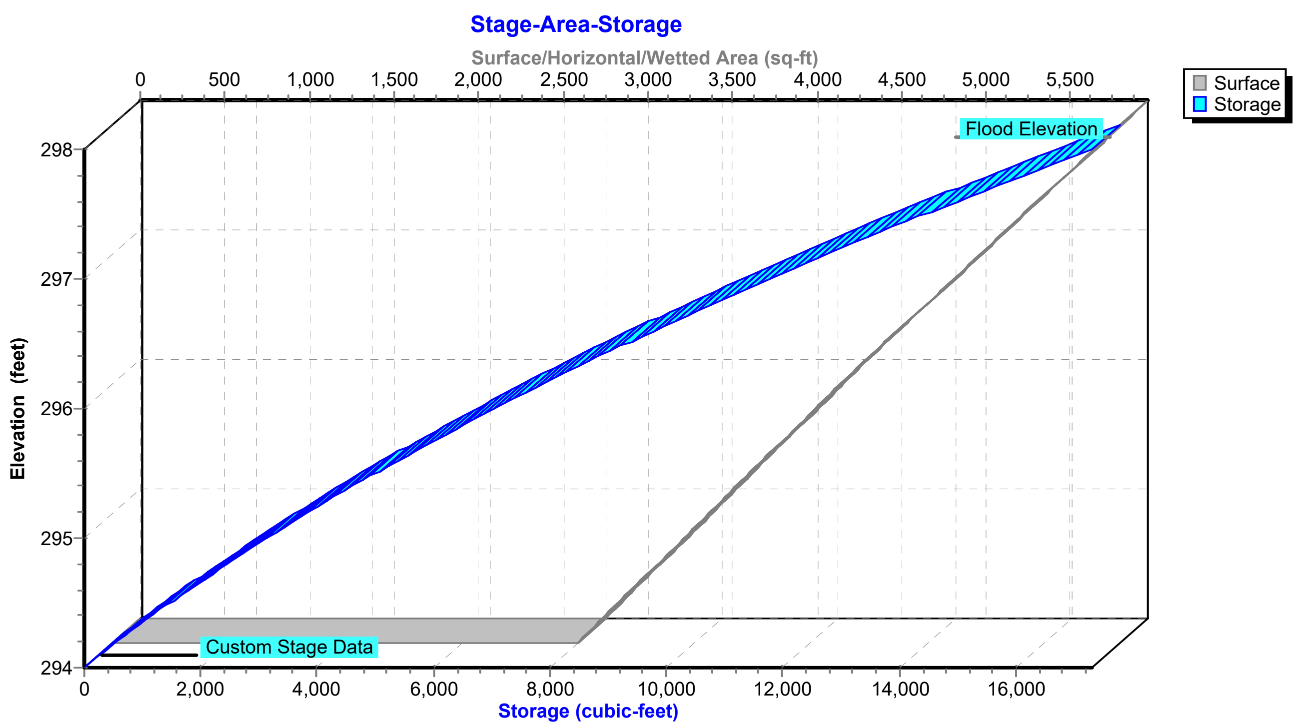
Primary OutFlow Max=0.54 cfs @ 12.53 hrs HW=295.19' (Free Discharge)
└─**1=Culvert** (Passes 0.54 cfs of 12.06 cfs potential flow)
  ├─**2=Slot** (Orifice Controls 0.54 cfs @ 1.41 fps)
  └─**3=Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=294.00' (Free Discharge)
└─**4=Emergency spillway** (Controls 0.00 cfs)

Pond 4P: infiltration basin



Pond 4P: infiltration basin



Stage-Area-Storage for Pond 4P: infiltration basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
294.00	2,750	0	296.60	4,797	9,779
294.05	2,789	138	296.65	4,838	10,020
294.10	2,828	279	296.70	4,879	10,263
294.15	2,866	421	296.75	4,921	10,508
294.20	2,905	565	296.80	4,962	10,755
294.25	2,944	712	296.85	5,003	11,004
294.30	2,983	860	296.90	5,045	11,255
294.35	3,021	1,010	296.95	5,086	11,508
294.40	3,060	1,162	297.00	5,128	11,764
294.45	3,099	1,316	297.05	5,169	12,021
294.50	3,138	1,472	297.10	5,210	12,281
294.55	3,176	1,630	297.15	5,252	12,542
294.60	3,215	1,790	297.20	5,293	12,806
294.65	3,254	1,951	297.25	5,334	13,071
294.70	3,292	2,115	297.30	5,376	13,339
294.75	3,331	2,280	297.35	5,417	13,609
294.80	3,370	2,448	297.40	5,458	13,881
294.85	3,409	2,617	297.45	5,500	14,155
294.90	3,447	2,789	297.50	5,541	14,431
294.95	3,486	2,962	297.55	5,583	14,709
295.00	3,525	3,138	297.60	5,624	14,989
295.05	3,564	3,315	297.65	5,665	15,271
295.10	3,603	3,494	297.70	5,707	15,556
295.15	3,641	3,675	297.75	5,748	15,842
295.20	3,680	3,858	297.80	5,790	16,131
295.25	3,719	4,043	297.85	5,831	16,421
295.30	3,758	4,230	297.90	5,872	16,714
295.35	3,796	4,419	297.95	5,914	17,008
295.40	3,835	4,609	298.00	**5,955**	**17,305**
295.45	3,874	4,802			
295.50	3,913	4,997			
295.55	3,951	5,193			
295.60	3,990	5,392			
295.65	4,029	5,592			
295.70	4,067	5,795			
295.75	4,106	5,999			
295.80	4,145	6,206			
295.85	4,184	6,414			
295.90	4,222	6,624			
295.95	4,261	6,836			
296.00	4,300	7,050			
296.05	4,341	7,266			
296.10	4,383	7,484			
296.15	4,424	7,704			
296.20	4,465	7,927			
296.25	4,507	8,151			
296.30	4,548	8,377			
296.35	4,590	8,606			
296.40	4,631	8,836			
296.45	4,672	9,069			
296.50	4,714	9,303			
296.55	4,755	9,540			

Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment100: Runoff Area=0.900 ac 21.11% Impervious Runoff Depth=3.02"
Flow Length=271' Tc=10.2 min CN=80 Runoff=2.73 cfs 0.226 af

Subcatchment200: Runoff Area=1.640 ac 1.83% Impervious Runoff Depth=2.65"
Flow Length=339' Tc=6.0 min CN=76 Runoff=5.00 cfs 0.362 af

Subcatchment201: Runoff Area=0.210 ac 38.10% Impervious Runoff Depth=3.70"
Tc=6.0 min CN=87 Runoff=0.87 cfs 0.065 af

Subcatchment202: Runoff Area=0.030 ac 100.00% Impervious Runoff Depth=4.90"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.012 af

Subcatchment203: Runoff Area=0.030 ac 100.00% Impervious Runoff Depth=4.90"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.012 af

Subcatchment300: Runoff Area=1.820 ac 0.55% Impervious Runoff Depth=1.67"
Flow Length=506' Tc=13.2 min CN=64 Runoff=2.65 cfs 0.254 af

Subcatchment301: Runoff Area=3.340 ac 32.63% Impervious Runoff Depth=2.83"
Tc=6.0 min CN=78 Runoff=10.87 cfs 0.788 af

Reach 2R: section of stream Avg. Flow Depth=0.15' Max Vel=3.50 fps Inflow=2.76 cfs 0.227 af
n=0.040 L=169.0' S=0.1230 '/' Capacity=634.20 cfs Outflow=2.69 cfs 0.227 af

Reach 3R: section of stream Avg. Flow Depth=0.38' Max Vel=4.29 fps Inflow=16.09 cfs 1.277 af
n=0.040 L=403.0' S=0.0546 '/' Capacity=621.58 cfs Outflow=15.69 cfs 1.277 af

Reach DP-1: Inflow=15.69 cfs 1.277 af
Outflow=15.69 cfs 1.277 af

Pond 1P: Lot 1 cultec Peak Elev=301.62' Storage=321 cf Inflow=0.87 cfs 0.065 af
Discarded=0.04 cfs 0.034 af Primary=0.65 cfs 0.030 af Outflow=0.69 cfs 0.065 af

Pond 1R: twin 48" culverts Peak Elev=300.07' Inflow=2.73 cfs 0.226 af
Outflow=2.73 cfs 0.226 af

Pond 2P: Lot 2 cultec Peak Elev=311.02' Storage=90 cf Inflow=0.15 cfs 0.012 af
Discarded=0.03 cfs 0.011 af Primary=0.05 cfs 0.001 af Outflow=0.07 cfs 0.012 af

Pond 3P: Lot 4 cultec Peak Elev=292.02' Storage=90 cf Inflow=0.15 cfs 0.012 af
Discarded=0.03 cfs 0.011 af Primary=0.05 cfs 0.001 af Outflow=0.07 cfs 0.012 af

Pond 4P: infiltration basin Peak Elev=296.14' Storage=7,677 cf Inflow=10.87 cfs 0.788 af
Discarded=0.42 cfs 0.386 af Primary=6.87 cfs 0.402 af Secondary=0.00 cfs 0.000 af Outflow=7.29 cfs 0.788 af

Total Runoff Area = 7.970 ac Runoff Volume = 1.719 af Average Runoff Depth = 2.59"
81.68% Pervious = 6.510 ac 18.32% Impervious = 1.460 ac

Summary for Subcatchment 100:

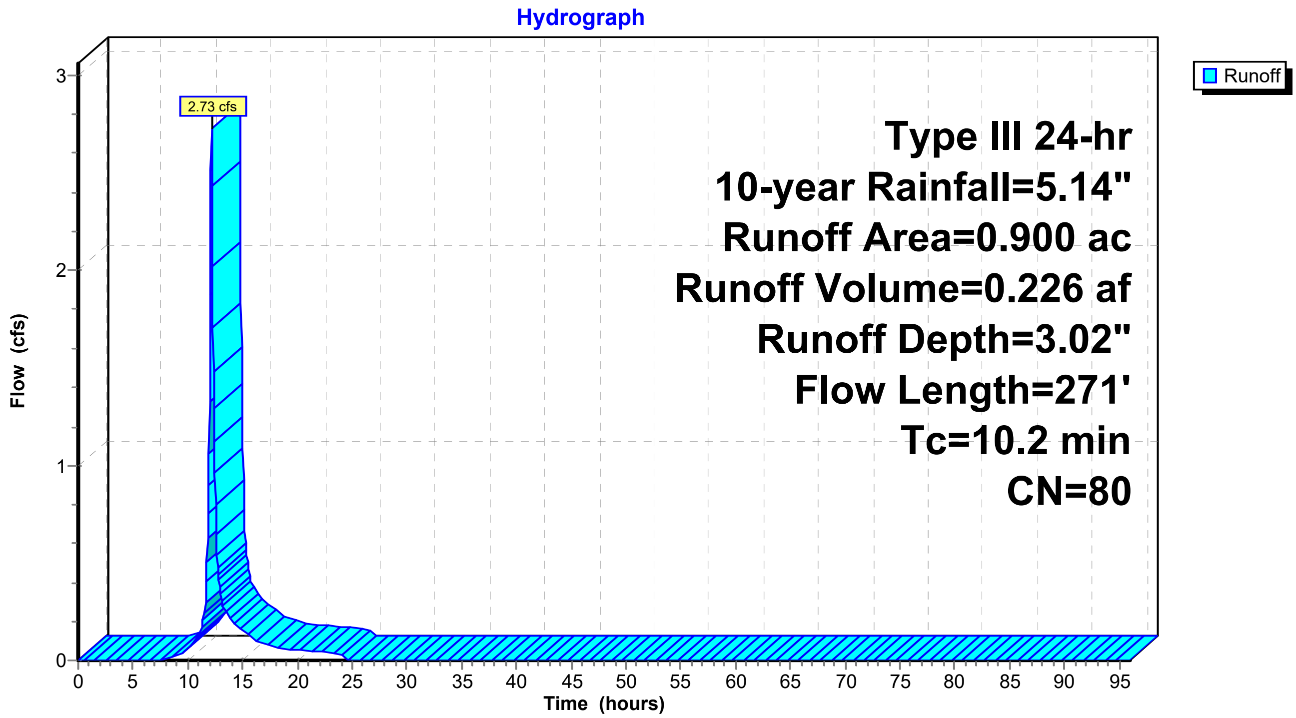
Runoff = 2.73 cfs @ 12.15 hrs, Volume= 0.226 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.14"

Area (ac)	CN	Description
0.150	98	Paved parking, HSG B
0.020	85	Gravel roads, HSG B
0.010	91	Gravel roads, HSG D
0.040	98	Roofs, HSG D
0.130	69	50-75% Grass cover, Fair, HSG B
0.130	80	>75% Grass cover, Good, HSG D
0.110	60	Woods, Fair, HSG B
0.310	79	Woods, Fair, HSG D
0.900	80	Weighted Average
0.710		78.89% Pervious Area
0.190		21.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.1400	0.17		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.41"
0.5	59	0.0680	1.83		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.1	112	0.0440	23.98	301.31	**Pipe Channel, C-D** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013 Corrugated PE, smooth interior
10.2	271	Total			

Subcatchment 100:



Summary for Subcatchment 200:

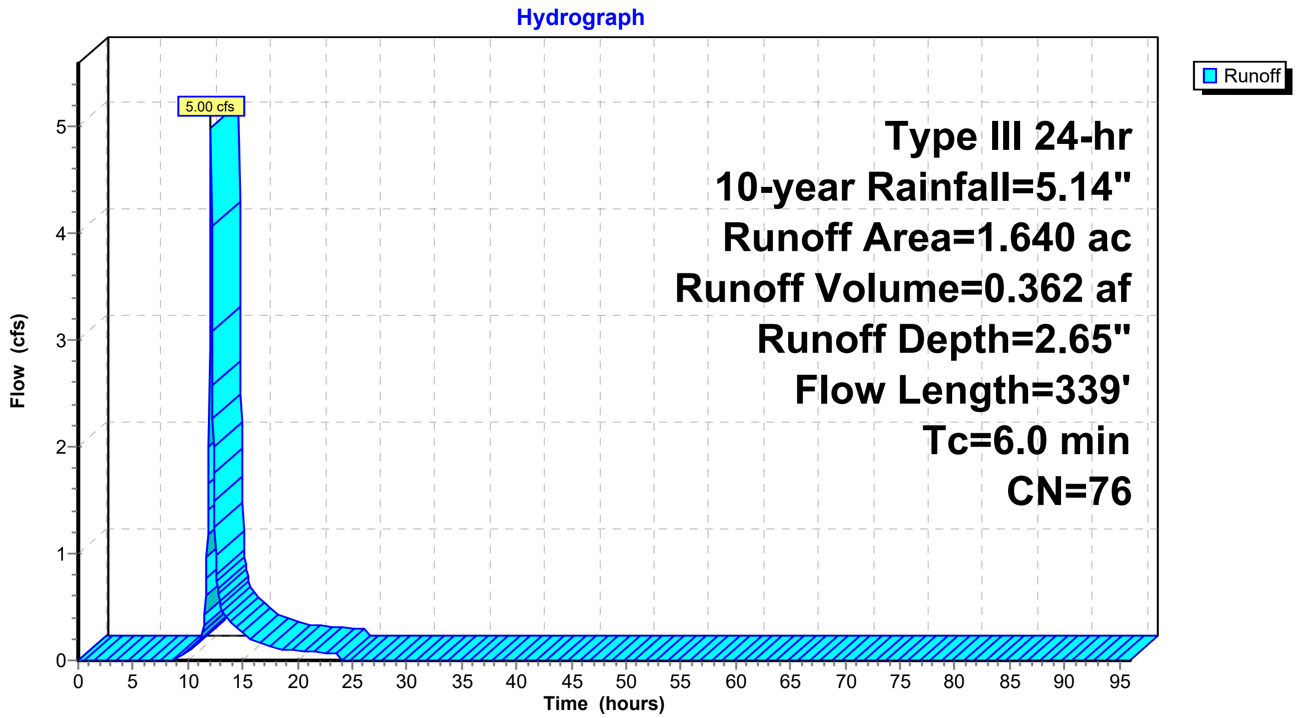
Runoff = 5.00 cfs @ 12.09 hrs, Volume= 0.362 af, Depth= 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.14"

Area (ac)	CN	Description
0.020	98	Water Surface, 0% imp, HSG B
0.010	98	Water Surface, 0% imp, HSG D
0.030	98	Roofs, HSG D
0.090	61	>75% Grass cover, Good, HSG B
0.720	80	>75% Grass cover, Good, HSG D
0.280	60	Woods, Fair, HSG B
0.490	79	Woods, Fair, HSG D
1.640	76	Weighted Average
1.610		98.17% Pervious Area
0.030		1.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	100	0.2100	0.45		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.41"
0.1	29	0.3800	4.32		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.7	126	0.3800	3.08		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
1.3	84	0.0480	1.10		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
5.8	339	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 200:



Summary for Subcatchment 201:

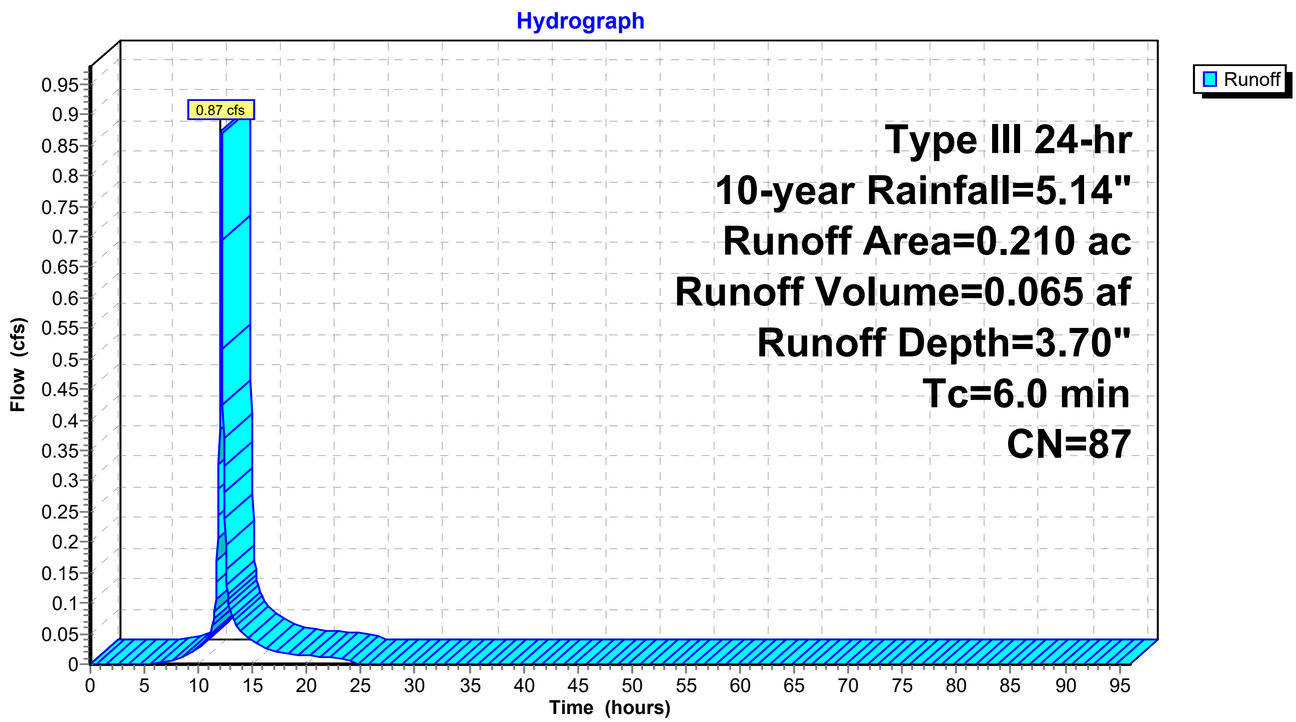
Runoff = 0.87 cfs @ 12.09 hrs, Volume= 0.065 af, Depth= 3.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.14"

Area (ac)	CN	Description
0.050	98	Paved parking, HSG D
0.030	98	Roofs, HSG D
0.130	80	>75% Grass cover, Good, HSG D
0.210	87	Weighted Average
0.130		61.90% Pervious Area
0.080		38.10% Impervious Area

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

Subcatchment 201:



Summary for Subcatchment 202:

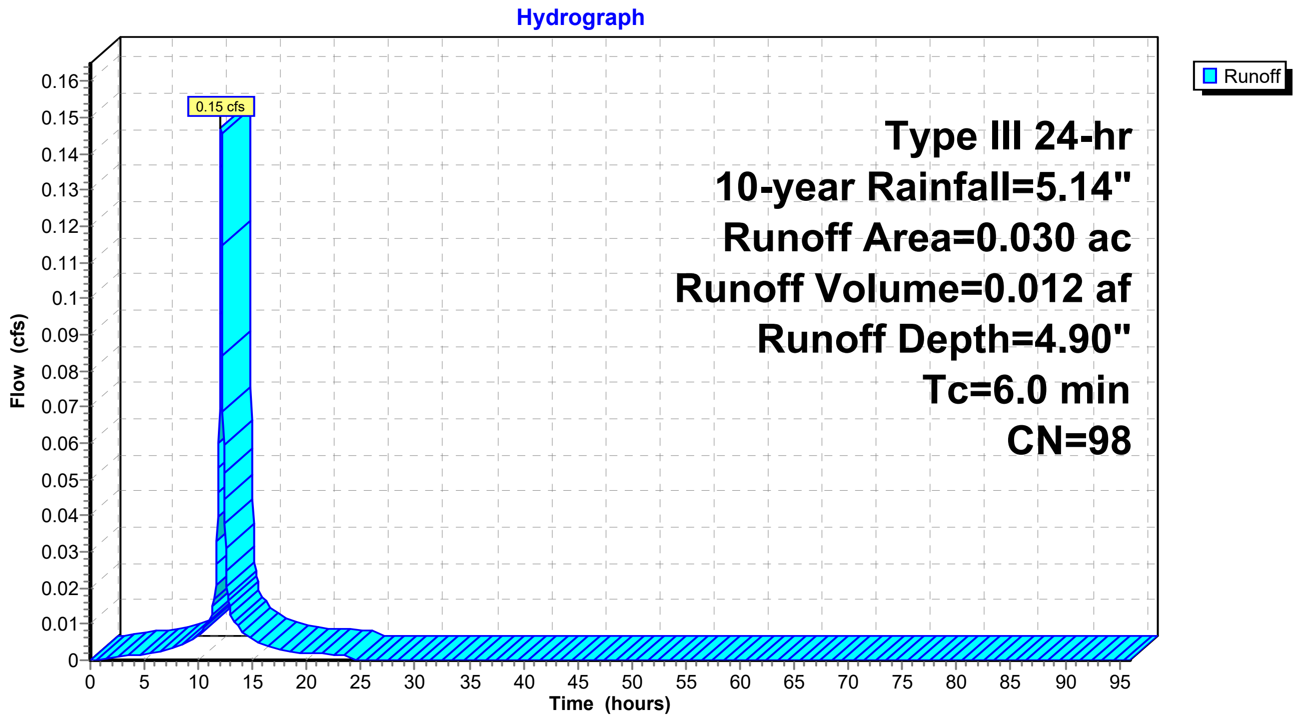
Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.14"

Area (ac)	CN	Description
0.030	98	Roofs, HSG D
0.030		100.00% Impervious Area

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

Subcatchment 202:



Summary for Subcatchment 203:

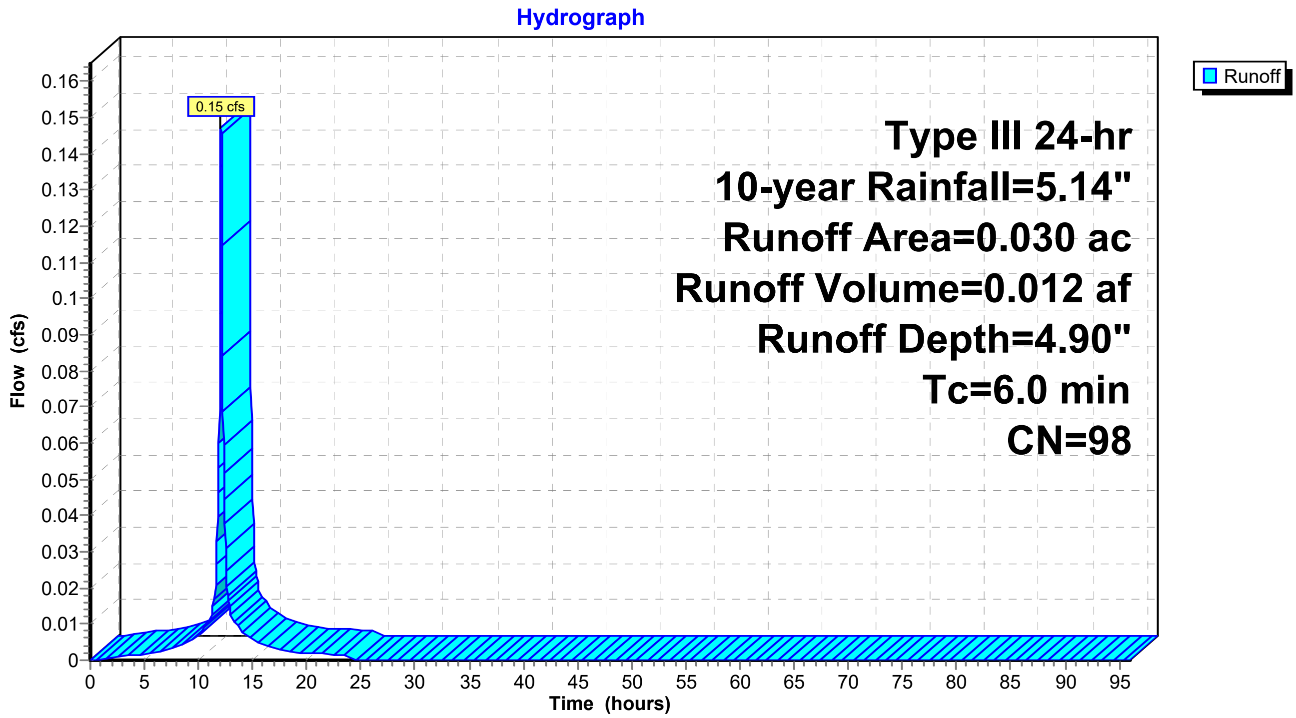
Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af, Depth= 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.14"

Area (ac)	CN	Description
0.030	98	Roofs, HSG D
0.030		100.00% Impervious Area

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

Subcatchment 203:



Summary for Subcatchment 300:

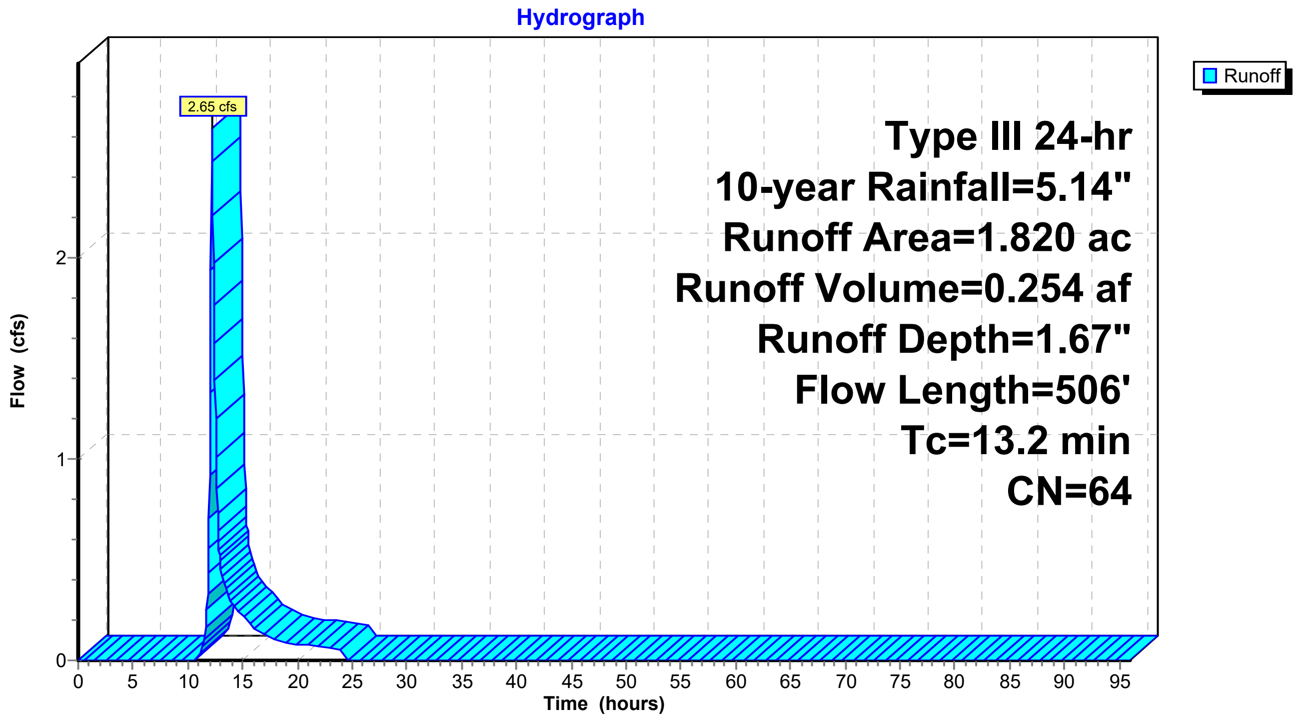
Runoff = 2.65 cfs @ 12.20 hrs, Volume= 0.254 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.14"

Area (ac)	CN	Description
1.110	60	Woods, Fair, HSG B
0.390	73	Woods, Fair, HSG C
0.040	98	Water Surface, 0% imp, HSG B
0.250	61	>75% Grass cover, Good, HSG B
0.020	74	>75% Grass cover, Good, HSG C
0.010	98	Paved parking, HSG B
1.820	64	Weighted Average
1.810		99.45% Pervious Area
0.010		0.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	100	0.1200	0.16		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.41"
2.1	245	0.1500	1.94		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.9	161	0.3300	2.87		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
13.2	506	Total			

Subcatchment 300:



Summary for Subcatchment 301:

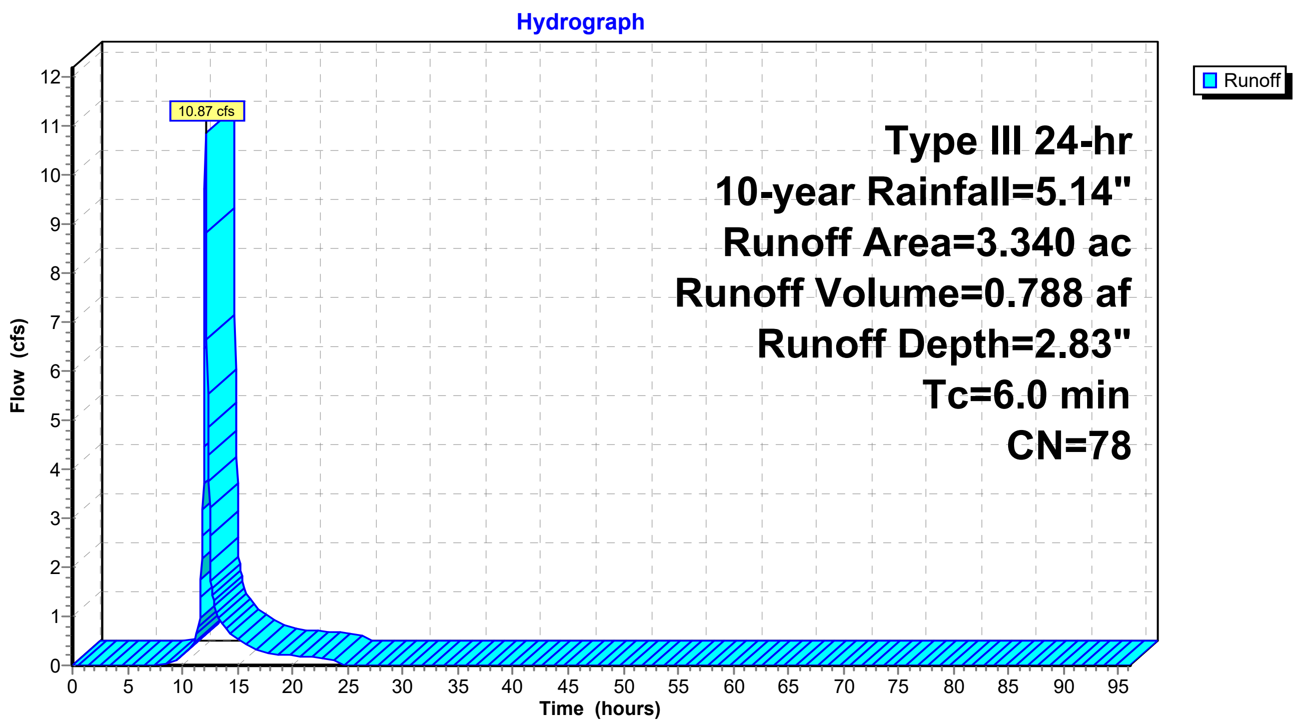
Runoff = 10.87 cfs @ 12.09 hrs, Volume= 0.788 af, Depth= 2.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.14"

Area (ac)	CN	Description
0.470	98	Paved parking, HSG B
0.100	98	Paved parking, HSG C
0.360	98	Paved parking, HSG D
0.080	98	Roofs, HSG B
0.080	98	Roofs, HSG C
0.250	60	Woods, Fair, HSG B
0.150	73	Woods, Fair, HSG C
0.120	79	Woods, Fair, HSG D
0.890	61	>75% Grass cover, Good, HSG B
0.530	74	>75% Grass cover, Good, HSG C
0.310	80	>75% Grass cover, Good, HSG D
3.340	78	Weighted Average
2.250		67.37% Pervious Area
1.090		32.63% Impervious Area

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

Subcatchment 301:



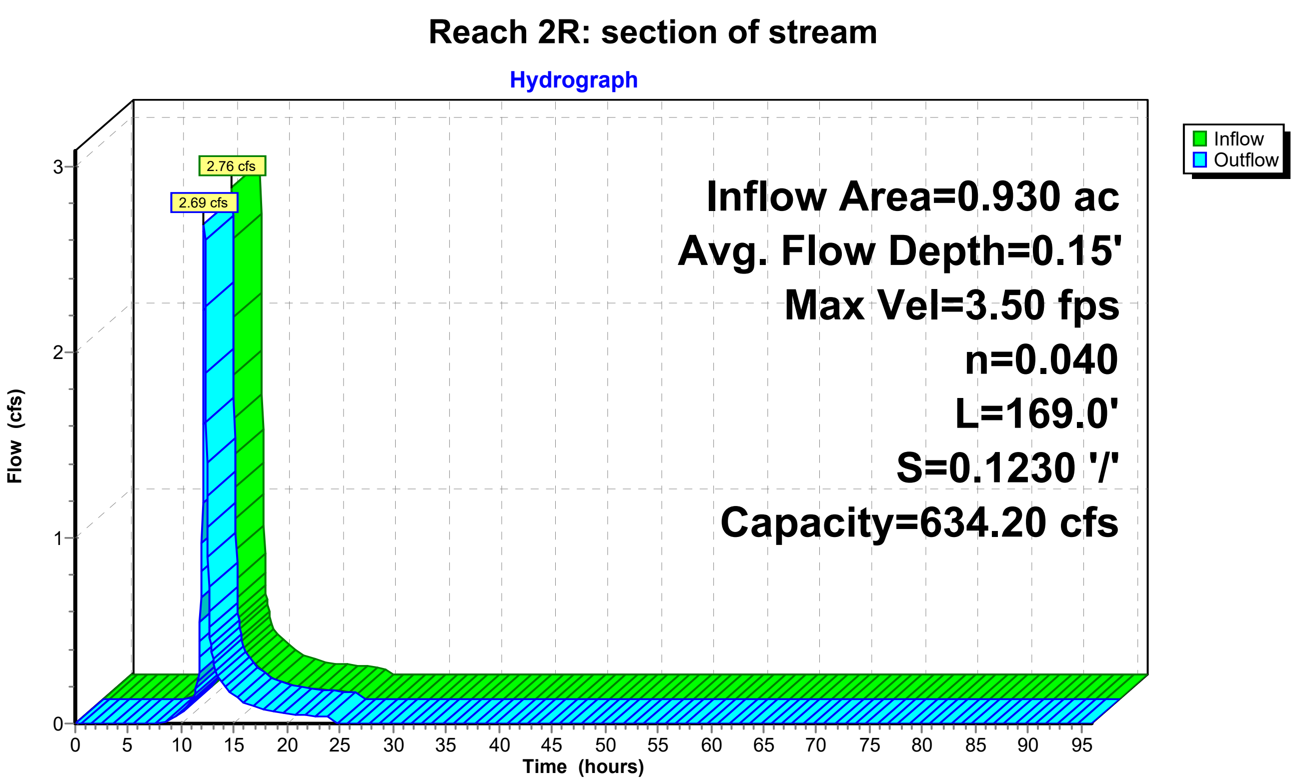
Summary for Reach 2R: section of stream

Inflow Area = 0.930 ac, 23.66% Impervious, Inflow Depth = 2.93" for 10-year event
Inflow = 2.76 cfs @ 12.15 hrs, Volume= 0.227 af
Outflow = 2.69 cfs @ 12.17 hrs, Volume= 0.227 af, Atten= 2%, Lag= 1.3 min

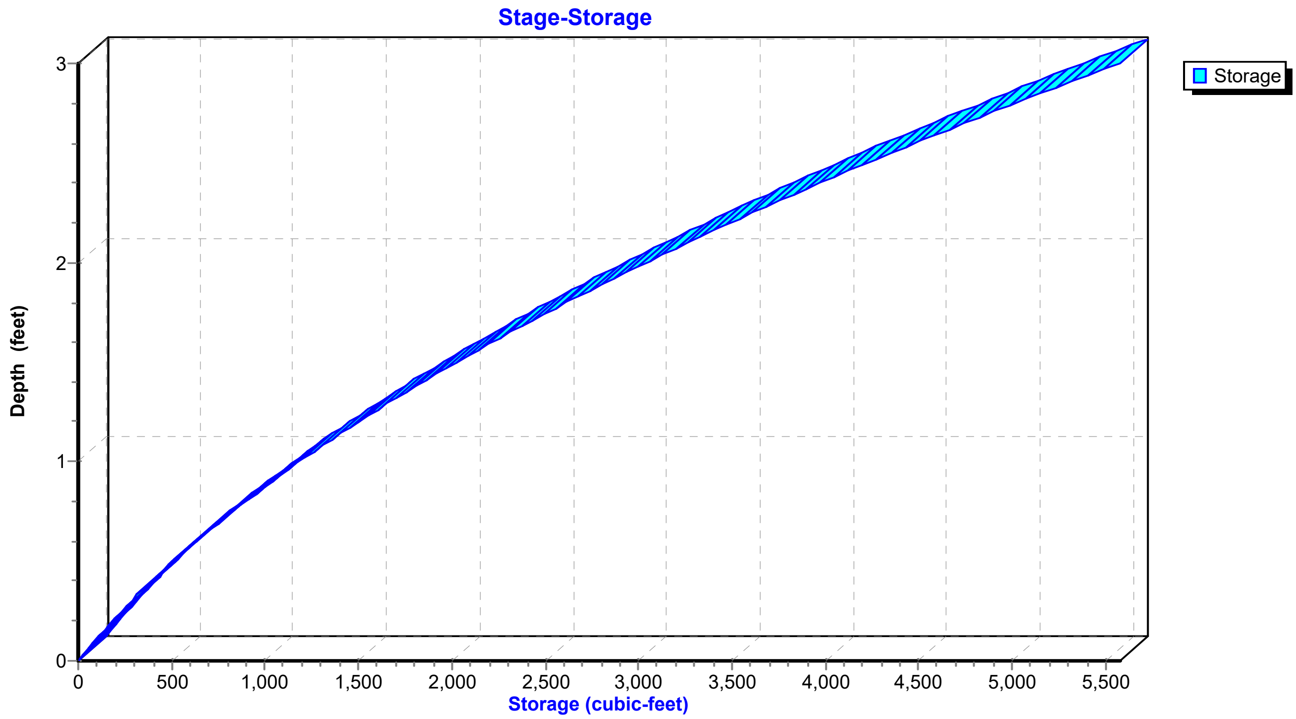
Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.50 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.35 fps, Avg. Travel Time= 2.1 min

Peak Storage= 133 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 3.00' Flow Area= 33.0 sf, Capacity= 634.20 cfs

5.00' x 3.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 17.00'
Length= 169.0' Slope= 0.1230 '/'
Inlet Invert= 286.78', Outlet Invert= 266.00'



Reach 2R: section of stream



Stage-Area-Storage for Reach 2R: section of stream

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
286.78	0.0	0
286.83	0.3	43
286.88	0.5	88
286.93	0.8	134
286.98	1.1	183
287.03	1.4	232
287.08	1.7	284
287.13	2.0	337
287.18	2.3	392
287.23	2.7	449
287.28	3.0	507
287.33	3.4	567
287.38	3.7	629
287.43	4.1	692
287.48	4.5	757
287.53	4.9	824
287.58	5.3	892
287.63	5.7	963
287.68	6.1	1,034
287.73	6.6	1,108
287.78	7.0	1,183
287.83	7.5	1,260
287.88	7.9	1,339
287.93	8.4	1,419
287.98	8.9	1,501
288.03	9.4	1,584
288.08	9.9	1,670
288.13	10.4	1,757
288.18	10.9	1,846
288.23	11.5	1,936
288.28	12.0	2,028
288.33	12.6	2,122
288.38	13.1	2,217
288.43	13.7	2,314
288.48	14.3	2,413
288.53	14.9	2,514
288.58	15.5	2,616
288.63	16.1	2,720
288.68	16.7	2,826
288.73	17.4	2,933
288.78	18.0	3,042
288.83	18.7	3,153
288.88	19.3	3,265
288.93	20.0	3,379
288.98	20.7	3,495
289.03	21.4	3,612
289.08	22.1	3,732
289.13	22.8	3,852
289.18	23.5	3,975
289.23	24.3	4,099
289.28	25.0	4,225
289.33	25.8	4,353
289.38	26.5	4,482
289.43	27.3	4,613
289.48	28.1	4,746
289.53	28.9	4,880
289.58	29.7	5,016
289.63	30.5	5,154
289.68	31.3	5,293
289.73	32.2	5,434
289.78	**33.0**	**5,577**

Summary for Reach 3R: section of stream

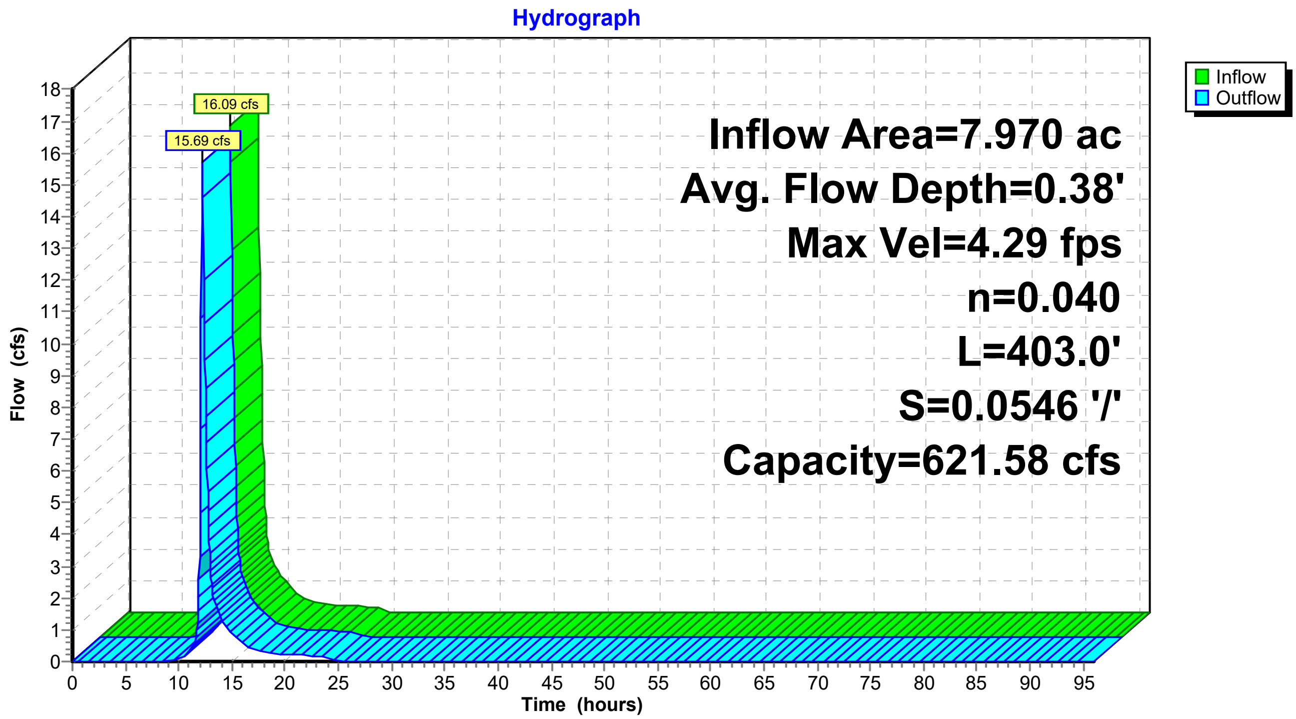
Inflow Area = 7.970 ac, 18.32% Impervious, Inflow Depth = 1.92" for 10-year event
Inflow = 16.09 cfs @ 12.18 hrs, Volume= 1.277 af
Outflow = 15.69 cfs @ 12.22 hrs, Volume= 1.277 af, Atten= 2%, Lag= 2.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.29 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 1.17 fps, Avg. Travel Time= 5.7 min

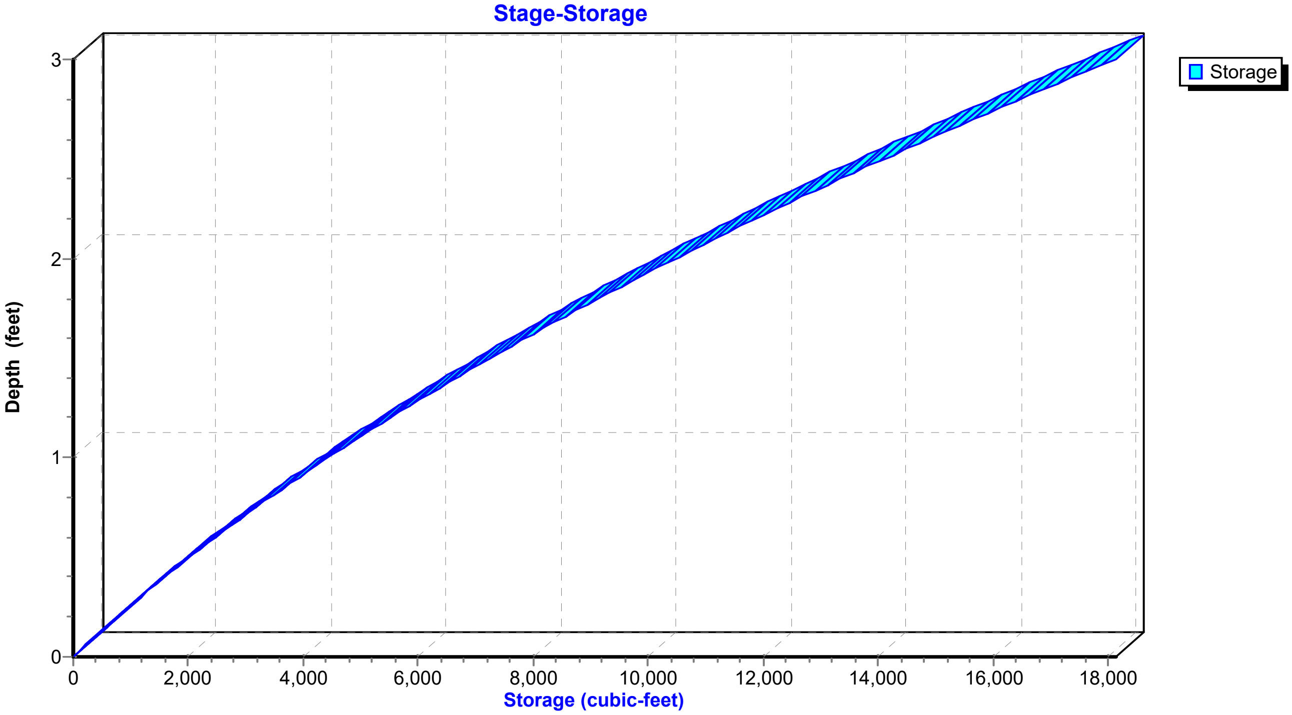
Peak Storage= 1,501 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 621.58 cfs

9.00' x 3.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 21.00'
Length= 403.0' Slope= 0.0546 '/'
Inlet Invert= 266.00', Outlet Invert= 244.00'

Reach 3R: section of stream



Reach 3R: section of stream



Stage-Area-Storage for Reach 3R: section of stream

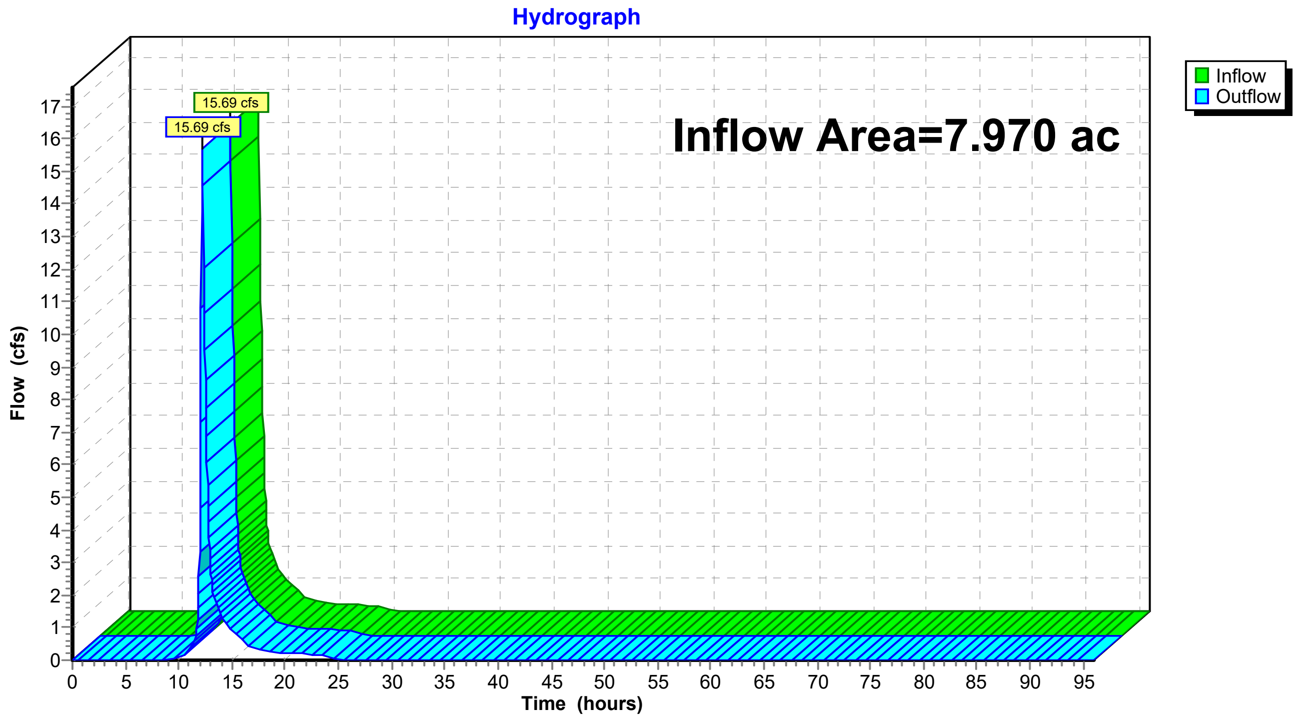
Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
266.00	0.0	0
266.05	0.5	184
266.10	0.9	371
266.15	1.4	562
266.20	1.9	758
266.25	2.4	957
266.30	2.9	1,161
266.35	3.4	1,368
266.40	3.9	1,580
266.45	4.5	1,795
266.50	5.0	2,015
266.55	5.6	2,239
266.60	6.1	2,466
266.65	6.7	2,698
266.70	7.3	2,934
266.75	7.9	3,174
266.80	8.5	3,418
266.85	9.1	3,665
266.90	9.7	3,917
266.95	10.4	4,173
267.00	11.0	4,433
267.05	11.7	4,697
267.10	12.3	4,965
267.15	13.0	5,237
267.20	13.7	5,513
267.25	14.4	5,793
267.30	15.1	6,077
267.35	15.8	6,365
267.40	16.5	6,658
267.45	17.3	6,954
267.50	18.0	7,254
267.55	18.8	7,558
267.60	19.5	7,867
267.65	20.3	8,179
267.70	21.1	8,495
267.75	21.9	8,816
267.80	22.7	9,140
267.85	23.5	9,469
267.90	24.3	9,801
267.95	25.2	10,137
268.00	26.0	10,478
268.05	26.9	10,823
268.10	27.7	11,171
268.15	28.6	11,524
268.20	29.5	11,881
268.25	30.4	12,241
268.30	31.3	12,606
268.35	32.2	12,975
268.40	33.1	13,347
268.45	34.1	13,724
268.50	35.0	14,105
268.55	36.0	14,490
268.60	36.9	14,879
268.65	37.9	15,272
268.70	38.9	15,669
268.75	39.9	16,070
268.80	40.9	16,475
268.85	41.9	16,884
268.90	42.9	17,297
268.95	44.0	17,714
269.00	**45.0**	**18,135**

Summary for Reach DP-1:

Inflow Area =	7.970 ac,	18.32% Impervious,	Inflow Depth = 1.92"	for 10-year event
Inflow =	15.69 cfs @	12.22 hrs, Volume=	1.277 af	
Outflow =	15.69 cfs @	12.22 hrs, Volume=	1.277 af, Atten= 0%, Lag= 0.0 min	

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Reach DP-1:



Summary for Pond 1P: Lot 1 cultec

Inflow Area = 0.210 ac, 38.10% Impervious, Inflow Depth = 3.70" for 10-year event
Inflow = 0.87 cfs @ 12.09 hrs, Volume= 0.065 af
Outflow = 0.69 cfs @ 12.16 hrs, Volume= 0.065 af, Atten= 21%, Lag= 4.1 min
Discarded = 0.04 cfs @ 10.75 hrs, Volume= 0.034 af
Primary = 0.65 cfs @ 12.16 hrs, Volume= 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 301.62' @ 12.16 hrs Surf.Area= 429 sf Storage= 321 cf

Plug-Flow detention time= 13.7 min calculated for 0.065 af (100% of inflow)
Center-of-Mass det. time= 13.6 min (813.9 - 800.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	300.40'	153 cf	**6.33'W x 24.50'L x 3.54'H Field A** 550 cf Overall - 168 cf Embedded = 382 cf x 40.0% Voids
#2A	300.90'	168 cf	**Cultec R-330XLHD** x 3 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
#3B	300.40'	253 cf	**11.17'W x 24.50'L x 3.54'H Field B** 969 cf Overall - 335 cf Embedded = 634 cf x 40.0% Voids
#4B	300.90'	335 cf	**Cultec R-330XLHD** x 6 Inside #3 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 2 rows
		909 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	300.90'	**6.0" Round Culvert** L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 300.90' / 300.00' S= 0.0346 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Discarded	300.40'	**4.100 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 10.75 hrs HW=300.44' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.64 cfs @ 12.16 hrs HW=301.61' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.64 cfs @ 3.27 fps)

Pond 1P: Lot 1 cultec - 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

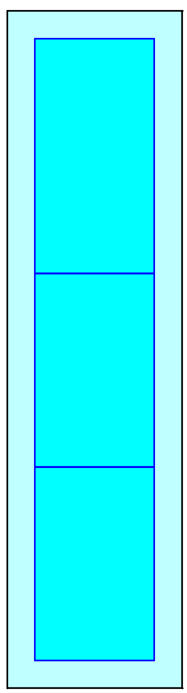
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

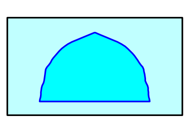
3 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 167.6 cf Chamber Storage

549.5 cf Field - 167.6 cf Chambers = 381.9 cf Stone x 40.0% Voids = 152.8 cf Stone Storage

Chamber Storage + Stone Storage = 320.4 cf = 0.007 af
Overall Storage Efficiency = 58.3%
Overall System Size = 24.50' x 6.33' x 3.54'

3 Chambers
20.4 cy Field
14.1 cy Stone





Pond 1P: Lot 1 cultec - Chamber Wizard Field B

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 2 rows

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

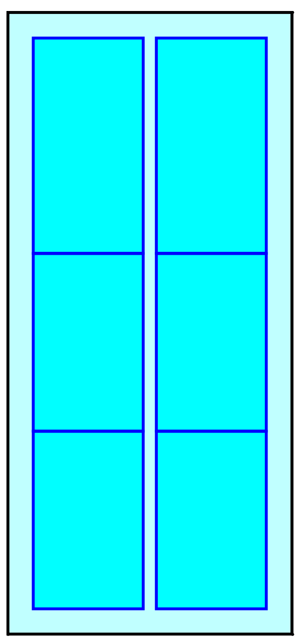
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.17' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

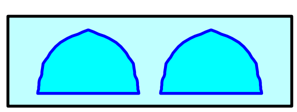
6 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 2 Rows = 335.3 cf Chamber Storage

968.9 cf Field - 335.3 cf Chambers = 633.6 cf Stone x 40.0% Voids = 253.5 cf Stone Storage

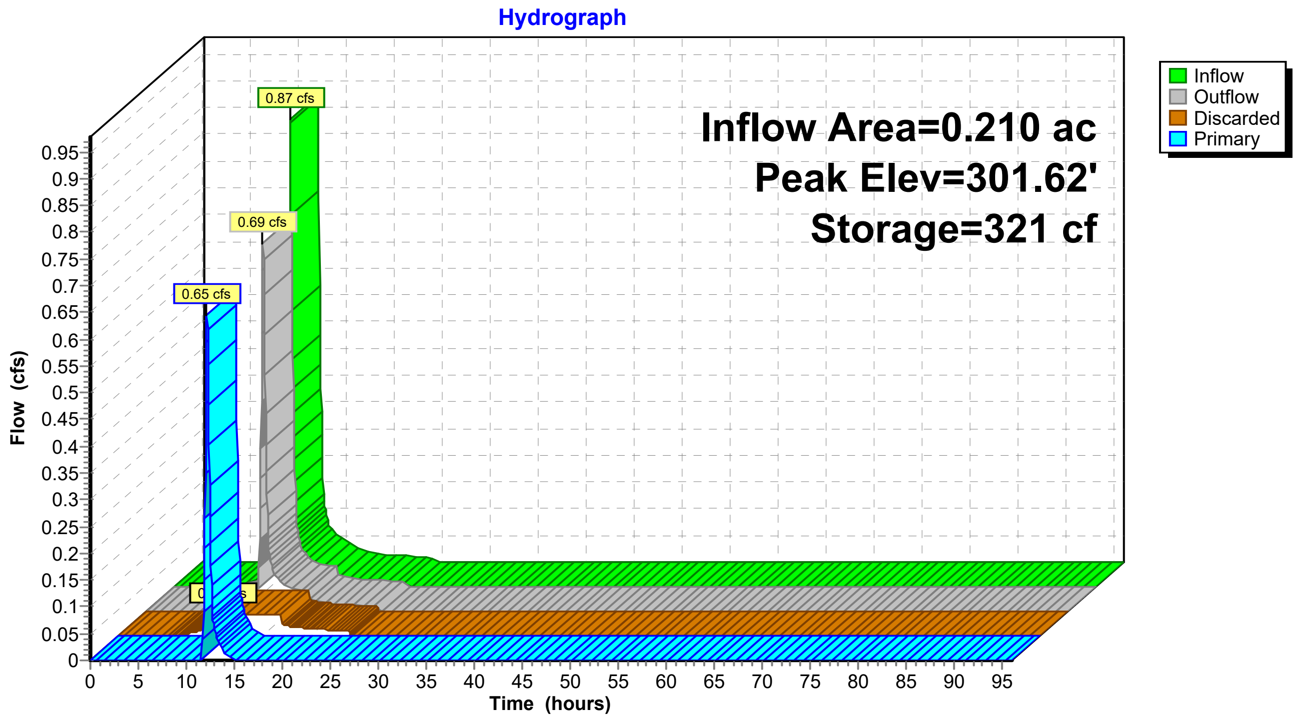
Chamber Storage + Stone Storage = 588.8 cf = 0.014 af
Overall Storage Efficiency = 60.8%
Overall System Size = 24.50' x 11.17' x 3.54'

6 Chambers
35.9 cy Field
23.5 cy Stone

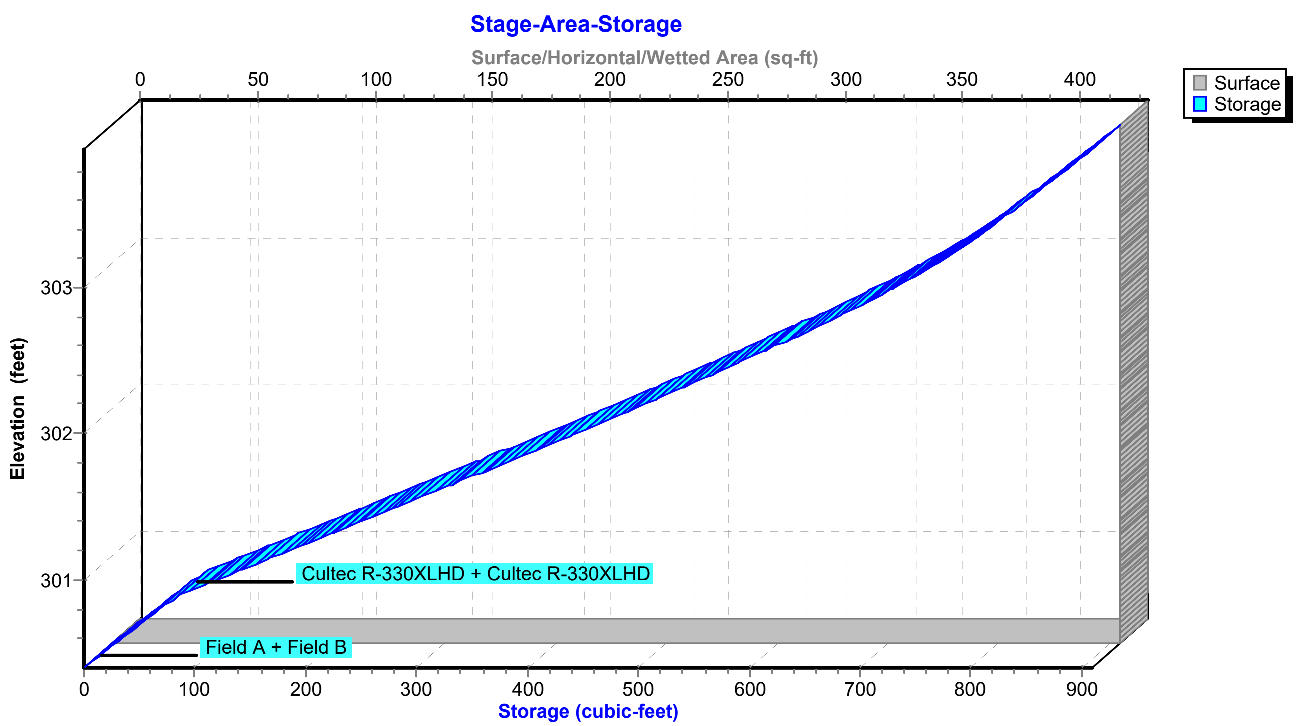




Pond 1P: Lot 1 cultec



Pond 1P: Lot 1 cultec



Stage-Area-Storage for Pond 1P: Lot 1 cultec

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
300.40	**429**	0	303.00	429	732
300.45	429	9	303.05	429	744
300.50	429	17	303.10	429	756
300.55	429	26	303.15	429	767
300.60	429	34	303.20	429	778
300.65	429	43	303.25	429	788
300.70	429	51	303.30	429	798
300.75	429	60	303.35	429	807
300.80	429	69	303.40	429	816
300.85	429	77	303.45	429	825
300.90	429	86	303.50	429	833
300.95	429	102	303.55	429	842
301.00	429	119	303.60	429	851
301.05	429	136	303.65	429	859
301.10	429	152	303.70	429	868
301.15	429	168	303.75	429	876
301.20	429	185	303.80	429	885
301.25	429	201	303.85	429	893
301.30	429	218	303.90	429	**902**
301.35	429	234			
301.40	429	251			
301.45	429	267			
301.50	429	283			
301.55	429	299			
301.60	429	316			
301.65	429	332			
301.70	429	347			
301.75	429	363			
301.80	429	379			
301.85	429	395			
301.90	429	411			
301.95	429	427			
302.00	429	443			
302.05	429	459			
302.10	429	474			
302.15	429	490			
302.20	429	505			
302.25	429	521			
302.30	429	536			
302.35	429	551			
302.40	429	566			
302.45	429	581			
302.50	429	595			
302.55	429	610			
302.60	429	624			
302.65	429	638			
302.70	429	652			
302.75	429	666			
302.80	429	680			
302.85	429	693			
302.90	429	706			
302.95	429	719			

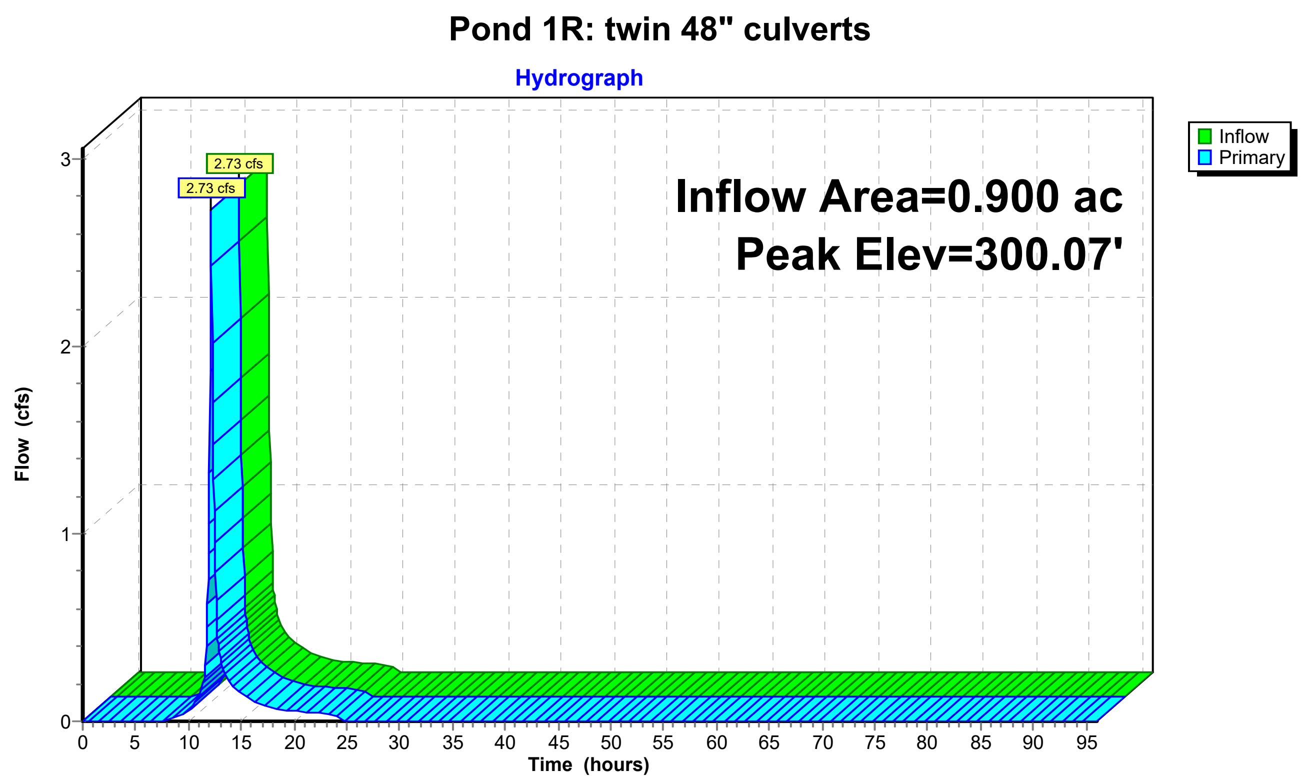
Summary for Pond 1R: twin 48" culverts

Inflow Area = 0.900 ac, 21.11% Impervious, Inflow Depth = 3.02" for 10-year event
Inflow = 2.73 cfs @ 12.15 hrs, Volume= 0.226 af
Outflow = 2.73 cfs @ 12.15 hrs, Volume= 0.226 af, Atten= 0%, Lag= 0.0 min
Primary = 2.73 cfs @ 12.15 hrs, Volume= 0.226 af

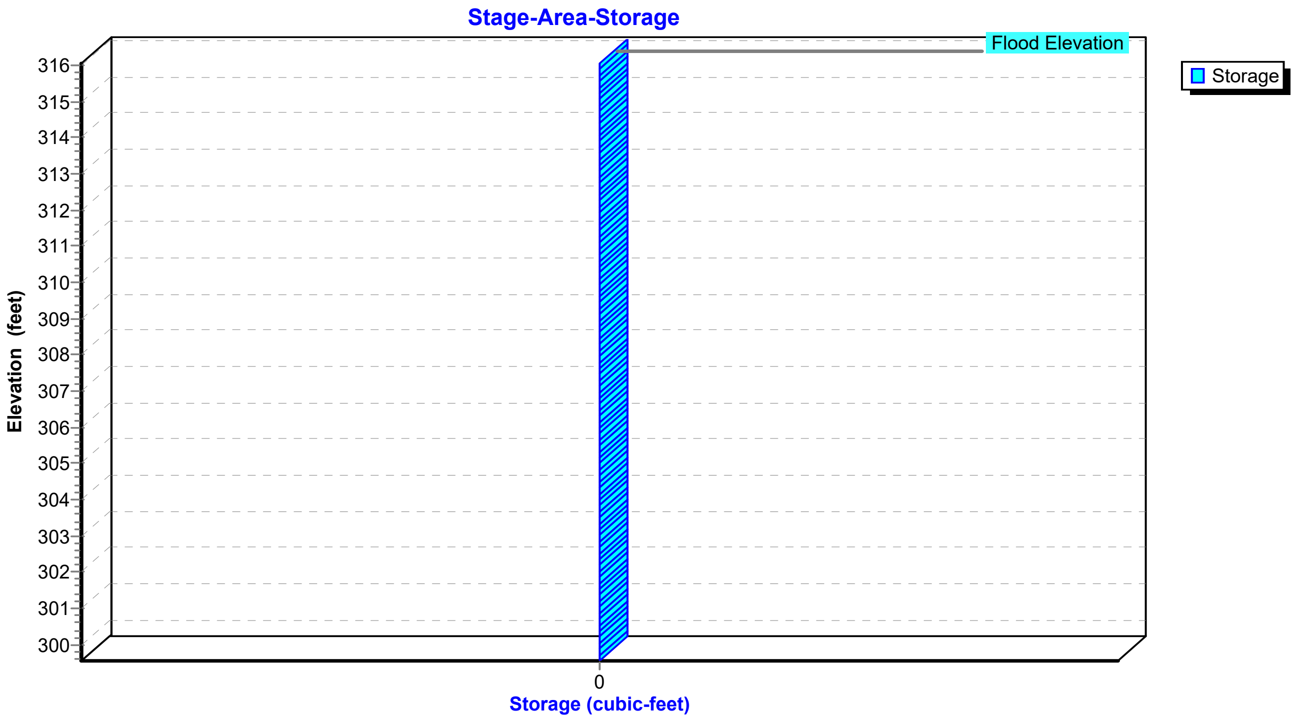
Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 300.07' @ 12.15 hrs
Flood Elev= 316.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	299.55'	**48.0" Round Culvert** L= 182.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 299.55' / 286.78' S= 0.0702 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf
#2	Primary	299.90'	**48.0" Round Culvert** L= 180.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 299.90' / 287.92' S= 0.0666 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

Primary OutFlow Max=2.65 cfs @ 12.15 hrs HW=300.07' (Free Discharge)
├─**1=Culvert** (Inlet Controls 2.38 cfs @ 2.46 fps)
└─**2=Culvert** (Inlet Controls 0.27 cfs @ 1.42 fps)



Pond 1R: twin 48" culverts



Stage-Area-Storage for Pond 1R: twin 48" culverts

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
299.55	**0**	309.95	0
299.75	0	310.15	0
299.95	0	310.35	0
300.15	0	310.55	0
300.35	0	310.75	0
300.55	0	310.95	0
300.75	0	311.15	0
300.95	0	311.35	0
301.15	0	311.55	0
301.35	0	311.75	0
301.55	0	311.95	0
301.75	0	312.15	0
301.95	0	312.35	0
302.15	0	312.55	0
302.35	0	312.75	0
302.55	0	312.95	0
302.75	0	313.15	0
302.95	0	313.35	0
303.15	0	313.55	0
303.35	0	313.75	0
303.55	0	313.95	0
303.75	0	314.15	0
303.95	0	314.35	0
304.15	0	314.55	0
304.35	0	314.75	0
304.55	0	314.95	0
304.75	0	315.15	0
304.95	0	315.35	0
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307.15	0		
307.35	0		
307.55	0		
307.75	0		
307.95	0		
308.15	0		
308.35	0		
308.55	0		
308.75	0		
308.95	0		
309.15	0		
309.35	0		
309.55	0		
309.75	0		

Summary for Pond 2P: Lot 2 cultec

Inflow Area = 0.030 ac,100.00% Impervious, Inflow Depth = 4.90" for 10-year event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.07 cfs @ 12.24 hrs, Volume= 0.012 af, Atten= 49%, Lag= 9.1 min
Discarded = 0.03 cfs @ 11.75 hrs, Volume= 0.011 af
Primary = 0.05 cfs @ 12.24 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 311.02' @ 12.24 hrs Surf.Area= 310 sf Storage= 90 cf

Plug-Flow detention time= 12.0 min calculated for 0.012 af (100% of inflow)
Center-of-Mass det. time= 12.0 min (759.5 - 747.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	310.40'	153 cf	**6.33'W x 24.50'L x 3.54'H Field A** 550 cf Overall - 168 cf Embedded = 382 cf x 40.0% Voids
#2A	310.90'	168 cf	**Cultec R-330XLHD** x 3 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
#3B	310.40'	153 cf	**6.33'W x 24.50'L x 3.54'H Field B** 550 cf Overall - 168 cf Embedded = 382 cf x 40.0% Voids
#4B	310.90'	168 cf	**Cultec R-330XLHD** x 3 Inside #3 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
		641 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	310.90'	**6.0" Round Culvert** L= 21.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 310.90' / 310.00' S= 0.0429 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Discarded	310.40'	**4.100 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 11.75 hrs HW=310.44' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.04 cfs @ 12.24 hrs HW=311.02' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.04 cfs @ 1.19 fps)

Pond 2P: Lot 2 cultec - 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

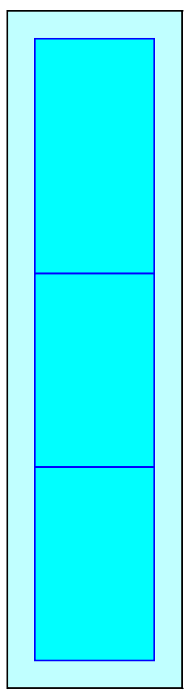
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

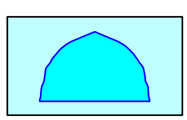
3 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 167.6 cf Chamber Storage

549.5 cf Field - 167.6 cf Chambers = 381.9 cf Stone x 40.0% Voids = 152.8 cf Stone Storage

Chamber Storage + Stone Storage = 320.4 cf = 0.007 af
Overall Storage Efficiency = 58.3%
Overall System Size = 24.50' x 6.33' x 3.54'

3 Chambers
20.4 cy Field
14.1 cy Stone





Pond 2P: Lot 2 cultec - Chamber Wizard Field B

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

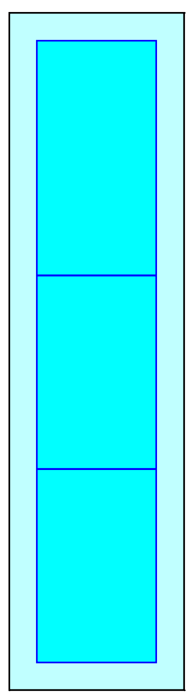
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

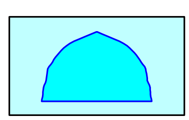
3 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 167.6 cf Chamber Storage

549.5 cf Field - 167.6 cf Chambers = 381.9 cf Stone x 40.0% Voids = 152.8 cf Stone Storage

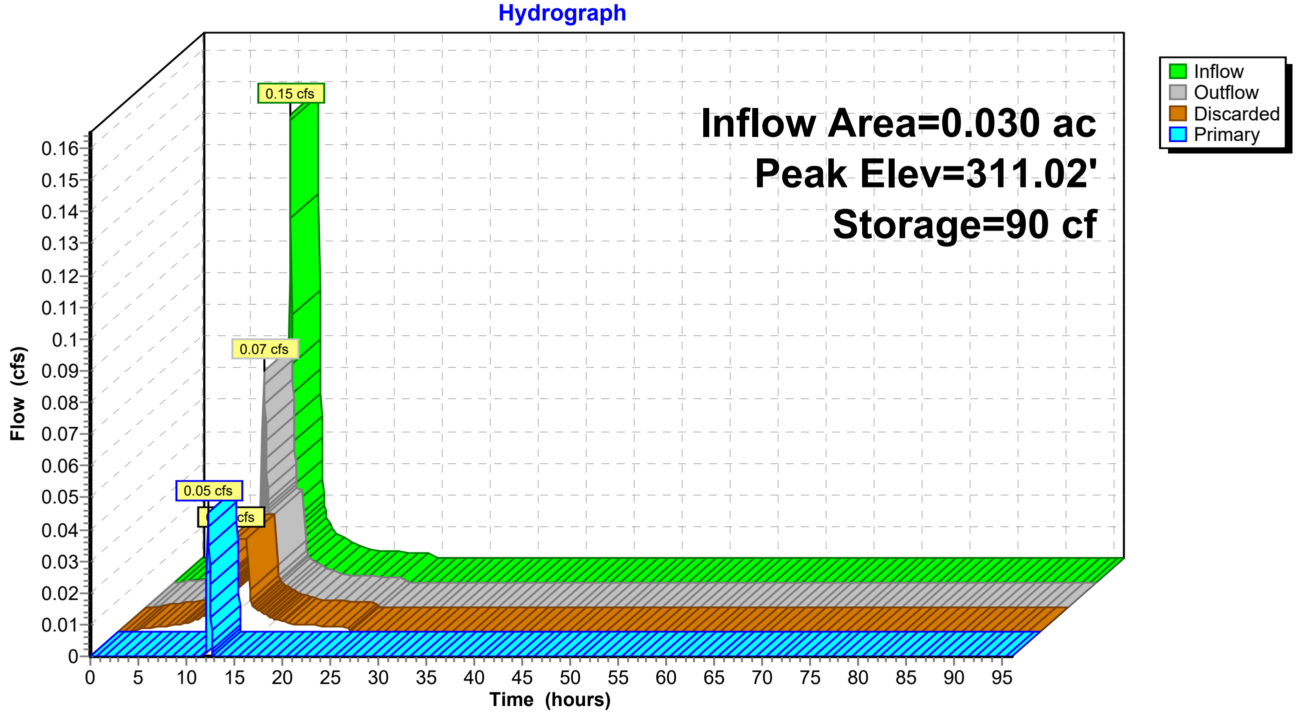
Chamber Storage + Stone Storage = 320.4 cf = 0.007 af
Overall Storage Efficiency = 58.3%
Overall System Size = 24.50' x 6.33' x 3.54'

3 Chambers
20.4 cy Field
14.1 cy Stone

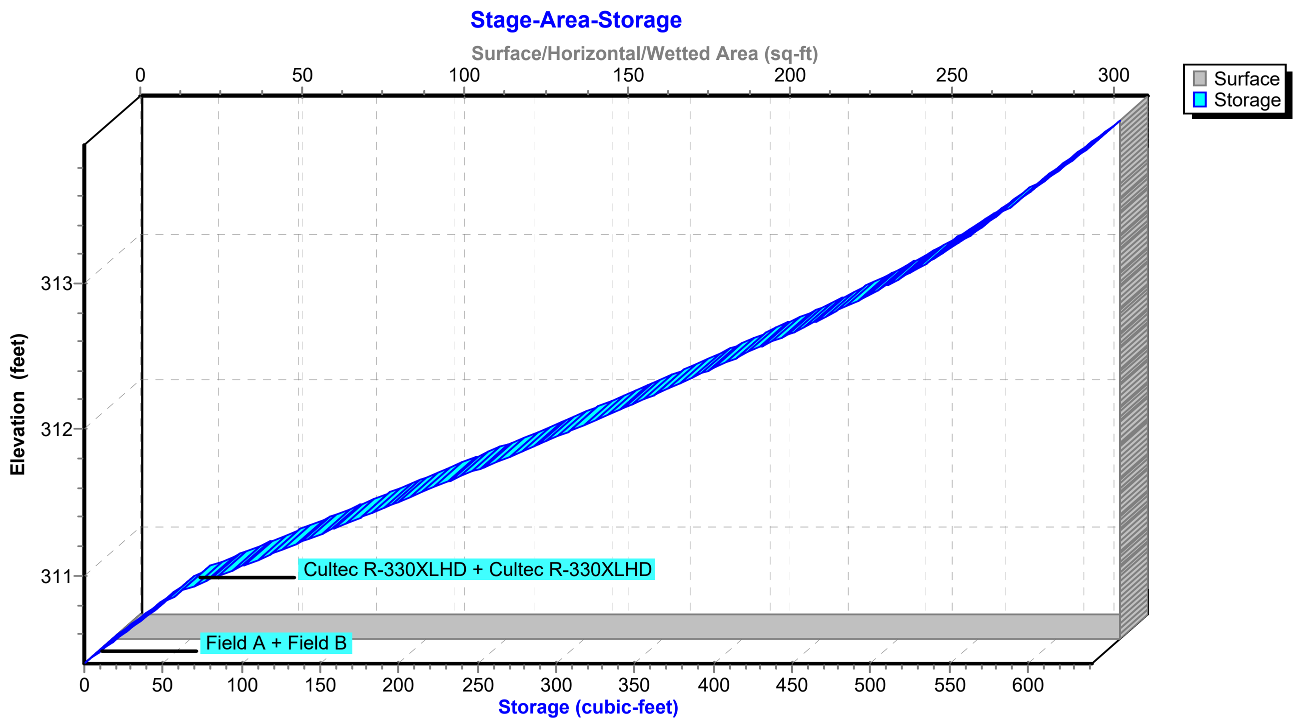




Pond 2P: Lot 2 cultec



Pond 2P: Lot 2 cultec



Stage-Area-Storage for Pond 2P: Lot 2 cultec

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
310.40	**310**	0	313.00	310	513
310.45	310	6	313.05	310	522
310.50	310	12	313.10	310	530
310.55	310	19	313.15	310	538
310.60	310	25	313.20	310	546
310.65	310	31	313.25	310	553
310.70	310	37	313.30	310	560
310.75	310	43	313.35	310	567
310.80	310	50	313.40	310	574
310.85	310	56	313.45	310	580
310.90	310	62	313.50	310	586
310.95	310	74	313.55	310	592
311.00	310	85	313.60	310	598
311.05	310	97	313.65	310	605
311.10	310	108	313.70	310	611
311.15	310	120	313.75	310	617
311.20	310	131	313.80	310	623
311.25	310	143	313.85	310	629
311.30	310	154	313.90	310	**636**
311.35	310	165			
311.40	310	177			
311.45	310	188			
311.50	310	200			
311.55	310	211			
311.60	310	222			
311.65	310	233			
311.70	310	244			
311.75	310	256			
311.80	310	267			
311.85	310	278			
311.90	310	289			
311.95	310	300			
312.00	310	311			
312.05	310	322			
312.10	310	333			
312.15	310	344			
312.20	310	355			
312.25	310	365			
312.30	310	376			
312.35	310	386			
312.40	310	397			
312.45	310	407			
312.50	310	418			
312.55	310	428			
312.60	310	438			
312.65	310	448			
312.70	310	457			
312.75	310	467			
312.80	310	477			
312.85	310	486			
312.90	310	495			
312.95	310	504			

Summary for Pond 3P: Lot 4 cultec

Inflow Area = 0.030 ac,100.00% Impervious, Inflow Depth = 4.90" for 10-year event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.012 af
Outflow = 0.07 cfs @ 12.24 hrs, Volume= 0.012 af, Atten= 49%, Lag= 9.1 min
Discarded = 0.03 cfs @ 11.75 hrs, Volume= 0.011 af
Primary = 0.05 cfs @ 12.24 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 292.02' @ 12.24 hrs Surf.Area= 310 sf Storage= 90 cf

Plug-Flow detention time= 12.0 min calculated for 0.012 af (100% of inflow)
Center-of-Mass det. time= 12.0 min (759.5 - 747.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	291.40'	153 cf	**6.33'W x 24.50'L x 3.54'H Field A** 550 cf Overall - 168 cf Embedded = 382 cf x 40.0% Voids
#2A	291.90'	168 cf	**Cultec R-330XLHD** x 3 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
#3B	291.40'	153 cf	**6.33'W x 24.50'L x 3.54'H Field B** 550 cf Overall - 168 cf Embedded = 382 cf x 40.0% Voids
#4B	291.90'	168 cf	**Cultec R-330XLHD** x 3 Inside #3 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
		641 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	291.90'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 291.90' / 291.00' S= 0.0450 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Discarded	291.40'	**4.100 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 11.75 hrs HW=291.44' (Free Discharge)
2=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.04 cfs @ 12.24 hrs HW=292.02' (Free Discharge)
1=Culvert (Inlet Controls 0.04 cfs @ 1.19 fps)

Pond 3P: Lot 4 cultec - 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

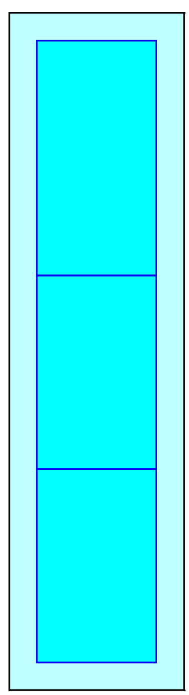
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

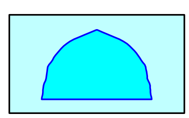
3 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 167.6 cf Chamber Storage

549.5 cf Field - 167.6 cf Chambers = 381.9 cf Stone x 40.0% Voids = 152.8 cf Stone Storage

Chamber Storage + Stone Storage = 320.4 cf = 0.007 af
Overall Storage Efficiency = 58.3%
Overall System Size = 24.50' x 6.33' x 3.54'

3 Chambers
20.4 cy Field
14.1 cy Stone





Pond 3P: Lot 4 cultec - Chamber Wizard Field B

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

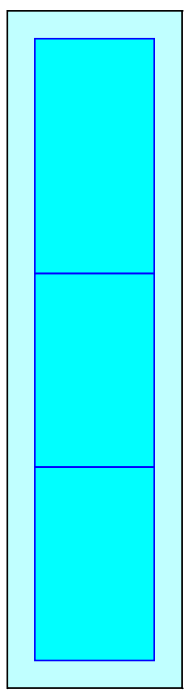
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

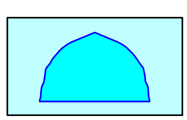
3 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 167.6 cf Chamber Storage

549.5 cf Field - 167.6 cf Chambers = 381.9 cf Stone x 40.0% Voids = 152.8 cf Stone Storage

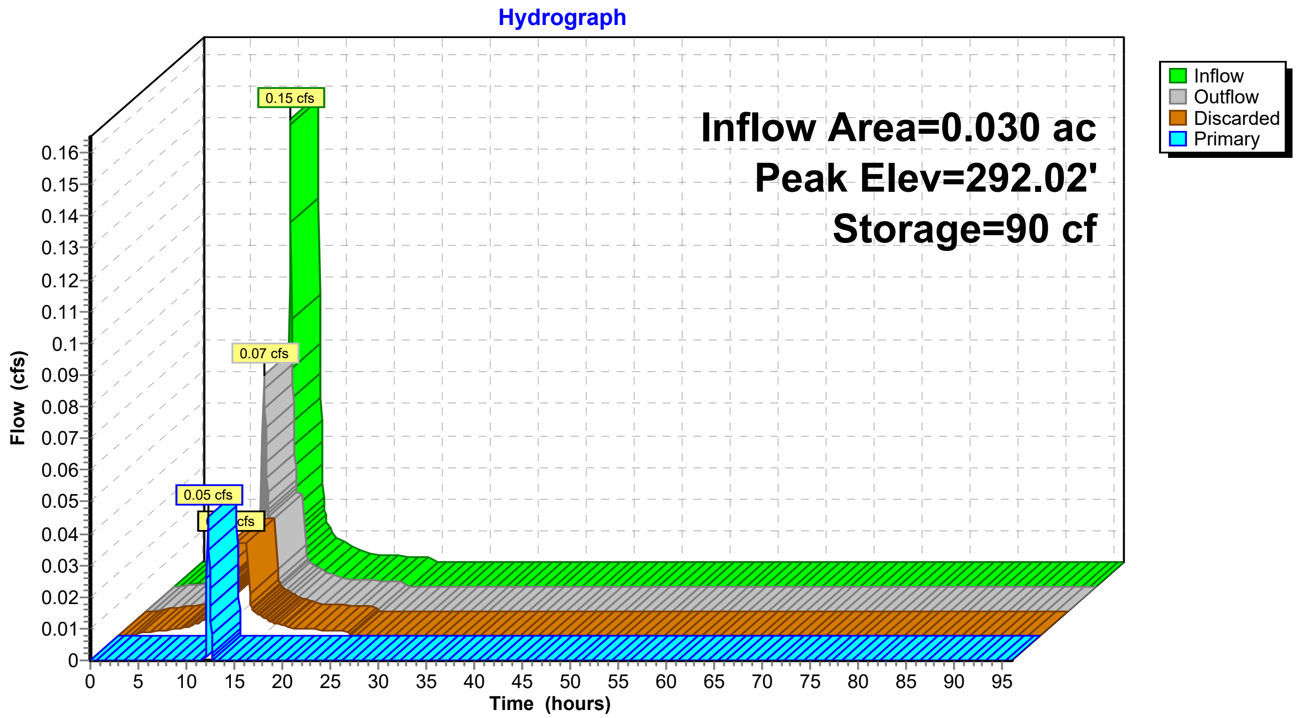
Chamber Storage + Stone Storage = 320.4 cf = 0.007 af
Overall Storage Efficiency = 58.3%
Overall System Size = 24.50' x 6.33' x 3.54'

3 Chambers
20.4 cy Field
14.1 cy Stone

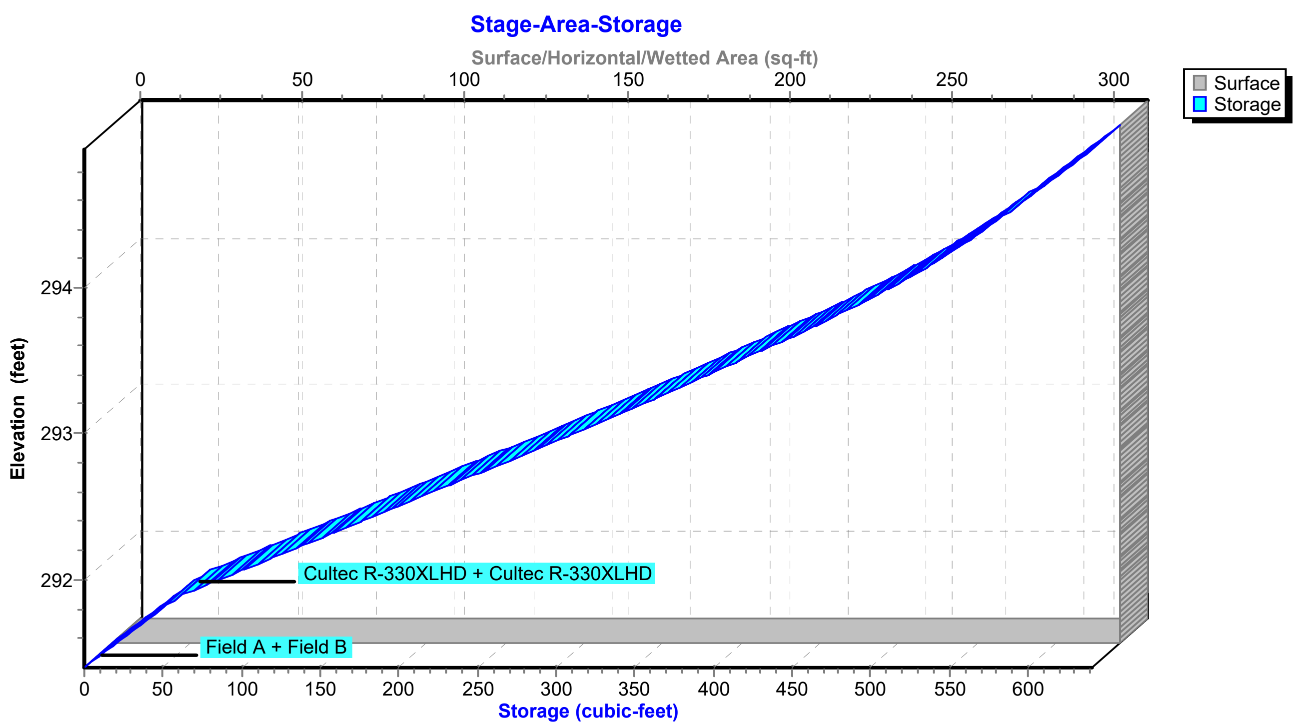




Pond 3P: Lot 4 cultec



Pond 3P: Lot 4 cultec



Stage-Area-Storage for Pond 3P: Lot 4 cultec

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
291.40	**310**	0
291.45	310	6
291.50	310	12
291.55	310	19
291.60	310	25
291.65	310	31
291.70	310	37
291.75	310	43
291.80	310	50
291.85	310	56
291.90	310	62
291.95	310	74
292.00	310	85
292.05	310	97
292.10	310	108
292.15	310	120
292.20	310	131
292.25	310	143
292.30	310	154
292.35	310	165
292.40	310	177
292.45	310	188
292.50	310	200
292.55	310	211
292.60	310	222
292.65	310	233
292.70	310	244
292.75	310	256
292.80	310	267
292.85	310	278
292.90	310	289
292.95	310	300
293.00	310	311
293.05	310	322
293.10	310	333
293.15	310	344
293.20	310	355
293.25	310	365
293.30	310	376
293.35	310	386
293.40	310	397
293.45	310	407
293.50	310	418
293.55	310	428
293.60	310	438
293.65	310	448
293.70	310	457
293.75	310	467
293.80	310	477
293.85	310	486
293.90	310	495
293.95	310	504

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
294.00	310	513
294.05	310	522
294.10	310	530
294.15	310	538
294.20	310	546
294.25	310	553
294.30	310	560
294.35	310	567
294.40	310	574
294.45	310	580
294.50	310	586
294.55	310	592
294.60	310	598
294.65	310	605
294.70	310	611
294.75	310	617
294.80	310	623
294.85	310	629
294.90	310	**636**

Summary for Pond 4P: infiltration basin

Inflow Area = 3.340 ac, 32.63% Impervious, Inflow Depth = 2.83" for 10-year event
Inflow = 10.87 cfs @ 12.09 hrs, Volume= 0.788 af
Outflow = 7.29 cfs @ 12.20 hrs, Volume= 0.788 af, Atten= 33%, Lag= 6.5 min
Discarded = 0.42 cfs @ 12.20 hrs, Volume= 0.386 af
Primary = 6.87 cfs @ 12.20 hrs, Volume= 0.402 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 296.14' @ 12.20 hrs Surf.Area= 4,419 sf Storage= 7,677 cf
Flood Elev= 298.00' Surf.Area= 5,955 sf Storage= 17,305 cf

Plug-Flow detention time= 61.6 min calculated for 0.788 af (100% of inflow)
Center-of-Mass det. time= 61.6 min (887.4 - 825.9)

Volume	Invert	Avail.Storage	Storage Description
#1	294.00'	17,305 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
294.00	2,750	0	0
296.00	4,300	7,050	7,050
298.00	5,955	10,255	17,305

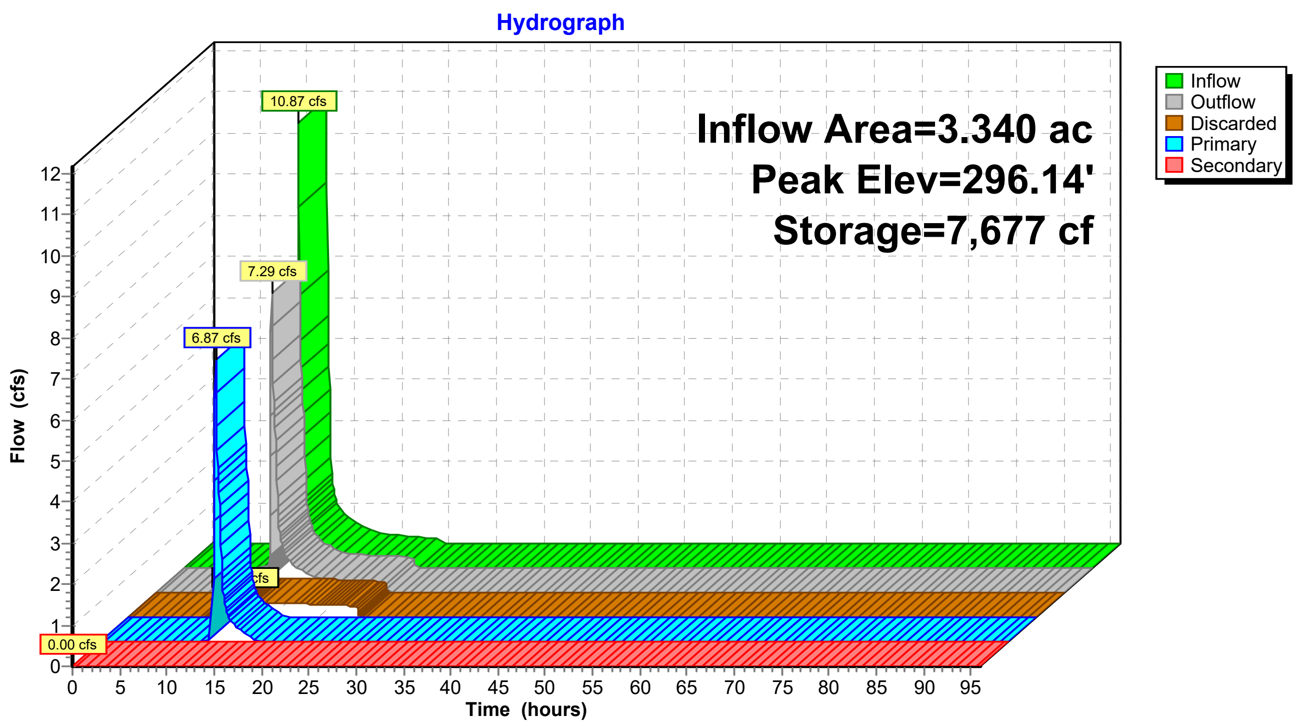
Device	Routing	Invert	Outlet Devices
#1	Primary	290.40'	**15.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 290.40' / 288.00' S= 0.1500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	295.00'	**24.0" W x 6.0" H Vert. Slot** C= 0.600
#3	Device 1	296.00'	**30.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	297.00'	**162.0 deg x 10.0' long x 1.00' rise Emergency spillway** Cv= 2.47 (C= 3.09)
#5	Discarded	294.00'	**4.100 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.42 cfs @ 12.20 hrs HW=296.14' (Free Discharge)
└**5=Exfiltration** (Exfiltration Controls 0.42 cfs)

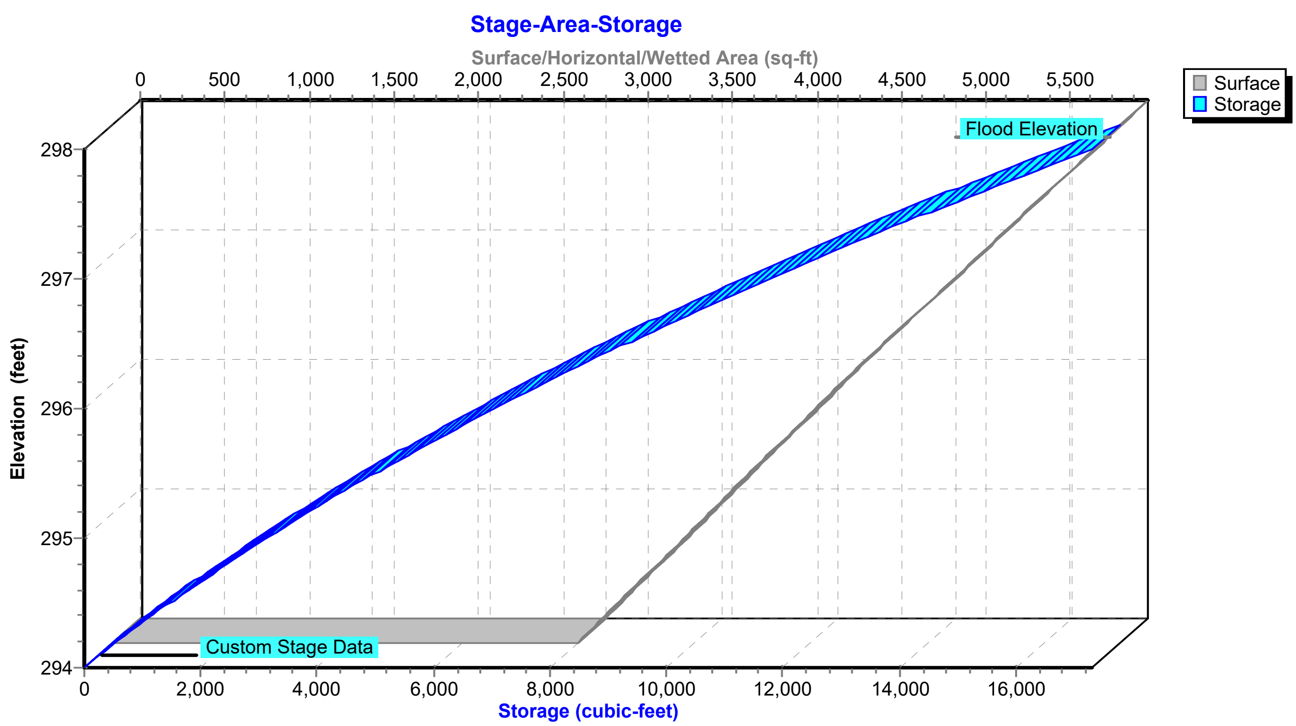
Primary OutFlow Max=6.82 cfs @ 12.20 hrs HW=296.14' (Free Discharge)
└**1=Culvert** (Passes 6.82 cfs of 13.37 cfs potential flow)
  ├**2=Slot** (Orifice Controls 4.53 cfs @ 4.53 fps)
  └**3=Grate** (Weir Controls 2.29 cfs @ 1.23 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=294.00' (Free Discharge)
└**4=Emergency spillway** (Controls 0.00 cfs)

Pond 4P: infiltration basin



Pond 4P: infiltration basin



Stage-Area-Storage for Pond 4P: infiltration basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
294.00	2,750	0
294.05	2,789	138
294.10	2,828	279
294.15	2,866	421
294.20	2,905	565
294.25	2,944	712
294.30	2,983	860
294.35	3,021	1,010
294.40	3,060	1,162
294.45	3,099	1,316
294.50	3,138	1,472
294.55	3,176	1,630
294.60	3,215	1,790
294.65	3,254	1,951
294.70	3,292	2,115
294.75	3,331	2,280
294.80	3,370	2,448
294.85	3,409	2,617
294.90	3,447	2,789
294.95	3,486	2,962
295.00	3,525	3,138
295.05	3,564	3,315
295.10	3,603	3,494
295.15	3,641	3,675
295.20	3,680	3,858
295.25	3,719	4,043
295.30	3,758	4,230
295.35	3,796	4,419
295.40	3,835	4,609
295.45	3,874	4,802
295.50	3,913	4,997
295.55	3,951	5,193
295.60	3,990	5,392
295.65	4,029	5,592
295.70	4,067	5,795
295.75	4,106	5,999
295.80	4,145	6,206
295.85	4,184	6,414
295.90	4,222	6,624
295.95	4,261	6,836
296.00	4,300	7,050
296.05	4,341	7,266
296.10	4,383	7,484
296.15	4,424	7,704
296.20	4,465	7,927
296.25	4,507	8,151
296.30	4,548	8,377
296.35	4,590	8,606
296.40	4,631	8,836
296.45	4,672	9,069
296.50	4,714	9,303
296.55	4,755	9,540
296.60	4,797	9,779
296.65	4,838	10,020
296.70	4,879	10,263
296.75	4,921	10,508
296.80	4,962	10,755
296.85	5,003	11,004
296.90	5,045	11,255
296.95	5,086	11,508
297.00	5,128	11,764
297.05	5,169	12,021
297.10	5,210	12,281
297.15	5,252	12,542
297.20	5,293	12,806
297.25	5,334	13,071
297.30	5,376	13,339
297.35	5,417	13,609
297.40	5,458	13,881
297.45	5,500	14,155
297.50	5,541	14,431
297.55	5,583	14,709
297.60	5,624	14,989
297.65	5,665	15,271
297.70	5,707	15,556
297.75	5,748	15,842
297.80	5,790	16,131
297.85	5,831	16,421
297.90	5,872	16,714
297.95	5,914	17,008
298.00	**5,955**	**17,305**

Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment100: Runoff Area=0.900 ac 21.11% Impervious Runoff Depth=6.84"
Flow Length=271' Tc=10.2 min CN=80 Runoff=6.06 cfs 0.513 af

Subcatchment200: Runoff Area=1.640 ac 1.83% Impervious Runoff Depth=6.34"
Flow Length=339' Tc=6.0 min CN=76 Runoff=11.79 cfs 0.867 af

Subcatchment201: Runoff Area=0.210 ac 38.10% Impervious Runoff Depth=7.71"
Tc=6.0 min CN=87 Runoff=1.75 cfs 0.135 af

Subcatchment202: Runoff Area=0.030 ac 100.00% Impervious Runoff Depth=9.05"
Tc=6.0 min CN=98 Runoff=0.27 cfs 0.023 af

Subcatchment203: Runoff Area=0.030 ac 100.00% Impervious Runoff Depth=9.05"
Tc=6.0 min CN=98 Runoff=0.27 cfs 0.023 af

Subcatchment300: Runoff Area=1.820 ac 0.55% Impervious Runoff Depth=4.83"
Flow Length=506' Tc=13.2 min CN=64 Runoff=8.10 cfs 0.733 af

Subcatchment301: Runoff Area=3.340 ac 32.63% Impervious Runoff Depth=6.59"
Tc=6.0 min CN=78 Runoff=24.82 cfs 1.835 af

Reach 2R: section of stream Avg. Flow Depth=0.27' Max Vel=4.96 fps Inflow=7.37 cfs 0.530 af
n=0.040 L=169.0' S=0.1230 '/' Capacity=634.20 cfs Outflow=7.26 cfs 0.530 af

Reach 3R: section of stream Avg. Flow Depth=0.65' Max Vel=5.93 fps Inflow=40.00 cfs 3.511 af
n=0.040 L=403.0' S=0.0546 '/' Capacity=621.58 cfs Outflow=39.68 cfs 3.511 af

Reach DP-1: Inflow=39.68 cfs 3.511 af
Outflow=39.68 cfs 3.511 af

Pond 1P: Lot 1 cultec Peak Elev=302.68' Storage=646 cf Inflow=1.75 cfs 0.135 af
Discarded=0.04 cfs 0.051 af Primary=1.17 cfs 0.084 af Outflow=1.21 cfs 0.135 af

Pond 1R: twin 48" culverts Peak Elev=300.29' Inflow=6.06 cfs 0.513 af
Outflow=6.06 cfs 0.513 af

Pond 2P: Lot 2 cultec Peak Elev=311.17' Storage=125 cf Inflow=0.27 cfs 0.023 af
Discarded=0.03 cfs 0.017 af Primary=0.20 cfs 0.005 af Outflow=0.23 cfs 0.023 af

Pond 3P: Lot 4 cultec Peak Elev=292.17' Storage=125 cf Inflow=0.27 cfs 0.023 af
Discarded=0.03 cfs 0.017 af Primary=0.20 cfs 0.005 af Outflow=0.23 cfs 0.023 af

Pond 4P: infiltration basin Peak Elev=297.13' Storage=12,446 cf Inflow=24.82 cfs 1.835 af
Discarded=0.50 cfs 0.533 af Primary=14.60 cfs 1.291 af Secondary=1.56 cfs 0.012 af Outflow=16.66 cfs 1.835 af

Total Runoff Area = 7.970 ac Runoff Volume = 4.129 af Average Runoff Depth = 6.22"
81.68% Pervious = 6.510 ac 18.32% Impervious = 1.460 ac

Summary for Subcatchment 100:

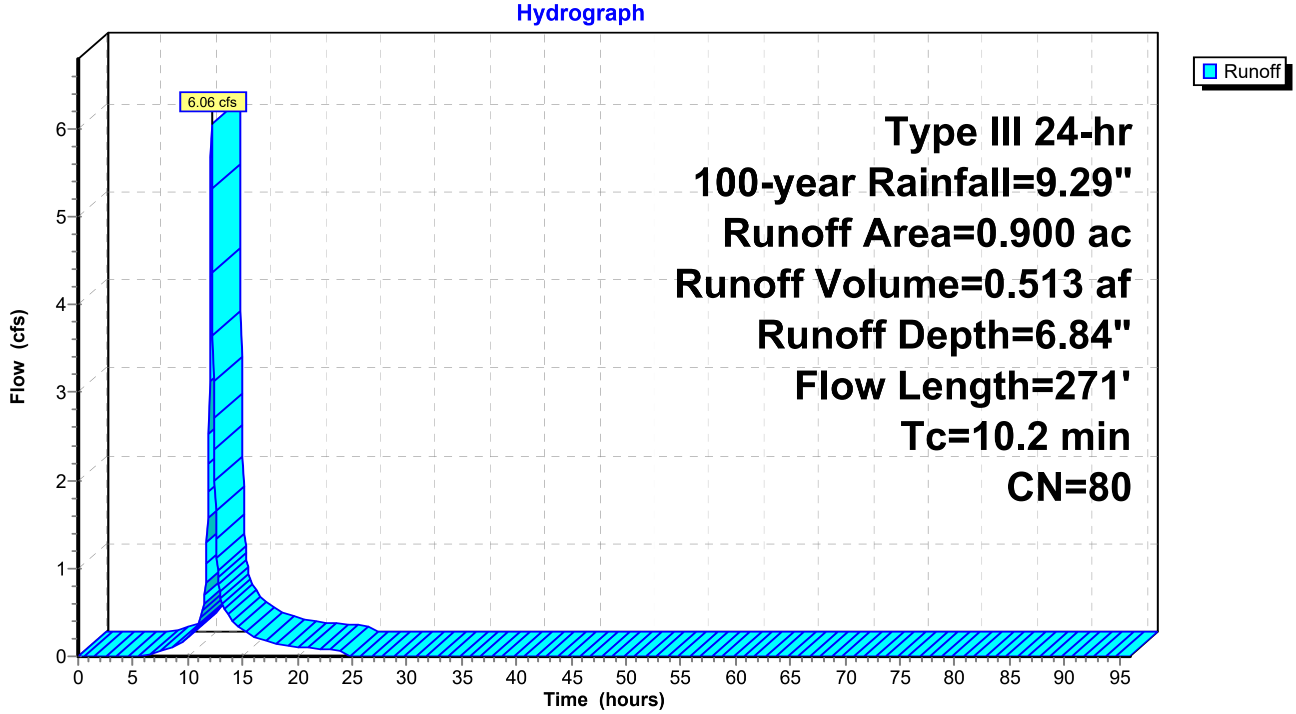
Runoff = 6.06 cfs @ 12.14 hrs, Volume= 0.513 af, Depth= 6.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=9.29"

Area (ac)	CN	Description
0.150	98	Paved parking, HSG B
0.020	85	Gravel roads, HSG B
0.010	91	Gravel roads, HSG D
0.040	98	Roofs, HSG D
0.130	69	50-75% Grass cover, Fair, HSG B
0.130	80	>75% Grass cover, Good, HSG D
0.110	60	Woods, Fair, HSG B
0.310	79	Woods, Fair, HSG D
0.900	80	Weighted Average
0.710		78.89% Pervious Area
0.190		21.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.6	100	0.1400	0.17		**Sheet Flow, A-B**
					Woods: Light underbrush n= 0.400 P2= 3.41"
0.5	59	0.0680	1.83		**Shallow Concentrated Flow, B-C**
					Short Grass Pasture Kv= 7.0 fps
0.1	112	0.0440	23.98	301.31	**Pipe Channel, C-D**
					48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00'
					n= 0.013 Corrugated PE, smooth interior
10.2	271	Total			

Subcatchment 100:



Summary for Subcatchment 200:

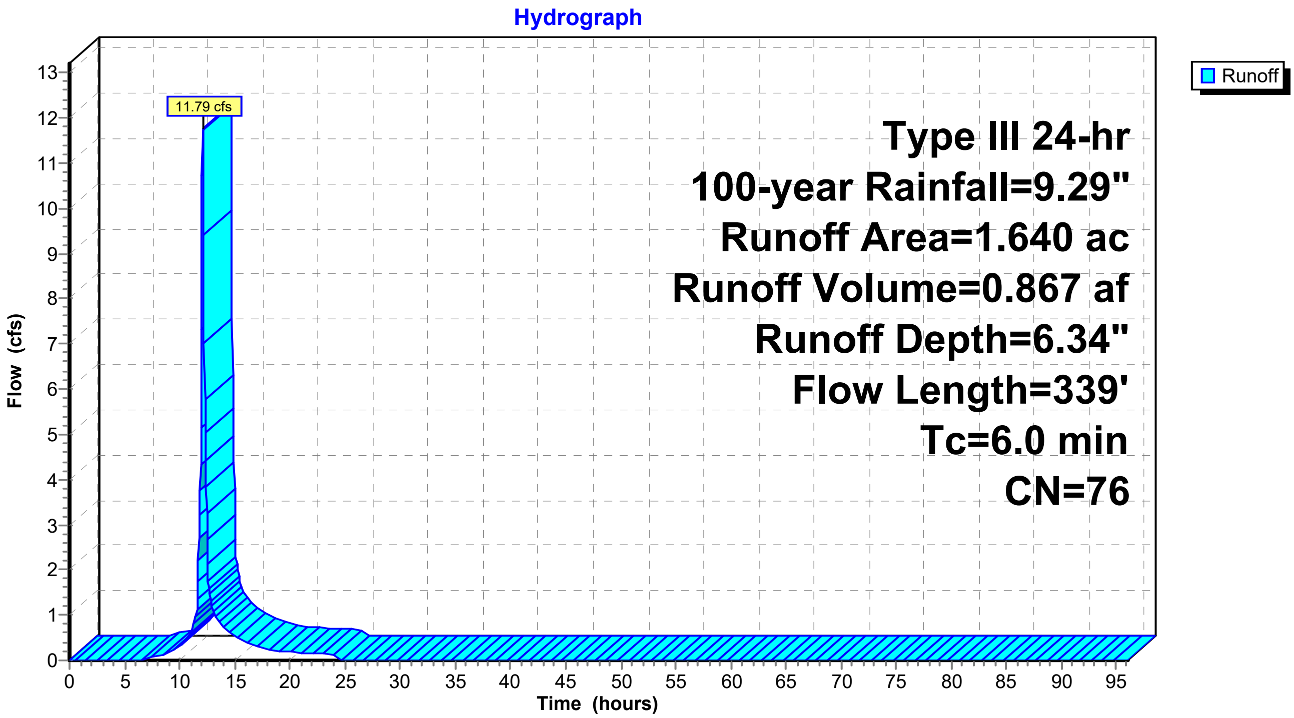
Runoff = 11.79 cfs @ 12.09 hrs, Volume= 0.867 af, Depth= 6.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=9.29"

Area (ac)	CN	Description
0.020	98	Water Surface, 0% imp, HSG B
0.010	98	Water Surface, 0% imp, HSG D
0.030	98	Roofs, HSG D
0.090	61	>75% Grass cover, Good, HSG B
0.720	80	>75% Grass cover, Good, HSG D
0.280	60	Woods, Fair, HSG B
0.490	79	Woods, Fair, HSG D
1.640	76	Weighted Average
1.610		98.17% Pervious Area
0.030		1.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	100	0.2100	0.45		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.41"
0.1	29	0.3800	4.32		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.7	126	0.3800	3.08		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
1.3	84	0.0480	1.10		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
5.8	339	Total, Increased to minimum Tc = 6.0 min			

Subcatchment 200:



Summary for Subcatchment 201:

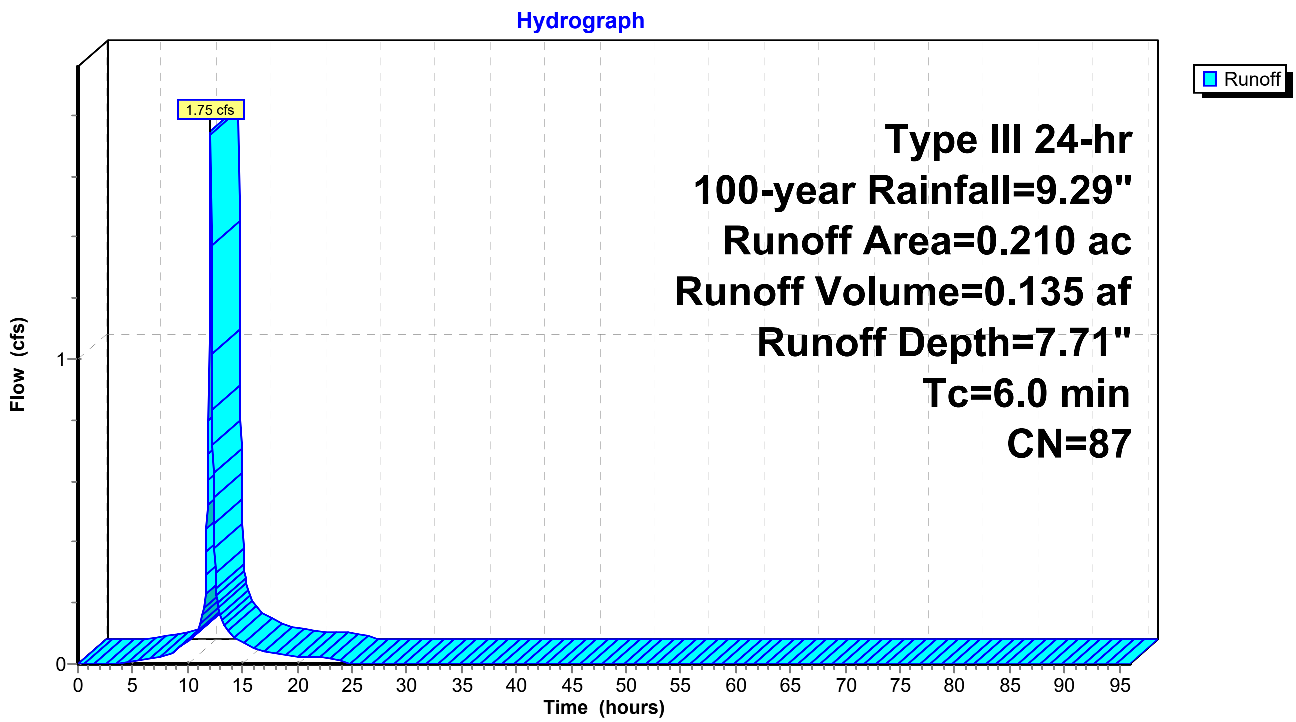
Runoff = 1.75 cfs @ 12.09 hrs, Volume= 0.135 af, Depth= 7.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=9.29"

Area (ac)	CN	Description
0.050	98	Paved parking, HSG D
0.030	98	Roofs, HSG D
0.130	80	>75% Grass cover, Good, HSG D
0.210	87	Weighted Average
0.130		61.90% Pervious Area
0.080		38.10% Impervious Area

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

Subcatchment 201:



Summary for Subcatchment 202:

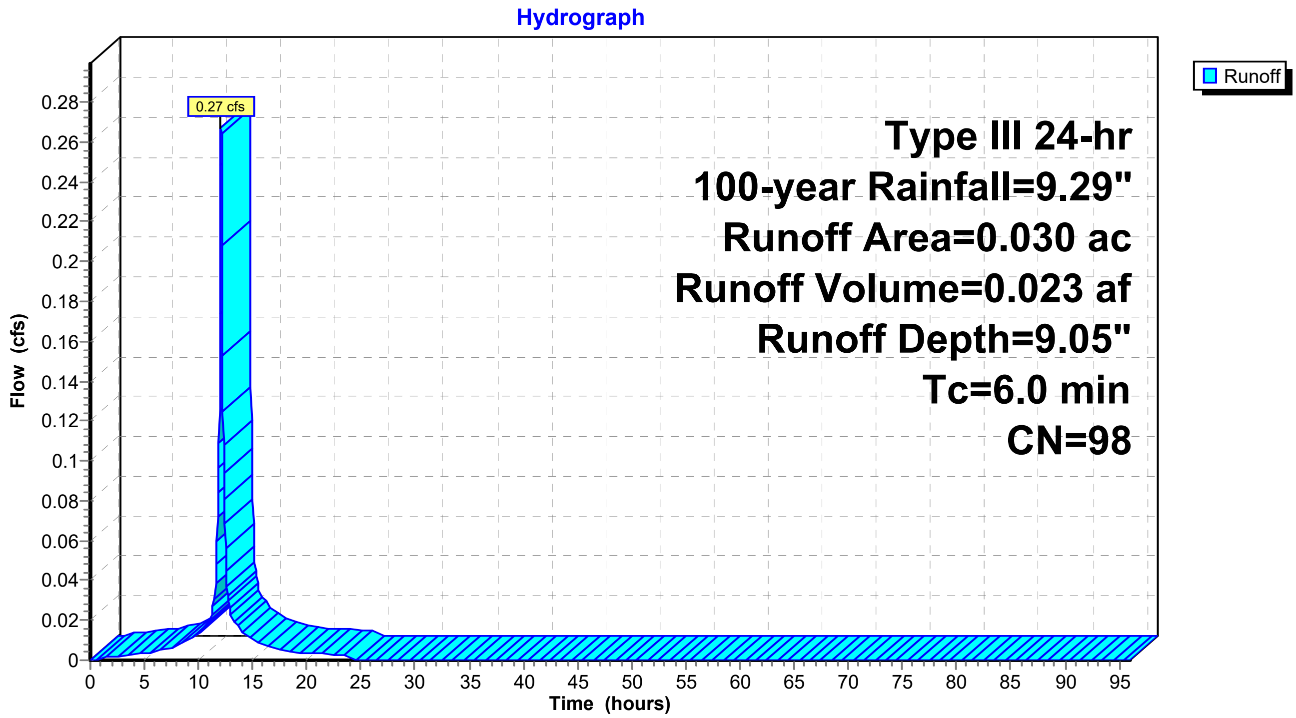
Runoff = 0.27 cfs @ 12.09 hrs, Volume= 0.023 af, Depth= 9.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=9.29"

Area (ac)	CN	Description
0.030	98	Roofs, HSG D
0.030		100.00% Impervious Area

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

Subcatchment 202:



Summary for Subcatchment 203:

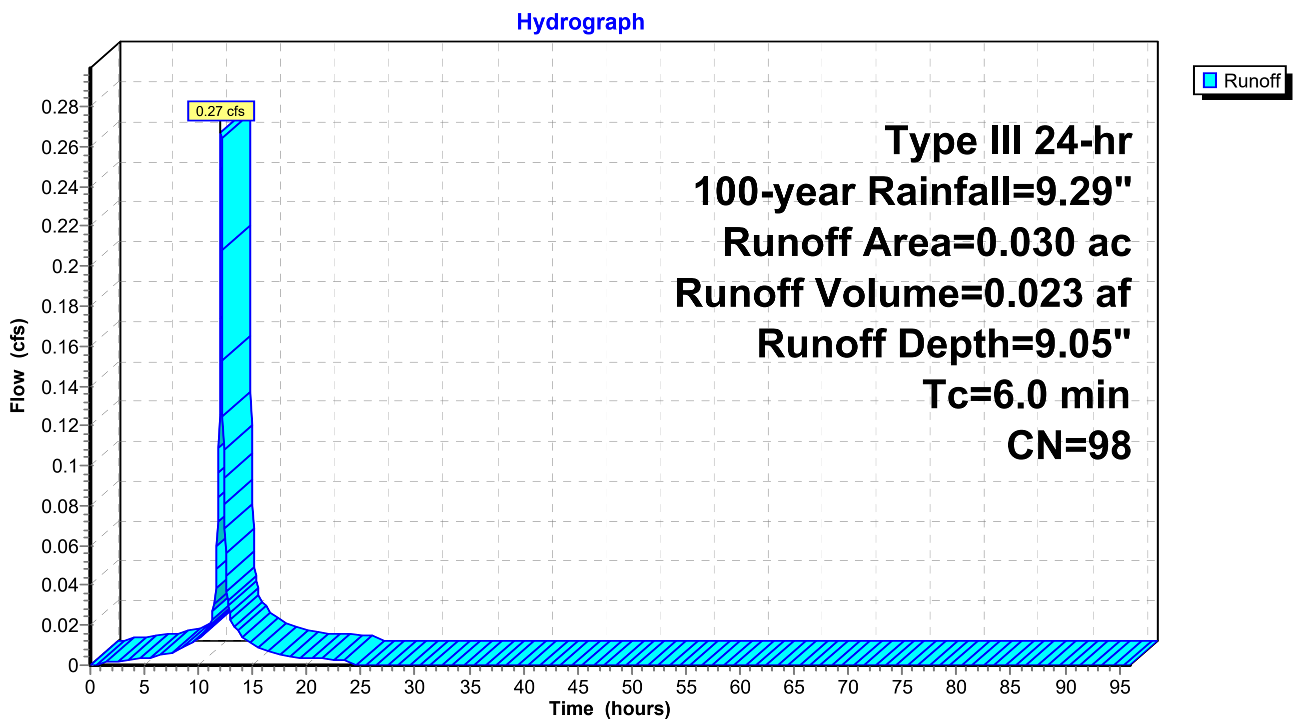
Runoff = 0.27 cfs @ 12.09 hrs, Volume= 0.023 af, Depth= 9.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=9.29"

Area (ac)	CN	Description
0.030	98	Roofs, HSG D
0.030		100.00% Impervious Area

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

Subcatchment 203:



Summary for Subcatchment 300:

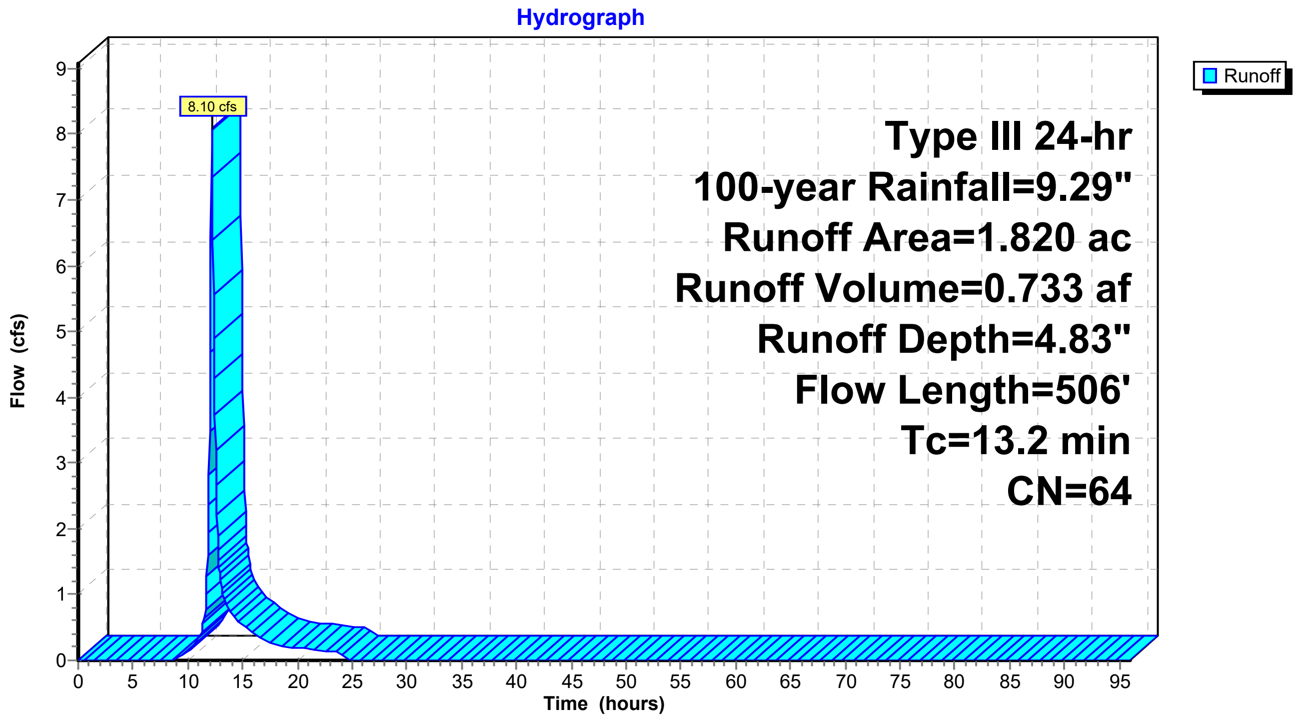
Runoff = 8.10 cfs @ 12.19 hrs, Volume= 0.733 af, Depth= 4.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=9.29"

Area (ac)	CN	Description
1.110	60	Woods, Fair, HSG B
0.390	73	Woods, Fair, HSG C
0.040	98	Water Surface, 0% imp, HSG B
0.250	61	>75% Grass cover, Good, HSG B
0.020	74	>75% Grass cover, Good, HSG C
0.010	98	Paved parking, HSG B
1.820	64	Weighted Average
1.810		99.45% Pervious Area
0.010		0.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.2	100	0.1200	0.16		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.41"
2.1	245	0.1500	1.94		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
0.9	161	0.3300	2.87		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
13.2	506	Total			

Subcatchment 300:



Summary for Subcatchment 301:

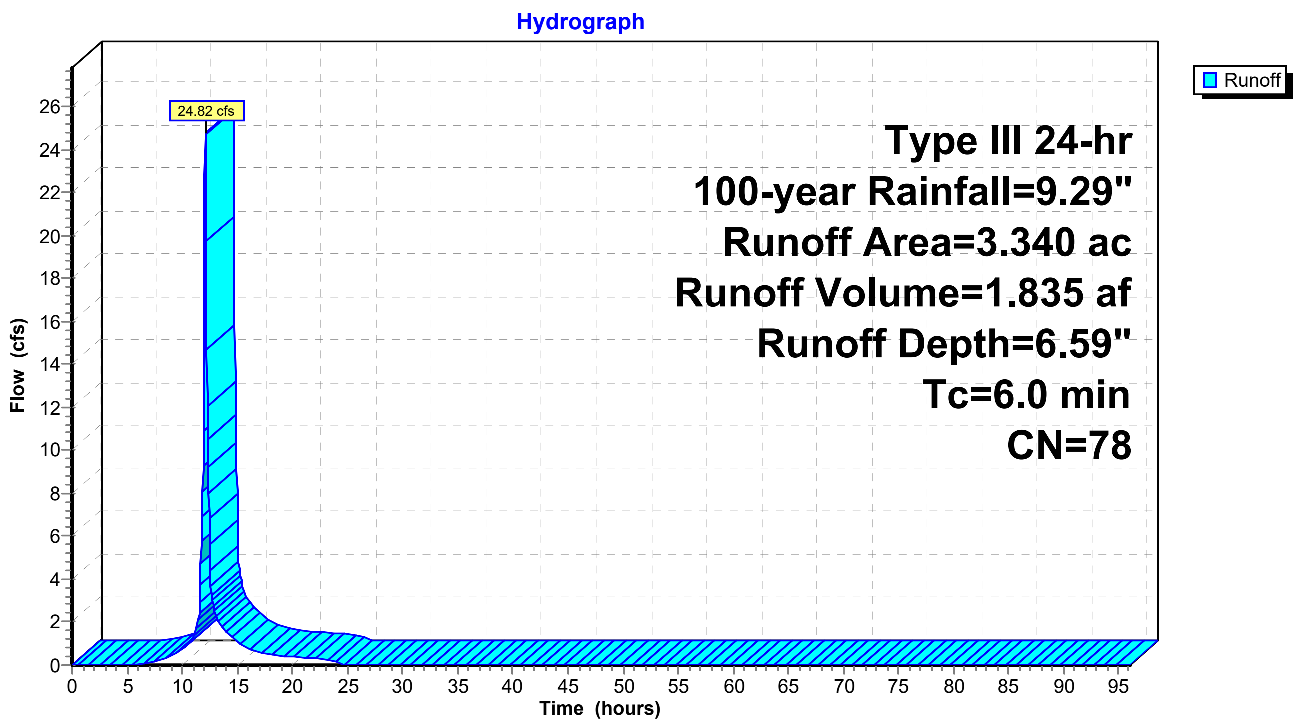
Runoff = 24.82 cfs @ 12.09 hrs, Volume= 1.835 af, Depth= 6.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=9.29"

Area (ac)	CN	Description
0.470	98	Paved parking, HSG B
0.100	98	Paved parking, HSG C
0.360	98	Paved parking, HSG D
0.080	98	Roofs, HSG B
0.080	98	Roofs, HSG C
0.250	60	Woods, Fair, HSG B
0.150	73	Woods, Fair, HSG C
0.120	79	Woods, Fair, HSG D
0.890	61	>75% Grass cover, Good, HSG B
0.530	74	>75% Grass cover, Good, HSG C
0.310	80	>75% Grass cover, Good, HSG D
3.340	78	Weighted Average
2.250		67.37% Pervious Area
1.090		32.63% Impervious Area

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

Subcatchment 301:



Summary for Reach 2R: section of stream

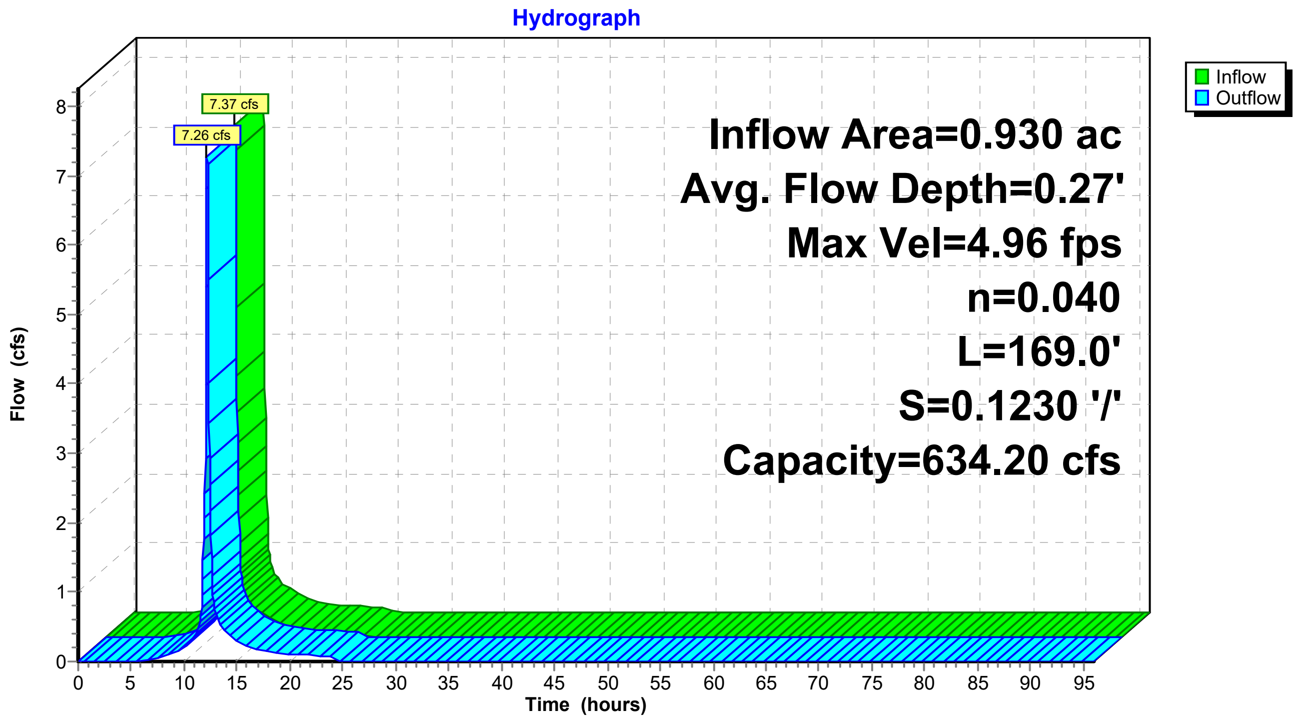
Inflow Area = 0.930 ac, 23.66% Impervious, Inflow Depth = 6.84" for 100-year event
Inflow = 7.37 cfs @ 12.17 hrs, Volume= 0.530 af
Outflow = 7.26 cfs @ 12.18 hrs, Volume= 0.530 af, Atten= 1%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.96 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.48 fps, Avg. Travel Time= 1.9 min

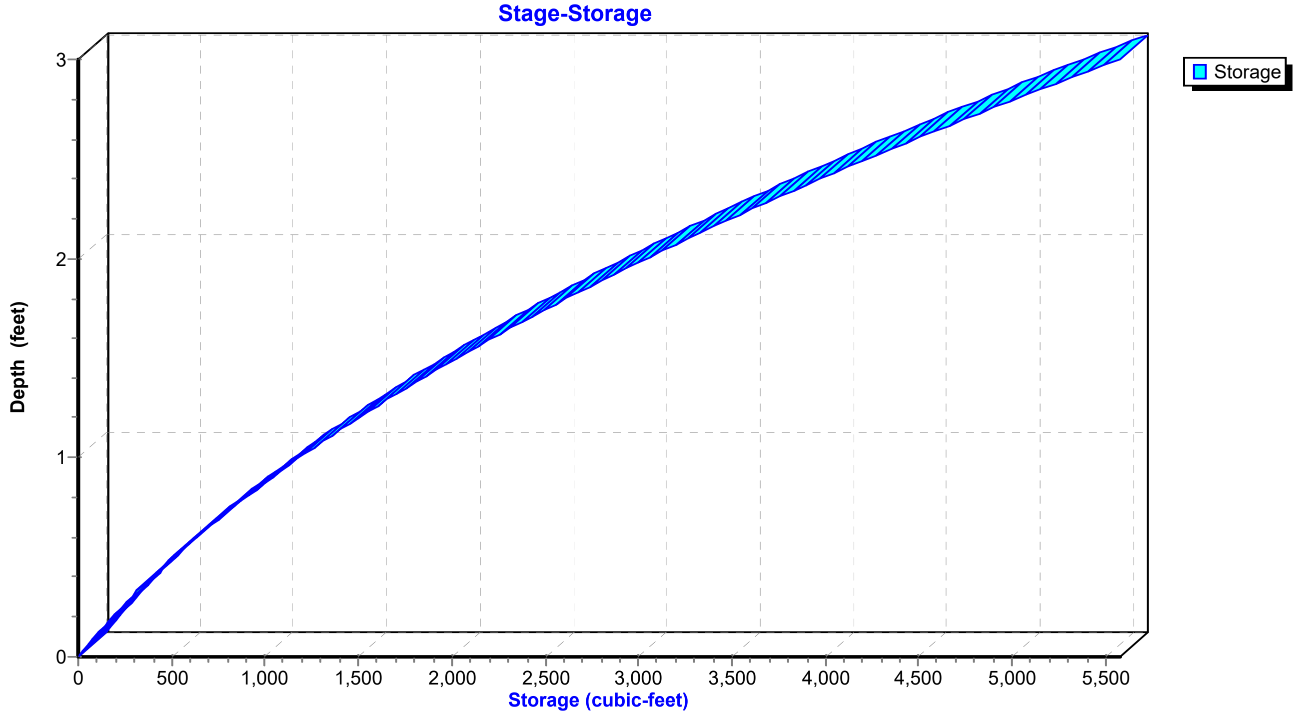
Peak Storage= 250 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 3.00' Flow Area= 33.0 sf, Capacity= 634.20 cfs

5.00' x 3.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 17.00'
Length= 169.0' Slope= 0.1230 '/'
Inlet Invert= 286.78', Outlet Invert= 266.00'

Reach 2R: section of stream



Reach 2R: section of stream



Stage-Area-Storage for Reach 2R: section of stream

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
286.78	0.0	0
286.83	0.3	43
286.88	0.5	88
286.93	0.8	134
286.98	1.1	183
287.03	1.4	232
287.08	1.7	284
287.13	2.0	337
287.18	2.3	392
287.23	2.7	449
287.28	3.0	507
287.33	3.4	567
287.38	3.7	629
287.43	4.1	692
287.48	4.5	757
287.53	4.9	824
287.58	5.3	892
287.63	5.7	963
287.68	6.1	1,034
287.73	6.6	1,108
287.78	7.0	1,183
287.83	7.5	1,260
287.88	7.9	1,339
287.93	8.4	1,419
287.98	8.9	1,501
288.03	9.4	1,584
288.08	9.9	1,670
288.13	10.4	1,757
288.18	10.9	1,846
288.23	11.5	1,936
288.28	12.0	2,028
288.33	12.6	2,122
288.38	13.1	2,217
288.43	13.7	2,314
288.48	14.3	2,413
288.53	14.9	2,514
288.58	15.5	2,616
288.63	16.1	2,720
288.68	16.7	2,826
288.73	17.4	2,933
288.78	18.0	3,042
288.83	18.7	3,153
288.88	19.3	3,265
288.93	20.0	3,379
288.98	20.7	3,495
289.03	21.4	3,612
289.08	22.1	3,732
289.13	22.8	3,852
289.18	23.5	3,975
289.23	24.3	4,099
289.28	25.0	4,225
289.33	25.8	4,353
289.38	26.5	4,482
289.43	27.3	4,613
289.48	28.1	4,746
289.53	28.9	4,880
289.58	29.7	5,016
289.63	30.5	5,154
289.68	31.3	5,293
289.73	32.2	5,434
289.78	**33.0**	**5,577**

Summary for Reach 3R: section of stream

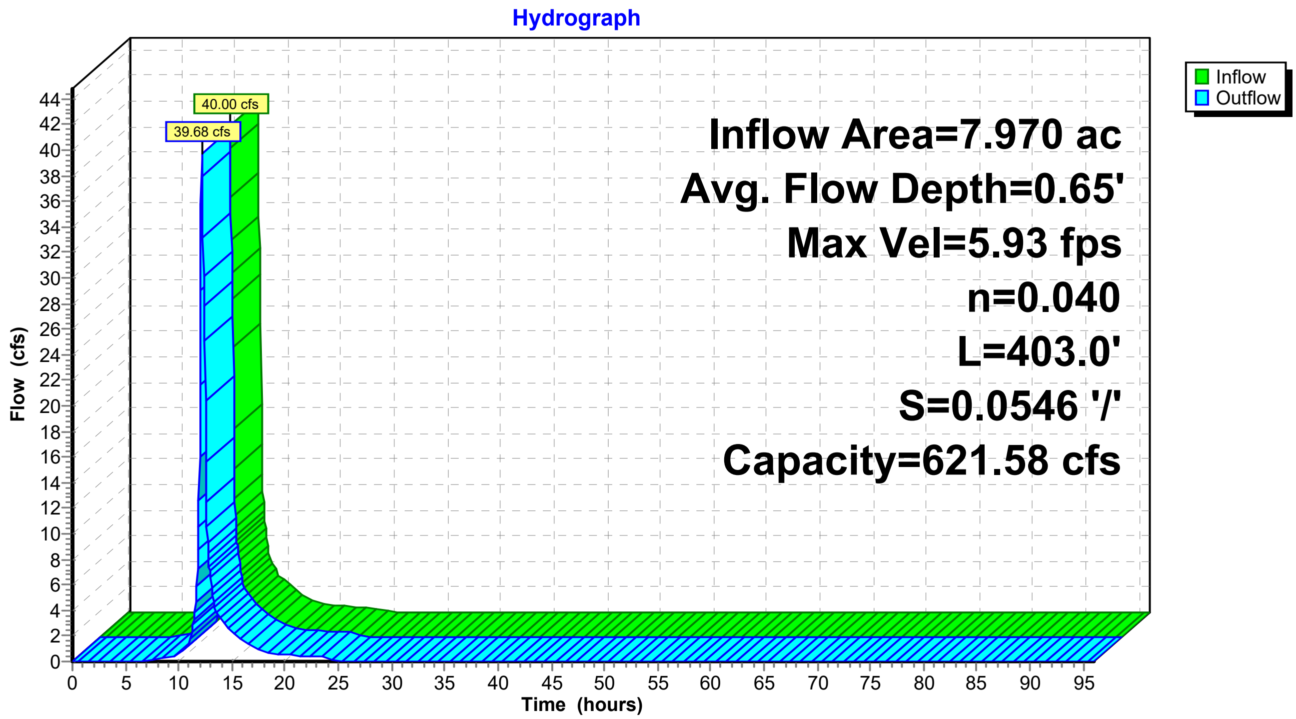
Inflow Area = 7.970 ac, 18.32% Impervious, Inflow Depth = 5.29" for 100-year event
Inflow = 40.00 cfs @ 12.14 hrs, Volume= 3.511 af
Outflow = 39.68 cfs @ 12.17 hrs, Volume= 3.511 af, Atten= 1%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.93 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.54 fps, Avg. Travel Time= 4.4 min

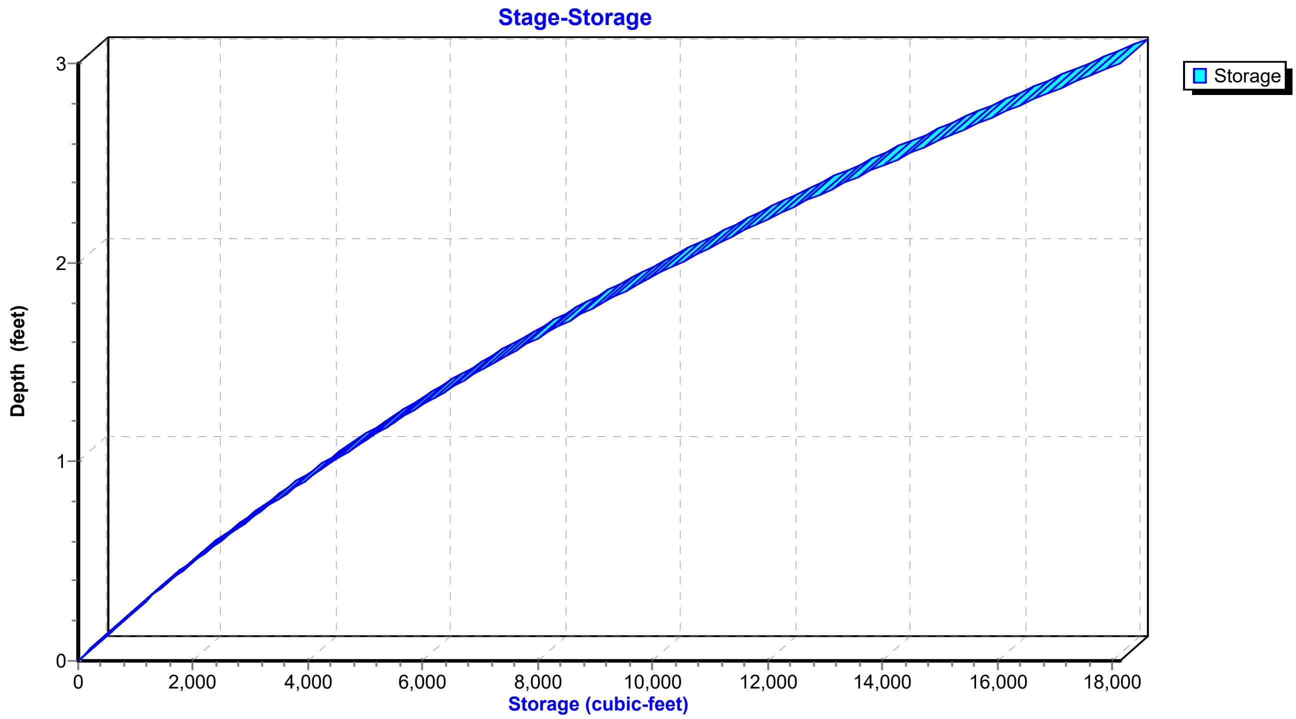
Peak Storage= 2,716 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.65'
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 621.58 cfs

9.00' x 3.00' deep channel, n= 0.040 Mountain streams
Side Slope Z-value= 2.0 '/' Top Width= 21.00'
Length= 403.0' Slope= 0.0546 '/'
Inlet Invert= 266.00', Outlet Invert= 244.00'

Reach 3R: section of stream



Reach 3R: section of stream



Stage-Area-Storage for Reach 3R: section of stream

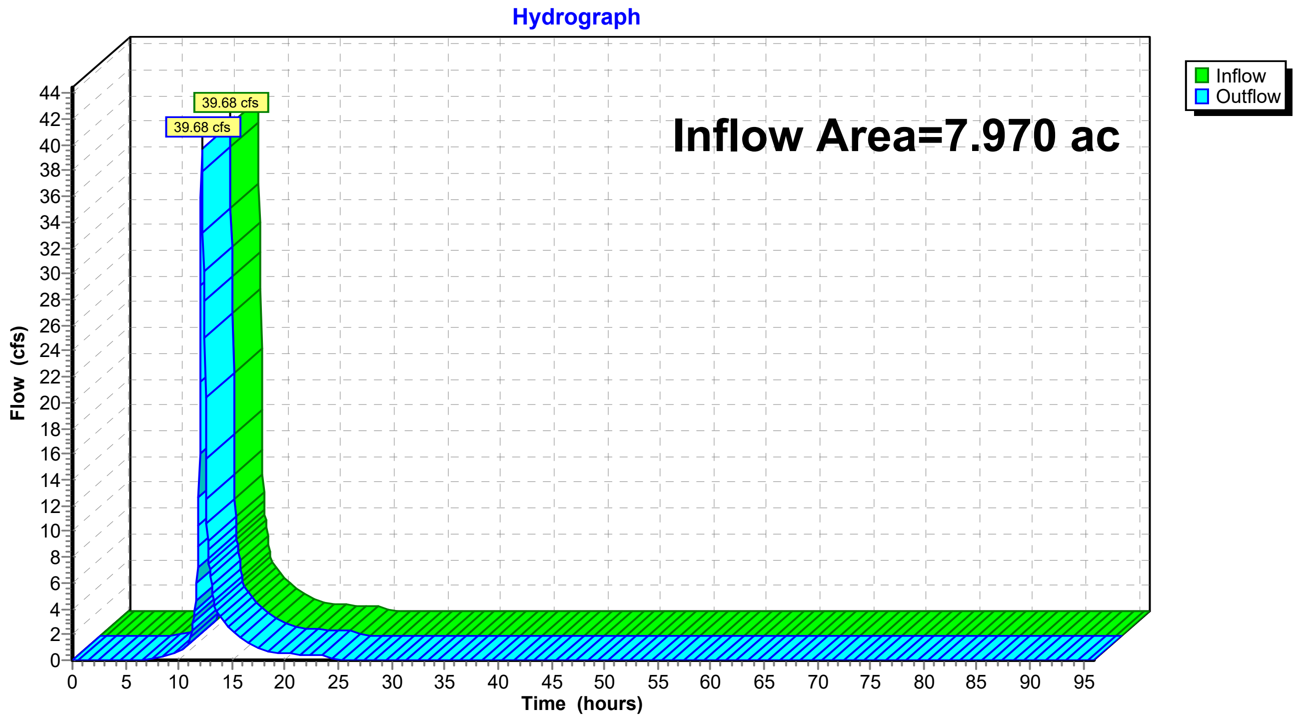
Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
266.00	0.0	0
266.05	0.5	184
266.10	0.9	371
266.15	1.4	562
266.20	1.9	758
266.25	2.4	957
266.30	2.9	1,161
266.35	3.4	1,368
266.40	3.9	1,580
266.45	4.5	1,795
266.50	5.0	2,015
266.55	5.6	2,239
266.60	6.1	2,466
266.65	6.7	2,698
266.70	7.3	2,934
266.75	7.9	3,174
266.80	8.5	3,418
266.85	9.1	3,665
266.90	9.7	3,917
266.95	10.4	4,173
267.00	11.0	4,433
267.05	11.7	4,697
267.10	12.3	4,965
267.15	13.0	5,237
267.20	13.7	5,513
267.25	14.4	5,793
267.30	15.1	6,077
267.35	15.8	6,365
267.40	16.5	6,658
267.45	17.3	6,954
267.50	18.0	7,254
267.55	18.8	7,558
267.60	19.5	7,867
267.65	20.3	8,179
267.70	21.1	8,495
267.75	21.9	8,816
267.80	22.7	9,140
267.85	23.5	9,469
267.90	24.3	9,801
267.95	25.2	10,137
268.00	26.0	10,478
268.05	26.9	10,823
268.10	27.7	11,171
268.15	28.6	11,524
268.20	29.5	11,881
268.25	30.4	12,241
268.30	31.3	12,606
268.35	32.2	12,975
268.40	33.1	13,347
268.45	34.1	13,724
268.50	35.0	14,105
268.55	36.0	14,490
268.60	36.9	14,879
268.65	37.9	15,272
268.70	38.9	15,669
268.75	39.9	16,070
268.80	40.9	16,475
268.85	41.9	16,884
268.90	42.9	17,297
268.95	44.0	17,714
269.00	**45.0**	**18,135**

Summary for Reach DP-1:

Inflow Area = 7.970 ac, 18.32% Impervious, Inflow Depth = 5.29" for 100-year event
Inflow = 39.68 cfs @ 12.17 hrs, Volume= 3.511 af
Outflow = 39.68 cfs @ 12.17 hrs, Volume= 3.511 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Reach DP-1:



Summary for Pond 1P: Lot 1 cultec

Inflow Area = 0.210 ac, 38.10% Impervious, Inflow Depth = 7.71" for 100-year event
Inflow = 1.75 cfs @ 12.09 hrs, Volume= 0.135 af
Outflow = 1.21 cfs @ 12.17 hrs, Volume= 0.135 af, Atten= 31%, Lag= 5.2 min
Discarded = 0.04 cfs @ 8.80 hrs, Volume= 0.051 af
Primary = 1.17 cfs @ 12.17 hrs, Volume= 0.084 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 302.68' @ 12.17 hrs Surf.Area= 429 sf Storage= 646 cf

Plug-Flow detention time= 13.8 min calculated for 0.135 af (100% of inflow)
Center-of-Mass det. time= 13.8 min (794.1 - 780.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	300.40'	153 cf	**6.33'W x 24.50'L x 3.54'H Field A**
			550 cf Overall - 168 cf Embedded = 382 cf x 40.0% Voids
#2A	300.90'	168 cf	**Cultec R-330XLHD** x 3 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
#3B	300.40'	253 cf	**11.17'W x 24.50'L x 3.54'H Field B**
			969 cf Overall - 335 cf Embedded = 634 cf x 40.0% Voids
#4B	300.90'	335 cf	**Cultec R-330XLHD** x 6 Inside #3
			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 2 rows
		909 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	300.90'	**6.0" Round Culvert**
			L= 26.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 300.90' / 300.00' S= 0.0346 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Discarded	300.40'	**4.100 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 8.80 hrs HW=300.44' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.16 cfs @ 12.17 hrs HW=302.64' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 1.16 cfs @ 5.89 fps)

Pond 1P: Lot 1 cultec - 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

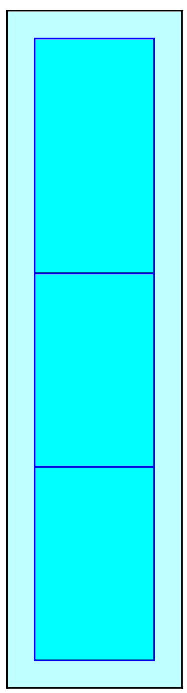
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

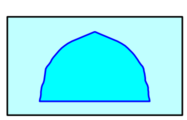
3 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 167.6 cf Chamber Storage

549.5 cf Field - 167.6 cf Chambers = 381.9 cf Stone x 40.0% Voids = 152.8 cf Stone Storage

Chamber Storage + Stone Storage = 320.4 cf = 0.007 af
Overall Storage Efficiency = 58.3%
Overall System Size = 24.50' x 6.33' x 3.54'

3 Chambers
20.4 cy Field
14.1 cy Stone





Pond 1P: Lot 1 cultec - Chamber Wizard Field B

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 2 rows

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

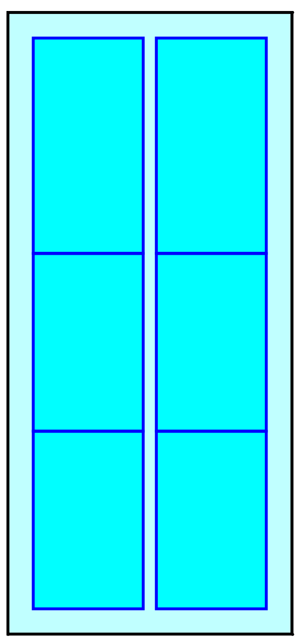
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
2 Rows x 52.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.17' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

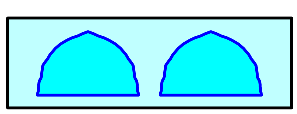
6 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 2 Rows = 335.3 cf Chamber Storage

968.9 cf Field - 335.3 cf Chambers = 633.6 cf Stone x 40.0% Voids = 253.5 cf Stone Storage

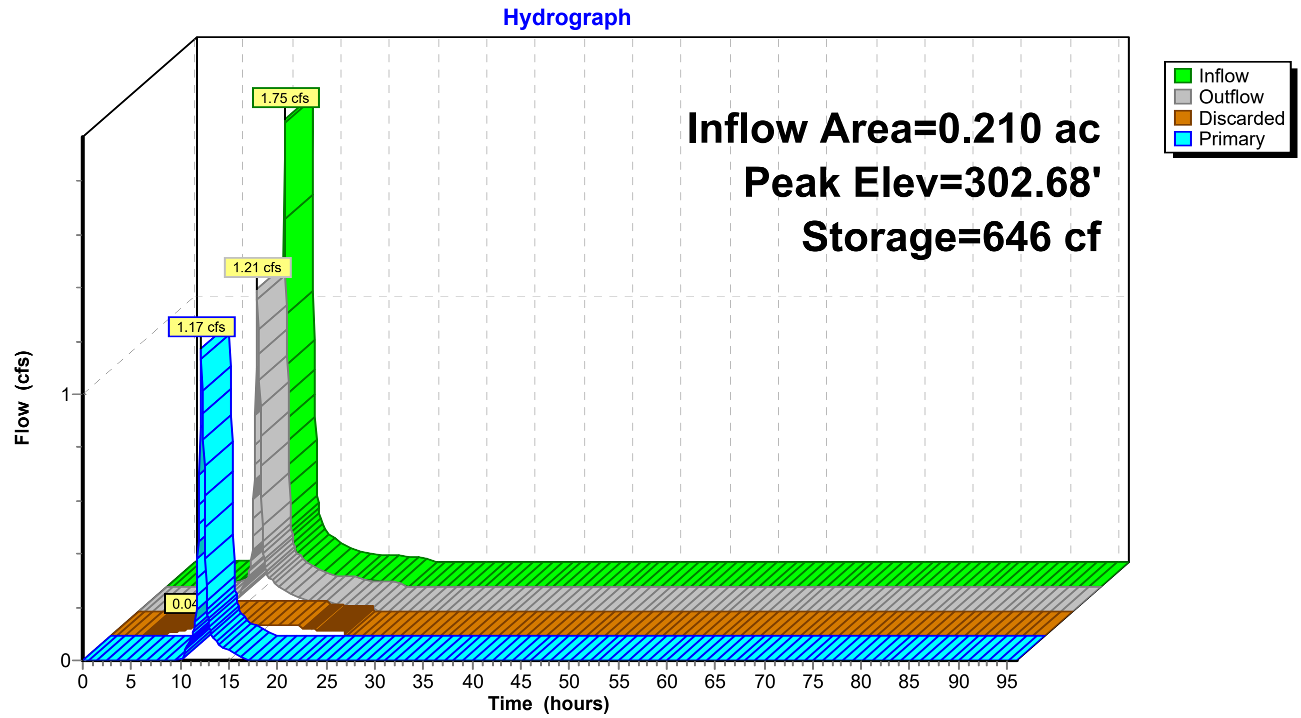
Chamber Storage + Stone Storage = 588.8 cf = 0.014 af
Overall Storage Efficiency = 60.8%
Overall System Size = 24.50' x 11.17' x 3.54'

6 Chambers
35.9 cy Field
23.5 cy Stone

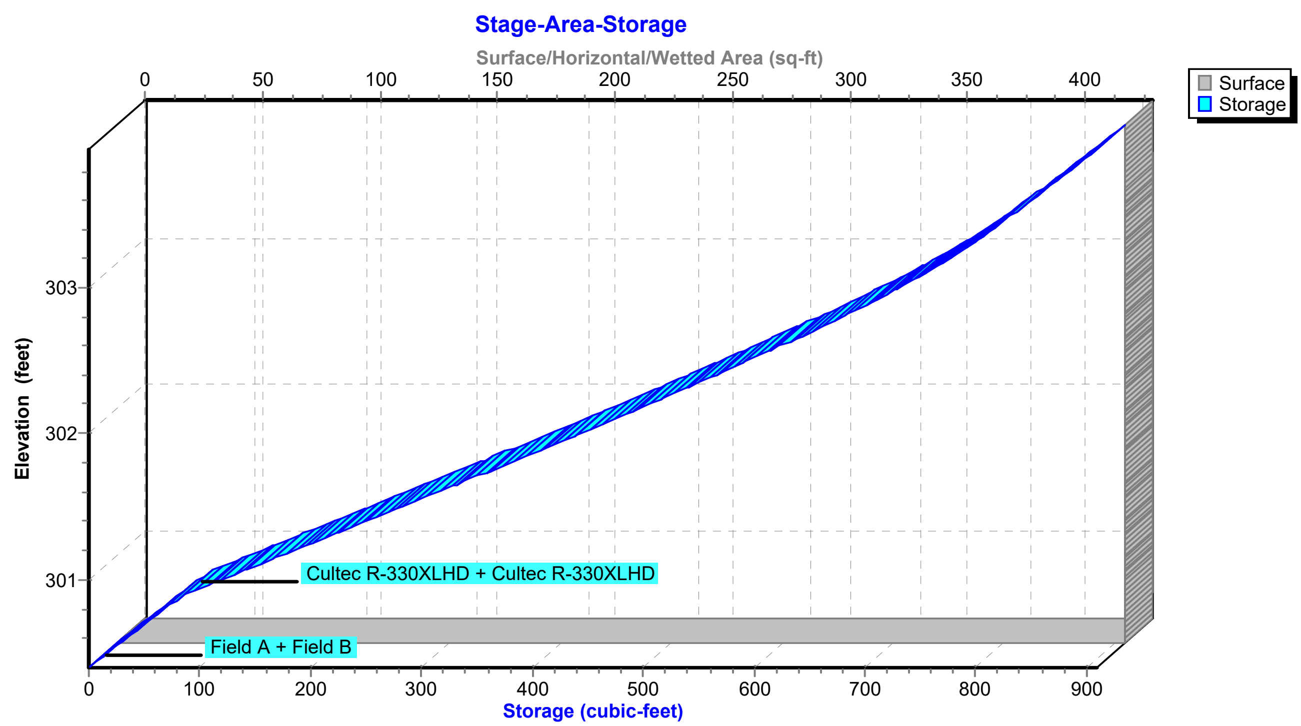




Pond 1P: Lot 1 cultec



Pond 1P: Lot 1 cultec



Stage-Area-Storage for Pond 1P: Lot 1 cultec

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
300.40	**429**	0
300.45	429	9
300.50	429	17
300.55	429	26
300.60	429	34
300.65	429	43
300.70	429	51
300.75	429	60
300.80	429	69
300.85	429	77
300.90	429	86
300.95	429	102
301.00	429	119
301.05	429	136
301.10	429	152
301.15	429	168
301.20	429	185
301.25	429	201
301.30	429	218
301.35	429	234
301.40	429	251
301.45	429	267
301.50	429	283
301.55	429	299
301.60	429	316
301.65	429	332
301.70	429	347
301.75	429	363
301.80	429	379
301.85	429	395
301.90	429	411
301.95	429	427
302.00	429	443
302.05	429	459
302.10	429	474
302.15	429	490
302.20	429	505
302.25	429	521
302.30	429	536
302.35	429	551
302.40	429	566
302.45	429	581
302.50	429	595
302.55	429	610
302.60	429	624
302.65	429	638
302.70	429	652
302.75	429	666
302.80	429	680
302.85	429	693
302.90	429	706
302.95	429	719
303.00	429	732
303.05	429	744
303.10	429	756
303.15	429	767
303.20	429	778
303.25	429	788
303.30	429	798
303.35	429	807
303.40	429	816
303.45	429	825
303.50	429	833
303.55	429	842
303.60	429	851
303.65	429	859
303.70	429	868
303.75	429	876
303.80	429	885
303.85	429	893
303.90	429	**902**

Summary for Pond 1R: twin 48" culverts

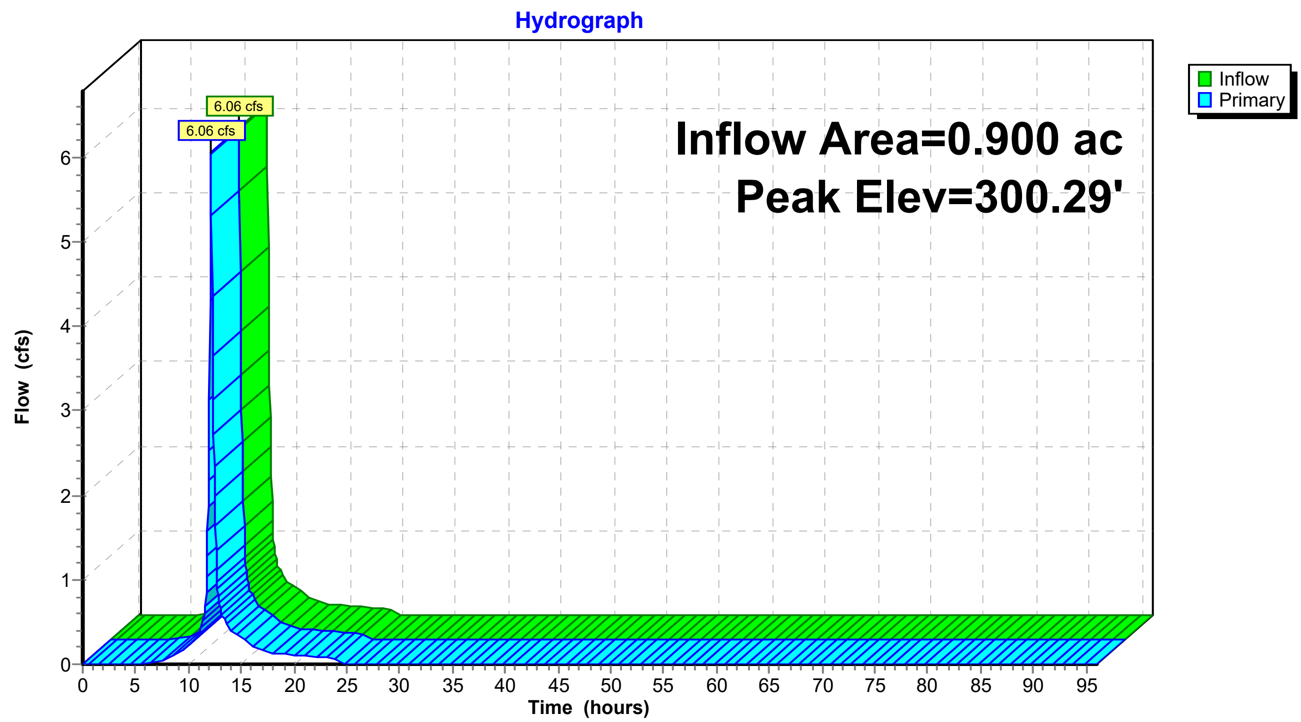
Inflow Area = 0.900 ac, 21.11% Impervious, Inflow Depth = 6.84" for 100-year event
Inflow = 6.06 cfs @ 12.14 hrs, Volume= 0.513 af
Outflow = 6.06 cfs @ 12.14 hrs, Volume= 0.513 af, Atten= 0%, Lag= 0.0 min
Primary = 6.06 cfs @ 12.14 hrs, Volume= 0.513 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 300.29' @ 12.14 hrs
Flood Elev= 316.05'

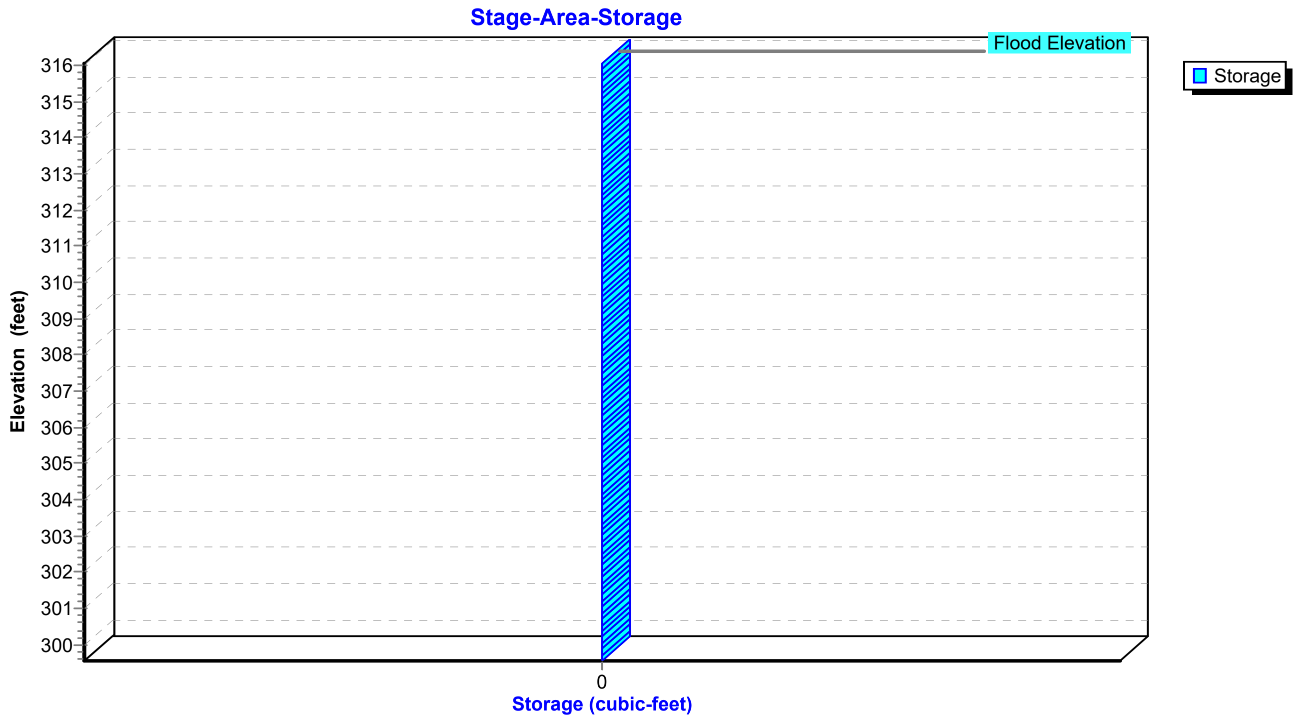
Device	Routing	Invert	Outlet Devices
#1	Primary	299.55'	**48.0" Round Culvert** L= 182.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 299.55' / 286.78' S= 0.0702 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf
#2	Primary	299.90'	**48.0" Round Culvert** L= 180.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 299.90' / 287.92' S= 0.0666 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 12.57 sf

Primary OutFlow Max=5.88 cfs @ 12.14 hrs HW=300.28' (Free Discharge)
—**1=Culvert** (Inlet Controls 4.59 cfs @ 2.91 fps)
—**2=Culvert** (Inlet Controls 1.29 cfs @ 2.11 fps)

Pond 1R: twin 48" culverts



Pond 1R: twin 48" culverts



Stage-Area-Storage for Pond 1R: twin 48" culverts

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
299.55	**0**	309.95	0
299.75	0	310.15	0
299.95	0	310.35	0
300.15	0	310.55	0
300.35	0	310.75	0
300.55	0	310.95	0
300.75	0	311.15	0
300.95	0	311.35	0
301.15	0	311.55	0
301.35	0	311.75	0
301.55	0	311.95	0
301.75	0	312.15	0
301.95	0	312.35	0
302.15	0	312.55	0
302.35	0	312.75	0
302.55	0	312.95	0
302.75	0	313.15	0
302.95	0	313.35	0
303.15	0	313.55	0
303.35	0	313.75	0
303.55	0	313.95	0
303.75	0	314.15	0
303.95	0	314.35	0
304.15	0	314.55	0
304.35	0	314.75	0
304.55	0	314.95	0
304.75	0	315.15	0
304.95	0	315.35	0
305.15	0	315.55	0
305.35	0	315.75	0
305.55	0	315.95	0
305.75	0		
305.95	0		
306.15	0		
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306.55	0		
306.75	0		
306.95	0		
307.15	0		
307.35	0		
307.55	0		
307.75	0		
307.95	0		
308.15	0		
308.35	0		
308.55	0		
308.75	0		
308.95	0		
309.15	0		
309.35	0		
309.55	0		
309.75	0		

Summary for Pond 2P: Lot 2 cultec

Inflow Area = 0.030 ac,100.00% Impervious, Inflow Depth = 9.05" for 100-year event
Inflow = 0.27 cfs @ 12.09 hrs, Volume= 0.023 af
Outflow = 0.23 cfs @ 12.14 hrs, Volume= 0.023 af, Atten= 15%, Lag= 3.5 min
Discarded = 0.03 cfs @ 11.50 hrs, Volume= 0.017 af
Primary = 0.20 cfs @ 12.14 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 311.17' @ 12.14 hrs Surf.Area= 310 sf Storage= 125 cf

Plug-Flow detention time= 10.9 min calculated for 0.023 af (100% of inflow)
Center-of-Mass det. time= 10.9 min (750.3 - 739.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	310.40'	153 cf	**6.33'W x 24.50'L x 3.54'H Field A** 550 cf Overall - 168 cf Embedded = 382 cf x 40.0% Voids
#2A	310.90'	168 cf	**Cultec R-330XLHD** x 3 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
#3B	310.40'	153 cf	**6.33'W x 24.50'L x 3.54'H Field B** 550 cf Overall - 168 cf Embedded = 382 cf x 40.0% Voids
#4B	310.90'	168 cf	**Cultec R-330XLHD** x 3 Inside #3 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
		641 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	310.90'	**6.0" Round Culvert** L= 21.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 310.90' / 310.00' S= 0.0429 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Discarded	310.40'	**4.100 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 11.50 hrs HW=310.44' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.19 cfs @ 12.14 hrs HW=311.17' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.19 cfs @ 1.78 fps)

Pond 2P: Lot 2 cultec - 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

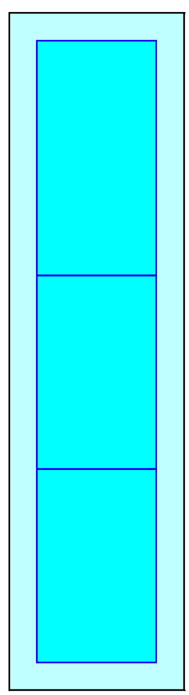
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

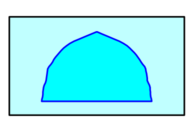
3 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 167.6 cf Chamber Storage

549.5 cf Field - 167.6 cf Chambers = 381.9 cf Stone x 40.0% Voids = 152.8 cf Stone Storage

Chamber Storage + Stone Storage = 320.4 cf = 0.007 af
Overall Storage Efficiency = 58.3%
Overall System Size = 24.50' x 6.33' x 3.54'

3 Chambers
20.4 cy Field
14.1 cy Stone





Pond 2P: Lot 2 cultec - Chamber Wizard Field B

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

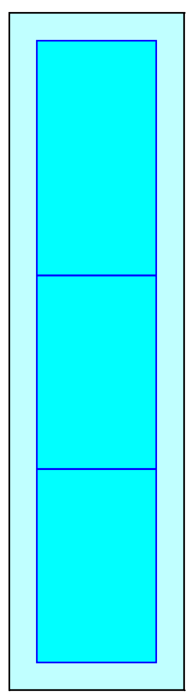
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

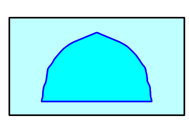
3 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 167.6 cf Chamber Storage

549.5 cf Field - 167.6 cf Chambers = 381.9 cf Stone x 40.0% Voids = 152.8 cf Stone Storage

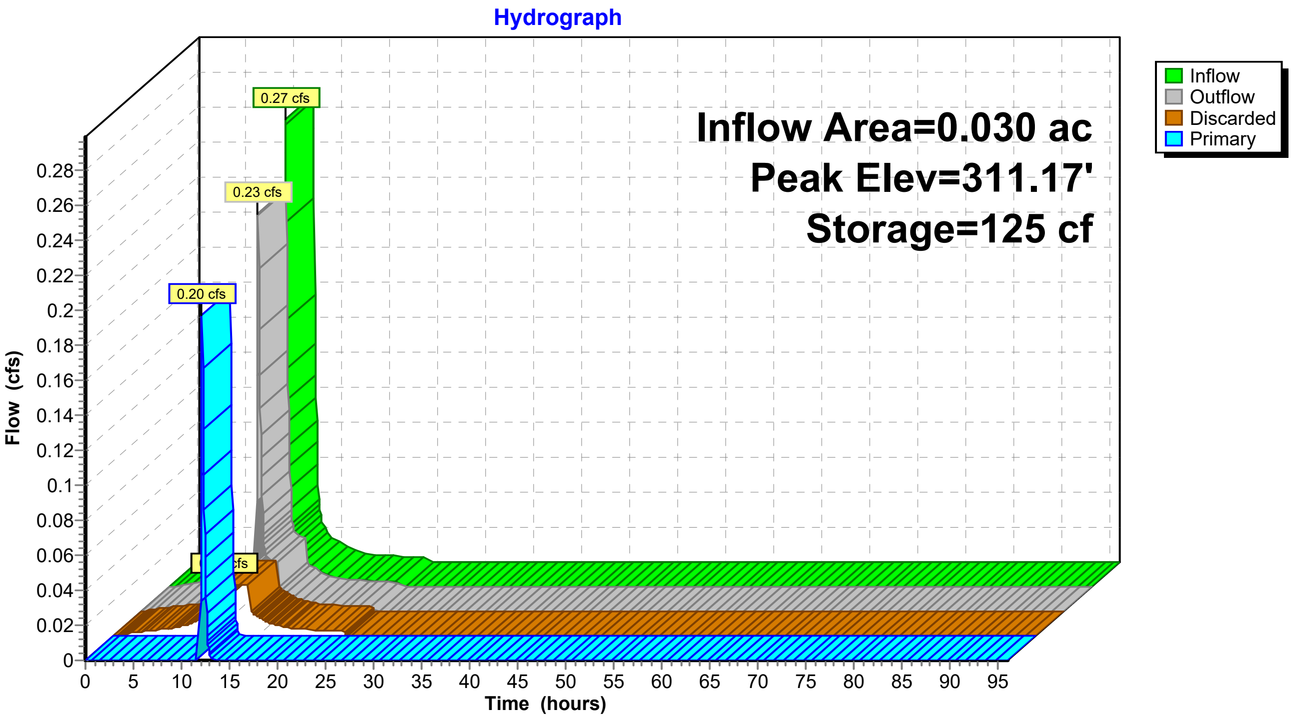
Chamber Storage + Stone Storage = 320.4 cf = 0.007 af
Overall Storage Efficiency = 58.3%
Overall System Size = 24.50' x 6.33' x 3.54'

3 Chambers
20.4 cy Field
14.1 cy Stone

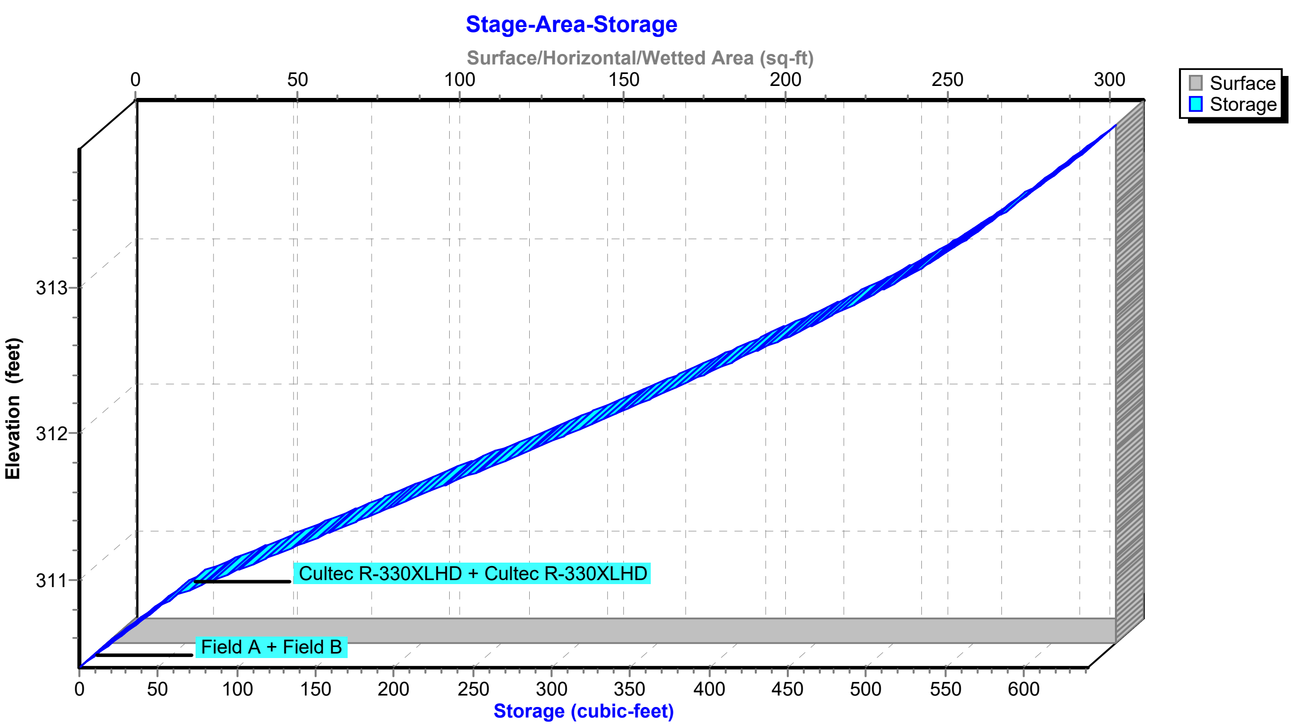




Pond 2P: Lot 2 cultec



Pond 2P: Lot 2 cultec



Stage-Area-Storage for Pond 2P: Lot 2 cultec

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
310.40	**310**	0	313.00	310	513
310.45	310	6	313.05	310	522
310.50	310	12	313.10	310	530
310.55	310	19	313.15	310	538
310.60	310	25	313.20	310	546
310.65	310	31	313.25	310	553
310.70	310	37	313.30	310	560
310.75	310	43	313.35	310	567
310.80	310	50	313.40	310	574
310.85	310	56	313.45	310	580
310.90	310	62	313.50	310	586
310.95	310	74	313.55	310	592
311.00	310	85	313.60	310	598
311.05	310	97	313.65	310	605
311.10	310	108	313.70	310	611
311.15	310	120	313.75	310	617
311.20	310	131	313.80	310	623
311.25	310	143	313.85	310	629
311.30	310	154	313.90	310	**636**
311.35	310	165			
311.40	310	177			
311.45	310	188			
311.50	310	200			
311.55	310	211			
311.60	310	222			
311.65	310	233			
311.70	310	244			
311.75	310	256			
311.80	310	267			
311.85	310	278			
311.90	310	289			
311.95	310	300			
312.00	310	311			
312.05	310	322			
312.10	310	333			
312.15	310	344			
312.20	310	355			
312.25	310	365			
312.30	310	376			
312.35	310	386			
312.40	310	397			
312.45	310	407			
312.50	310	418			
312.55	310	428			
312.60	310	438			
312.65	310	448			
312.70	310	457			
312.75	310	467			
312.80	310	477			
312.85	310	486			
312.90	310	495			
312.95	310	504			

Summary for Pond 3P: Lot 4 cultec

Inflow Area = 0.030 ac,100.00% Impervious, Inflow Depth = 9.05" for 100-year event
Inflow = 0.27 cfs @ 12.09 hrs, Volume= 0.023 af
Outflow = 0.23 cfs @ 12.14 hrs, Volume= 0.023 af, Atten= 15%, Lag= 3.5 min
Discarded = 0.03 cfs @ 11.50 hrs, Volume= 0.017 af
Primary = 0.20 cfs @ 12.14 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 292.17' @ 12.14 hrs Surf.Area= 310 sf Storage= 125 cf

Plug-Flow detention time= 10.9 min calculated for 0.023 af (100% of inflow)
Center-of-Mass det. time= 10.9 min (750.3 - 739.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	291.40'	153 cf	**6.33'W x 24.50'L x 3.54'H Field A** 550 cf Overall - 168 cf Embedded = 382 cf x 40.0% Voids
#2A	291.90'	168 cf	**Cultec R-330XLHD** x 3 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
#3B	291.40'	153 cf	**6.33'W x 24.50'L x 3.54'H Field B** 550 cf Overall - 168 cf Embedded = 382 cf x 40.0% Voids
#4B	291.90'	168 cf	**Cultec R-330XLHD** x 3 Inside #3 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
		641 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	291.90'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 291.90' / 291.00' S= 0.0450 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Discarded	291.40'	**4.100 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 11.50 hrs HW=291.44' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.19 cfs @ 12.14 hrs HW=292.17' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.19 cfs @ 1.78 fps)

Pond 3P: Lot 4 cultec - 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

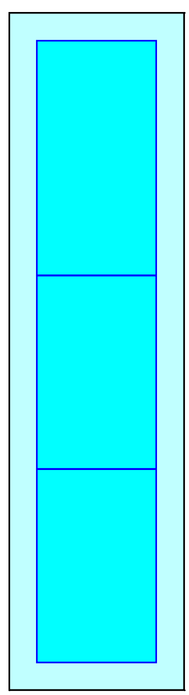
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

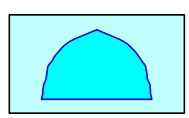
3 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 167.6 cf Chamber Storage

549.5 cf Field - 167.6 cf Chambers = 381.9 cf Stone x 40.0% Voids = 152.8 cf Stone Storage

Chamber Storage + Stone Storage = 320.4 cf = 0.007 af
Overall Storage Efficiency = 58.3%
Overall System Size = 24.50' x 6.33' x 3.54'

3 Chambers
20.4 cy Field
14.1 cy Stone





Pond 3P: Lot 4 cultec - Chamber Wizard Field B

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

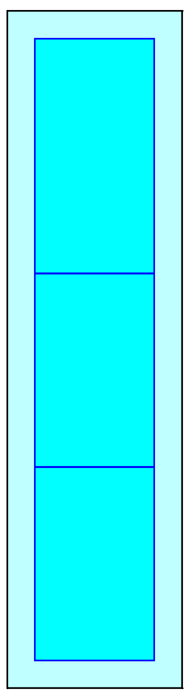
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +12.0" End Stone x 2 = 24.50' Base Length
1 Rows x 52.0" Wide + 12.0" Side Stone x 2 = 6.33' Base Width
6.0" Base + 30.5" Chamber Height + 6.0" Cover = 3.54' Field Height

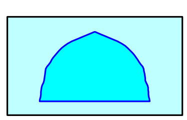
3 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 1 Rows = 167.6 cf Chamber Storage

549.5 cf Field - 167.6 cf Chambers = 381.9 cf Stone x 40.0% Voids = 152.8 cf Stone Storage

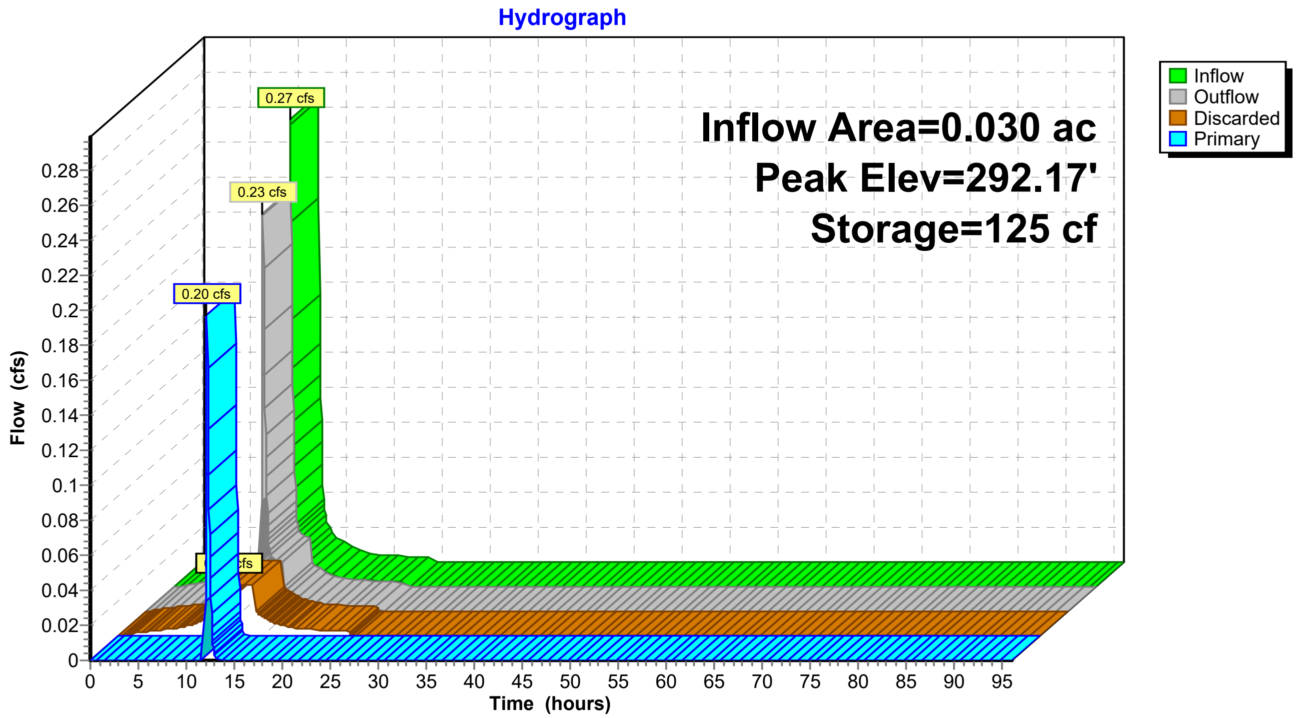
Chamber Storage + Stone Storage = 320.4 cf = 0.007 af
Overall Storage Efficiency = 58.3%
Overall System Size = 24.50' x 6.33' x 3.54'

3 Chambers
20.4 cy Field
14.1 cy Stone

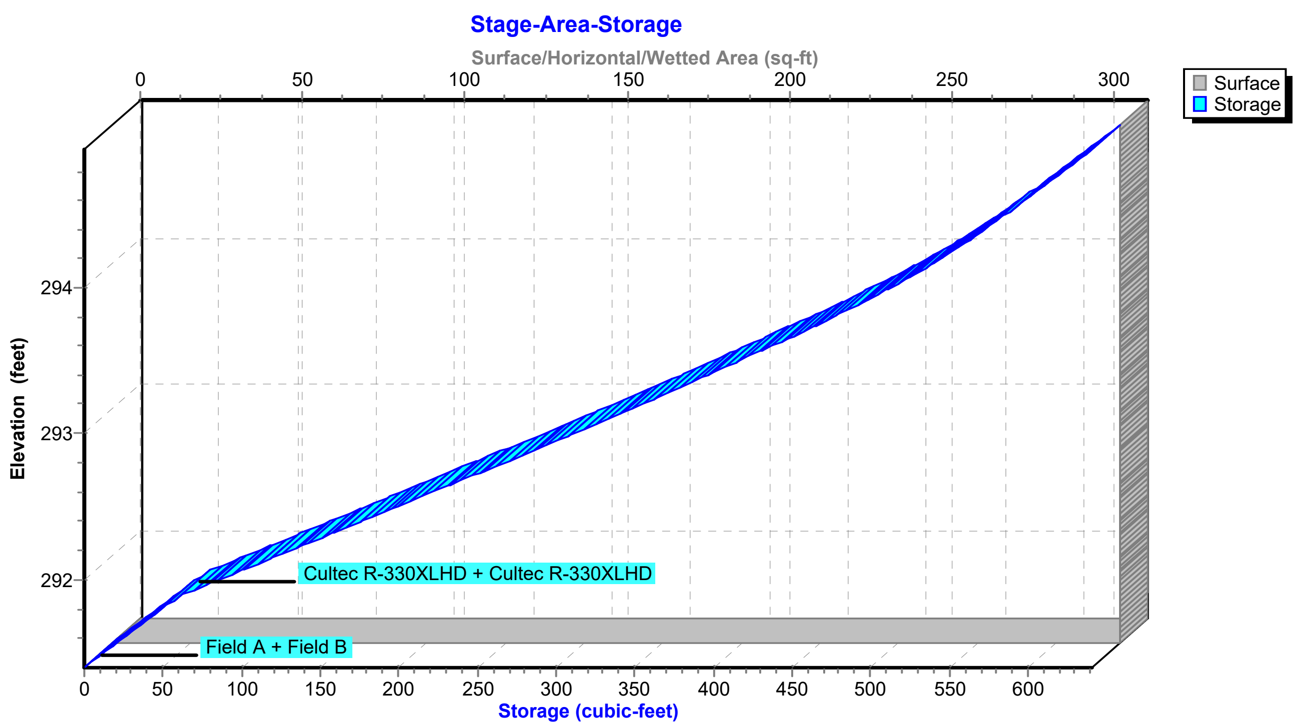




Pond 3P: Lot 4 cultec



Pond 3P: Lot 4 cultec



Stage-Area-Storage for Pond 3P: Lot 4 cultec

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
291.40	**310**	0	294.00	310	513
291.45	310	6	294.05	310	522
291.50	310	12	294.10	310	530
291.55	310	19	294.15	310	538
291.60	310	25	294.20	310	546
291.65	310	31	294.25	310	553
291.70	310	37	294.30	310	560
291.75	310	43	294.35	310	567
291.80	310	50	294.40	310	574
291.85	310	56	294.45	310	580
291.90	310	62	294.50	310	586
291.95	310	74	294.55	310	592
292.00	310	85	294.60	310	598
292.05	310	97	294.65	310	605
292.10	310	108	294.70	310	611
292.15	310	120	294.75	310	617
292.20	310	131	294.80	310	623
292.25	310	143	294.85	310	629
292.30	310	154	294.90	310	**636**
292.35	310	165			
292.40	310	177			
292.45	310	188			
292.50	310	200			
292.55	310	211			
292.60	310	222			
292.65	310	233			
292.70	310	244			
292.75	310	256			
292.80	310	267			
292.85	310	278			
292.90	310	289			
292.95	310	300			
293.00	310	311			
293.05	310	322			
293.10	310	333			
293.15	310	344			
293.20	310	355			
293.25	310	365			
293.30	310	376			
293.35	310	386			
293.40	310	397			
293.45	310	407			
293.50	310	418			
293.55	310	428			
293.60	310	438			
293.65	310	448			
293.70	310	457			
293.75	310	467			
293.80	310	477			
293.85	310	486			
293.90	310	495			
293.95	310	504			

Summary for Pond 4P: infiltration basin

Inflow Area = 3.340 ac, 32.63% Impervious, Inflow Depth = 6.59" for 100-year event
Inflow = 24.82 cfs @ 12.09 hrs, Volume= 1.835 af
Outflow = 16.66 cfs @ 12.19 hrs, Volume= 1.835 af, Atten= 33%, Lag= 6.0 min
Discarded = 0.50 cfs @ 12.19 hrs, Volume= 0.533 af
Primary = 14.60 cfs @ 12.19 hrs, Volume= 1.291 af
Secondary = 1.56 cfs @ 12.19 hrs, Volume= 0.012 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 297.13' @ 12.19 hrs Surf.Area= 5,236 sf Storage= 12,446 cf
Flood Elev= 298.00' Surf.Area= 5,955 sf Storage= 17,305 cf

Plug-Flow detention time= 45.1 min calculated for 1.834 af (100% of inflow)
Center-of-Mass det. time= 45.2 min (847.0 - 801.8)

Volume	Invert	Avail.Storage	Storage Description
#1	294.00'	17,305 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
294.00	2,750	0	0
296.00	4,300	7,050	7,050
298.00	5,955	10,255	17,305

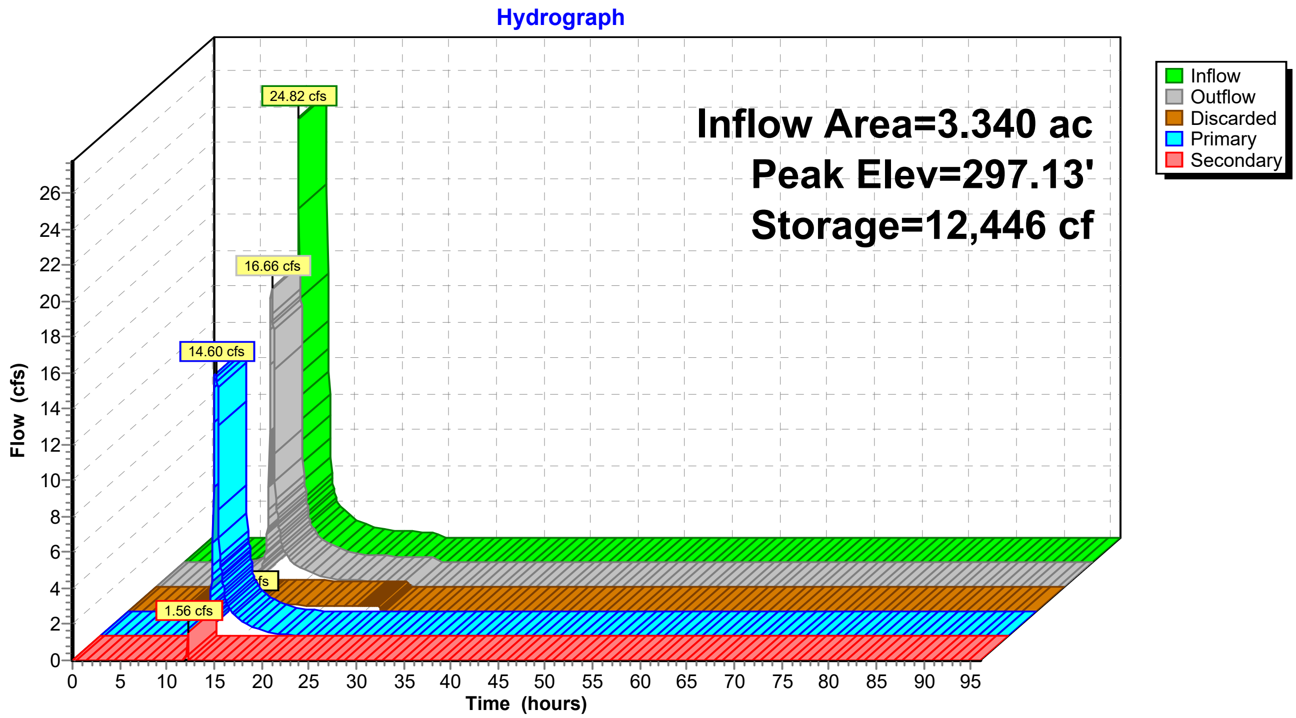
Device	Routing	Invert	Outlet Devices
#1	Primary	290.40'	**15.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 290.40' / 288.00' S= 0.1500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	295.00'	**24.0" W x 6.0" H Vert. Slot** C= 0.600
#3	Device 1	296.00'	**30.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	297.00'	**162.0 deg x 10.0' long x 1.00' rise Emergency spillway** Cv= 2.47 (C= 3.09)
#5	Discarded	294.00'	**4.100 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.50 cfs @ 12.19 hrs HW=297.12' (Free Discharge)
└─**5=Exfiltration** (Exfiltration Controls 0.50 cfs)

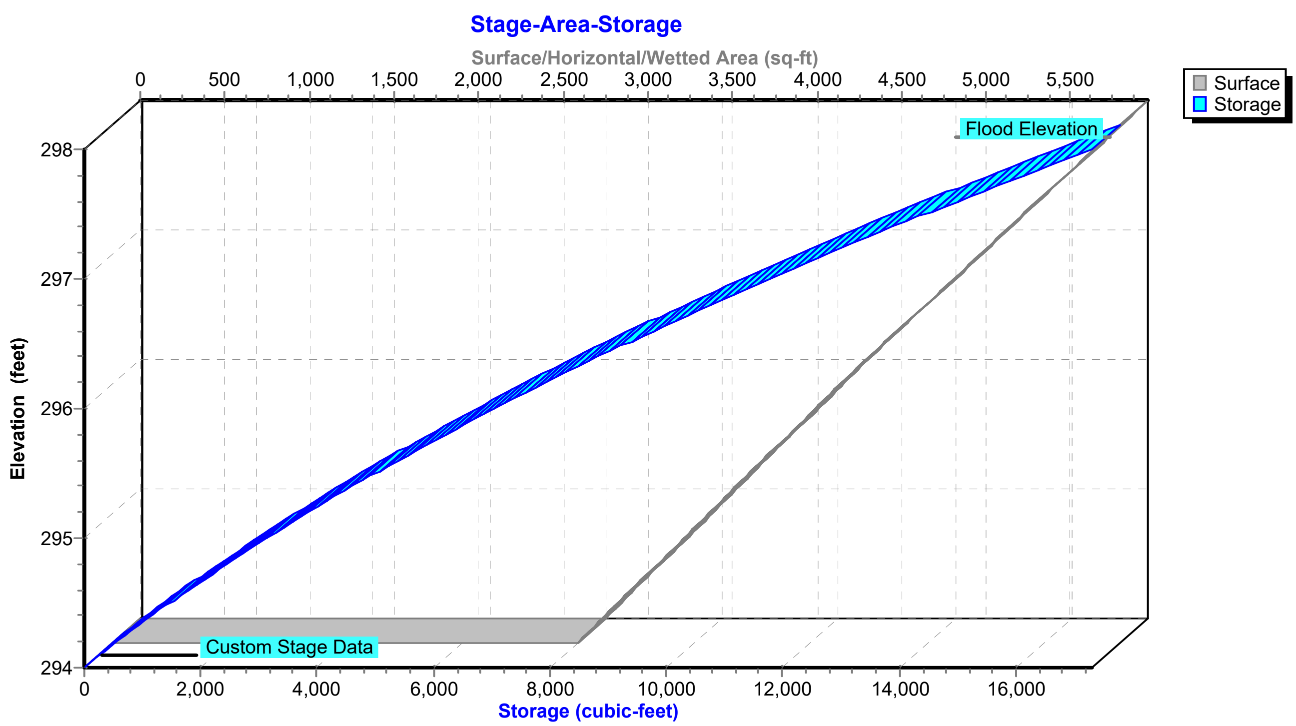
Primary OutFlow Max=14.59 cfs @ 12.19 hrs HW=297.12' (Free Discharge)
└─**1=Culvert** (Inlet Controls 14.59 cfs @ 11.89 fps)
  ├─**2=Slot** (Passes < 6.58 cfs potential flow)
  └─**3=Grate** (Passes < 50.44 cfs potential flow)

Secondary OutFlow Max=1.39 cfs @ 12.19 hrs HW=297.12' (Free Discharge)
└─**4=Emergency spillway** (Weir Controls 1.39 cfs @ 1.06 fps)

Pond 4P: infiltration basin



Pond 4P: infiltration basin



Stage-Area-Storage for Pond 4P: infiltration basin

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
294.00	2,750	0	296.60	4,797	9,779
294.05	2,789	138	296.65	4,838	10,020
294.10	2,828	279	296.70	4,879	10,263
294.15	2,866	421	296.75	4,921	10,508
294.20	2,905	565	296.80	4,962	10,755
294.25	2,944	712	296.85	5,003	11,004
294.30	2,983	860	296.90	5,045	11,255
294.35	3,021	1,010	296.95	5,086	11,508
294.40	3,060	1,162	297.00	5,128	11,764
294.45	3,099	1,316	297.05	5,169	12,021
294.50	3,138	1,472	297.10	5,210	12,281
294.55	3,176	1,630	297.15	5,252	12,542
294.60	3,215	1,790	297.20	5,293	12,806
294.65	3,254	1,951	297.25	5,334	13,071
294.70	3,292	2,115	297.30	5,376	13,339
294.75	3,331	2,280	297.35	5,417	13,609
294.80	3,370	2,448	297.40	5,458	13,881
294.85	3,409	2,617	297.45	5,500	14,155
294.90	3,447	2,789	297.50	5,541	14,431
294.95	3,486	2,962	297.55	5,583	14,709
295.00	3,525	3,138	297.60	5,624	14,989
295.05	3,564	3,315	297.65	5,665	15,271
295.10	3,603	3,494	297.70	5,707	15,556
295.15	3,641	3,675	297.75	5,748	15,842
295.20	3,680	3,858	297.80	5,790	16,131
295.25	3,719	4,043	297.85	5,831	16,421
295.30	3,758	4,230	297.90	5,872	16,714
295.35	3,796	4,419	297.95	5,914	17,008
295.40	3,835	4,609	298.00	**5,955**	**17,305**
295.45	3,874	4,802			
295.50	3,913	4,997			
295.55	3,951	5,193			
295.60	3,990	5,392			
295.65	4,029	5,592			
295.70	4,067	5,795			
295.75	4,106	5,999			
295.80	4,145	6,206			
295.85	4,184	6,414			
295.90	4,222	6,624			
295.95	4,261	6,836			
296.00	4,300	7,050			
296.05	4,341	7,266			
296.10	4,383	7,484			
296.15	4,424	7,704			
296.20	4,465	7,927			
296.25	4,507	8,151			
296.30	4,548	8,377			
296.35	4,590	8,606			
296.40	4,631	8,836			
296.45	4,672	9,069			
296.50	4,714	9,303			
296.55	4,755	9,540			

Appendix H: Post-Construction Inspection & Maintenance

Post Construction Inspection & Maintenance Checklist: Site

1. Steep Slopes (any slope 3:1 or steeper)
(Frequency: Annual)

	Yes	No	NA
a. Vegetation and ground cover adequate.	☐	☐	☐
i. Minimum 80% ground cover. *<u>Maintenance</u>: Topsoil, rake and seed bare areas. Remove any dead or dying plants and decaying plant material. Replace dead and dying plants.*	☐	☐	☐
ii. Excessively tall grass (greater than 6" in height) *<u>Maintenance</u>: Mow slopes 3:1 or flatter to have a grass height of 4" to 6". Increase mowing frequency as necessary. Steep slopes planted with meadow mix as shown on the approved plans do not have to be mowed.*	☐	☐	☐
iii. Unauthorized plants. *<u>Maintenance</u>: Remove any unauthorized plants, including roots. Do not use herbicides. Topsoil, rake and seed the area disturbed by their removal.*	☐	☐	☐
b. Slope erosion.	☐	☐	☐
i. Small bare areas (min. 50 square feet). *<u>Maintenance</u>: Topsoil, rake and seed bare areas.*	☐	☐	☐
ii. Ruts less than 12" wide. *<u>Maintenance</u>: Prior to making any repairs, identify the source of erosion and correct. Protect the slopes prior to any work occurring. Backfill ruts and compact soil. Topsoil, rake and seed bare areas. Alternatively, hydroseeding can be used to seed the slope.*	☐	☐	☐
iii. Ruts greater than 12" wide. *<u>Maintenance</u>: Prior to making any repairs, identify the source of erosion and correct. Protect the slopes prior to any work occurring. Re-grade, backfill ruts and compact soil. Install erosion control mats on slopes 3:1 or steeper to protect the re-graded slope. Topsoil, rake and seed bare areas. Inspect on a weekly basis until 80% ground cover is achieved. Alternatively, hydroseeding can be used to seed the slope.*	☐	☐	☐
c. Uneven settling *<u>Maintenance</u>: Visually inspect for uneven settling. Classify the settling based upon the categories below.*	☐	☐	☐
i. Greater than 0" but less than 2" of settling. *<u>Maintenance</u>: No immediate action required. Re-inspect in 6 months.*	☐	☐	☐
ii. Greater than 2" but less than 4" of settling. *<u>Maintenance</u>: Immediately repair. Re-grade and compact the soil. Topsoil, rake and seed the area. Re-inspect in 6 months.*	☐	☐	☐

	Yes	No	NA
iii. Greater than 4" of settling. *Maintenance: Immediately stabilize the area and consult a NYS Licensed Professional Engineer within 2 weeks before making any additional repairs.*	☐	☐	☐

2. Swales (Frequency: Annual)	**Yes**	**No**	**NA**
a. Inflow Points	☐	☐	☐
i. Vegetation and ground cover adequate. *Maintenance: Reseed bare areas. Remove any unauthorized plants or any nuisance weeds and vegetation, including their roots. Do not use any herbicides. Topsoil, rake and seed the disturbed area by their removal.*	☐	☐	☐
ii. Free from erosion/undercutting. *Maintenance: Immediately stabilize and repair any areas where erosion around has occurred. Rake and seed the area. Seed mixture shall meet the seed mixture requirements specified on the approved plans.*	☐	☐	☐
iii. Rip rap in good condition. *Maintenance: Replace stone, as necessary.*	☐	☐	☐
iv. No evidence of sediment buildup. *Maintenance: Remove and properly dispose of any accumulated sediment when the depth is 20% of swale design depth.*	☐	☐	☐
b. Check Dams	☐	☐	☐
i. No evidence of sediment buildup. *Maintenance: Remove accumulated sediment behind dams when sediment depth is one-third the dam height.*	☐	☐	☐
ii. Stone in good condition. *Maintenance: Replace stone, as necessary.*	☐	☐	☐
iii. No evidence of erosion *Maintenance: Immediately stabilize and repair any areas where erosion has occurred. Replace stone, as necessary. Topsoil, rake and reseed area.*	☐	☐	☐
c. Energy Dissipaters	☐	☐	☐
i. No evidence of sediment buildup. *Maintenance: Remove and properly dispose of any accumulated sediment when half of the void space is filled.*	☐	☐	☐
ii. Rip rap in good condition. *Maintenance: Replace stone, as necessary.*	☐	☐	☐
iii. No evidence of erosion. *Maintenance: Immediately stabilize and repair any areas where erosion has occurred. Replace stone, as necessary. Topsoil, rake and reseed.*	☐	☐	☐

	Yes	No	NA
3. Culverts (Frequency: Annual)			
a. Headwalls or End sections	☐	☐	☐
i. In good condition, no need for repairs.	☐	☐	☐
a. Cracks or displacement. *Maintenance: Repair any minor cracks. If minor displacement is observed, re-inspect in 6 months. Replace structure if major cracks or significant displacement is observed.*	☐	☐	☐
b. Minor spalling (<1"). *Maintenance: Repair any minor spalling.*	☐	☐	☐
c. Major spalling (rebars exposed). *Maintenance: Replace structure.*	☐	☐	☐
ii. Clear of sediment. *Maintenance: Remove and properly dispose of any accumulated sediment.*	☐	☐	☐
iii. Clear of debris and trash. *Maintenance: Remove and properly dispose of any debris and trash.*	☐	☐	☐
b. Rip rap in good condition. *Maintenance: Replace stone, as necessary.*	☐	☐	☐
c. Pipes free from damage, corrosion, and sediment. *Maintenance: Immediately repair any damaged pipes. If pipes are severely damaged and cannot be repaired, replace the pipes. Remove and properly dispose of any sediment.*	☐	☐	☐

Notes:

1. The site must be returned to the approved conditions when any repairs are made.
2. Unauthorized plants are any plants that are growing or have been installed that are not any of the plants shown on the approved plans.
3. All seed mixtures shall meet the seed mixture requirements specified on the approved plans.
4. Replace any dead or dying plants with plants specified in the planting schedule shown on the approved plans.

Comments:

____
____
____
____

Actions to be taken:

____
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____

Post Construction Inspection and Maintenance Checklist
Infiltration Basin

1. Embankment
(Frequency: Annual)

	Yes	No	NA
a. Vegetation and ground cover adequate.	☐	☐	☐
i. Minimum 80% ground cover. *<u>Maintenance</u>: Topsoil, rake and seed bare areas. Replace dead and dying plants.*	☐	☐	☐
ii. Excessively tall grass (greater than 6" in height) *<u>Maintenance</u>: Mow grass to have a height of 4" to 6". Increase mowing frequency as necessary.*	☐	☐	☐
iii. Unauthorized plants. *<u>Maintenance</u>: Remove any unauthorized plants, including roots. Do not use herbicides. Topsoil, rake and seed the area disturbed by their removal.*	☐	☐	☐
b. Slope erosion.	☐	☐	☐
i. Small bare areas (min. 50 square feet). *<u>Maintenance</u>: Topsoil, rake and seed bare areas.*	☐	☐	☐
ii. Ruts less than 12" wide. *<u>Maintenance</u>: Prior to making any repairs, identify the source of erosion and correct. Protect the slopes prior to any work occurring. Backfill ruts and compact soil. Topsoil, rake and seed bare areas. Alternatively, hydroseeding can be used to seed the slope.*	☐	☐	☐
iii. Ruts greater than 12" wide. *<u>Maintenance</u>: Prior to making any repairs, identify the source of erosion and correct. Protect the slopes prior to any work occurring. Re-grade, backfill ruts and compact soil. Install erosion control mats on slopes 3:1 or steeper to protect the re-graded slope. Topsoil, rake and seed bare areas. Inspect on a weekly basis until 80% ground cover is achieved. Alternatively, hydroseeding can be used to seed the slope.*	☐	☐	☐
c. Uneven settling *<u>Maintenance</u>: Install permanent benchmarks or other permanent reference point in each practice to be used with as-built elevations to measure uneven settling.*	☐	☐	☐
i. Greater than 0" but less than 2" of settling. *<u>Maintenance</u>: No immediate action required. Re-inspect in 6 months.*	☐	☐	☐
ii. Greater than 2" but less than 4" of settling. *<u>Maintenance</u>: Immediately repair. Re-grade and compact the soil. Topsoil, rake and seed the area. Re-inspect in 6 months.*	☐	☐	☐

	Yes	No	NA
iii. Greater than 4" of settling. *<u>Maintenance</u>: Immediately stabilize the area and consult a NYS Licensed Professional Engineer within 2 weeks before making any additional repairs.*	☐	☐	☐
d. Animal burrows. *<u>Maintenance</u>: Fill animal burrows with similar material to the existing material and compact. Rake and seed the area.*	☐	☐	☐
e. Cracking, bulging, or sliding of slope.	☐	☐	☐
i. Upstream face.	☐	☐	☐
ii. Downstream face.	☐	☐	☐
iii. At or beyond downstream toe.	☐	☐	☐
iv. At or beyond upstream toe.	☐	☐	☐
v. Emergency spillway. *<u>Maintenance</u>: Immediately stabilize the slope and consult an NYS Licensed Professional Engineer within 2 weeks before making any additional repairs.*	☐	☐	☐
f. Seeps/leaks at downstream face. *<u>Maintenance</u>: Look for changes in the color of the vegetation, plant species and their density to help locate the leak source.*	☐	☐	☐
g. Rip rap slope protection failure. *<u>Maintenance</u>: Stabilize slope, re-grade and compact the soil. Replace stone as necessary.*	☐	☐	☐
i. Emergency spillway clear of any obstructions or debris. *<u>Maintenance</u>: Remove and properly dispose of any trash and debris. Remove any unauthorized plants or any nuisance weeds and vegetation, including their roots. Do not use any herbicides. Topsoil, rake and seed the disturbed area by their removal.*	☐	☐	☐

2. Inflow Points
(Frequency: Annual)

	Yes	No	NA
a. Vegetation and ground cover adequate. *<u>Maintenance</u>: Reseed bare areas. Remove any unauthorized plants or any nuisance weeds and vegetation, including their roots. Do not use any herbicides. Topsoil, rake and seed the disturbed area by their removal.*	☐	☐	☐
b. Free from erosion/undercutting. *<u>Maintenance</u>: Immediately stabilize and repair any areas where erosion around has occurred. Rake and seed the area. Seed mixture shall meet the seed mixture requirements specified on the approved plans.*	☐	☐	☐
c. Rip rap in good condition. *<u>Maintenance</u>: Replace stone, as necessary.*	☐	☐	☐

Yes No NA

d. Pipes free from damage, corrosion, and sediment. ☐ ☐ ☐
Maintenance: Immediately repair any damaged pipes. If pipes are severely damaged and cannot be repaired, replace the pipes. Remove and properly dispose of any sediment.

3. Outlet Structure/Overflow Spillway
(Frequency: Annual)

Yes No NA

a. Outlet structure in good condition. ☐ ☐ ☐
   i. In good condition, no need for repairs. ☐ ☐ ☐
      a. Cracks or displacement ☐ ☐ ☐
      Maintenance: Repair any minor cracks or displacement. Replace structure if major cracks or displacement is observed.
      b. Minor spalling (<1"). ☐ ☐ ☐
      Maintenance: Repair any minor spalling observed.
      c. Major spalling (rebars exposed). ☐ ☐ ☐
      Maintenance: Replace structure.
      d. Joint failures. ☐ ☐ ☐
      Maintenance: Replace structure.
      e. Water tightness. ☐ ☐ ☐
      Maintenance: Reseal structure for water tightness if minor leaks are observed. Replace structure if significant leaks are observed.
   ii. Clear of sediment. ☐ ☐ ☐
   Maintenance: Remove and properly dispose of any accumulated sediment when at 50% of sump height.
   iii. Clear of debris and trash. ☐ ☐ ☐
   Maintenance: Remove and properly dispose of any debris and trash.
   iv. Pipes free from damage, corrosion, and sediment. ☐ ☐ ☐
   Maintenance: Immediately repair any damaged pipes. If pipes are severely damaged and cannot be repaired, replace the pipes. Remove and properly dispose of any sediment.

b. Overflow spillway ☐ ☐ ☐
   i. In good condition, no need for repairs. ☐ ☐ ☐
   Maintenance: Replace stone, as necessary.
   ii. Clear of sediment. ☐ ☐ ☐
   Maintenance: Remove and properly dispose of any accumulated sediment when half of the void space is filled.
   iii. Clear of debris and trash. ☐ ☐ ☐
   Maintenance: Remove and properly dispose of any debris and trash.

	Yes	No	NA
iv. No evidence of erosion. *Maintenance: Immediately stabilize and repair any areas where erosion occurred around or below the overflow spillway. Replace stone, as necessary. Topsoil, rake and seed the area.*	☐	☐	☐
v. No evidence of erosion at downstream toe of drop structure or weir spillway. *Maintenance: Immediately stabilize and repair any areas where erosion has occurred. Replace stone, as necessary. Topsoil, rake and reseed.*	☐	☐	☐

4. Sediment Forebay
(Frequency: Monthly)

	Yes	No	NA
a. Free of sediment. *Maintenance: Remove and properly dispose of any accumulated sediment when at 50% of the design capacity.*	☐	☐	☐
b. No evidence of erosion. *Maintenance: Immediately stabilize and repair any areas where erosion has occurred. Topsoil, rake and seed the area.*	☐	☐	☐
c. Overflow Spillway.	☐	☐	☐
i. In good working condition, no need for repairs. *Maintenance: Replace stone, as necessary.*	☐	☐	☐
ii. Clear of sediment. *Maintenance: Remove and properly dispose of any accumulated sediment when half of the void space is filled.*	☐	☐	☐
iii. Clear of trash and debris. *Maintenance: Remove and properly dispose of any debris and trash.*	☐	☐	☐
iv. No evidence of erosion. *Maintenance: Immediately stabilize and repair any areas where erosion occurred around or below the overflow spillway. Replace stone, as necessary. Topsoil, rake and seed the area.*	☐	☐	☐
v. No evidence of erosion at downstream toe of drop structure or weir spillway. *Maintenance: Immediately stabilize and repair any areas where erosion has occurred. Replace stone, as necessary. Topsoil, rake and seed the area.*	☐	☐	☐

5. Debris Cleanout
(Frequency: Monthly)

	Yes	No	NA
a. Trench/basin surface clear of debris. *Maintenance: Remove and properly dispose of any trash and debris.*	☐	☐	☐
b. Inflow pipes clear of debris. *Maintenance: Remove and properly dispose of any trash and debris.*	☐	☐	☐

	Yes	No	NA
c. Overflow spillway clear of debris. *<u>Maintenance</u>: Remove and properly dispose of any trash and debris.*	☐	☐	☐
d. Inlet area clear of debris. *<u>Maintenance</u>: Remove and properly dispose of any trash and debris.*	☐	☐	☐

6. Dewatering
(Frequency: Monthly)

	Yes	No	NA
a. Dewaters between storms. *<u>Maintenance</u>: Remove excess sediment accumulation. If still not dewatering fully and underdrain system present, flush underdrain system to remove any trapped sediment. If underdrain system not present, contact a NYS licensed Professional Engineer.*	☐	☐	☐
c. Underdrain present and no evidence of standing water. *<u>Maintenance</u>: Flush underdrain system to remove any trapped sediment. If still not dewatering fully, contact a NYS licensed Professional Engineer.*	☐	☐	☐

7. Basin Vegetation
(Frequency: Monthly)

	Yes	No	NA
a. No placement of unapproved plants. *<u>Maintenance</u>: Remove any unauthorized plants or any nuisance weeds and vegetation, including their roots. Do not use herbicides.*	☐	☐	☐
b. Grass height not greater than 6”. *<u>Maintenance</u>: Mow grass. Increase frequency of mowing as necessary to keep grass heights less than 6”.*	☐	☐	☐
c. Sparse or bare vegetation in more than 10% of basin area. *<u>Maintenance</u>: Install replacement plants, as necessary. Topsoil, rake and seed the area.*	☐	☐	☐
d. Nuisance weeds or vegetation taking over more than 25% of the basin. *<u>Maintenance</u>: Remove any nuisance weeds and vegetation, including their roots. Do not use any herbicides. Topsoil, rake and seed the disturbed area*	☐	☐	☐

Notes:
1. The site must be returned to the approved conditions when any repairs are made.
2. Unauthorized plants are any plants that are growing or have been installed that are not any of the plants shown on the approved plans.
3. All seed mixtures shall meet the seed mixture requirements specified on the approved plans.

4. Replaced rip rap stone shall meet the stone requirements specified on the approved plans.

Comments:

Actions to be taken:

Post Construction Inspection & Maintenance Checklist: Underground Infiltration System

1. Inlet and Outlet Structures
(Frequency: Annual)

	Yes	No	NA
a. Concrete structure	☐	☐	☐
i. In good condition, no need for repairs.	☐	☐	☐
a. Cracks or displacement. *Maintenance: Repair any minor cracks. If minor displacement is observed, re-inspect in 6 months. Replace structure if major cracks or significant displacement is observed.*	☐	☐	☐
b. Minor spalling (<1”). *Maintenance: Repair any minor spalling.*	☐	☐	☐
c. Major spalling (rebars exposed). *Maintenance: Replace structure.*	☐	☐	☐
d. Joint failures. *Maintenance: Replace structure.*	☐	☐	☐
e. Water tightness. *Maintenance: Reseal structure for water tightness if minor leaks are observed. Replace structure if significant leaks are observed.*	☐	☐	☐
ii. Clear of sediment. *Maintenance: Remove and properly dispose of any accumulated sediment when at 50% of sump height.*	☐	☐	☐
iii. Clear of debris and trash. *Maintenance: Remove and properly dispose of any debris and trash.*	☐	☐	☐
iv. Pipes free from damage, corrosion, and sediment. *Maintenance: Immediately repair any damaged pipes. If pipes are severely damaged and cannot be repaired, replace the pipes. Remove and properly dispose of any sediment.*	☐	☐	☐

2. Header System
(Frequency: Annual)

	Yes	No	NA
a. Clear of debris and litter. *Maintenance: Use a high pressure nozzle with rear facing jets to wash the sediment and debris into the upstream structure. Remove sediment and debris from the sump of the upstream structure.*	☐	☐	☐
b. Clear of sediment. *Maintenance: Remove and properly dispose of sediment when accumulated over 4 inches. Use a high pressure nozzle with rear facing jets to wash the sediment into the upstream structure. Remove sediment from the sump of the upstream structure.*	☐	☐	☐

3. Isolator/Containment Row
(Frequency: Annual)

	Yes	No	NA
a. Clear of debris and litter. *<u>Maintenance</u>: Remove and properly dispose of any debris and trash. Use a high pressure nozzle with rear facing jets to wash the debris into the upstream structure. Remove debris from the sump of the upstream structure.*	☐	☐	☐
b. Clear of sediment. *<u>Maintenance</u>: Remove and properly dispose of sediment when accumulated over 4 inches. Use a high pressure nozzle with rear facing jets to wash the sediment into the upstream structure. Remove sediment from the sump of the upstream structure.*	☐	☐	☐

4. Underground Chambers
(Frequency: Annual)

	Yes	No	NA
a. Chambers are in good condition. *<u>Maintenance</u>: Inspect the interior of the chambers using a CCTV or comparable inspection method through the inspection port. If deficiencies are noted immediately contact a NYS licensed Professional Engineer.*	☐	☐	☐
b. Clear of debris and litter. *<u>Maintenance</u>: Remove and properly dispose of any debris and trash. Use a high pressure nozzle with rear facing jets to wash the debris into the upstream structure. Remove debris from the sump of the upstream structure.*	☐	☐	☐
c. Clear of sediment. *<u>Maintenance</u>: Remove and properly dispose of sediment when accumulated over 4 inches. Use a high pressure nozzle with rear facing jets to wash the sediment into the upstream structure. Remove sediment from the sump of the upstream structure.*	☐	☐	☐
d. Dewaters between storms. *<u>Maintenance</u>: If standing water during inspection, recheck after 48 hours. If standing water is still present, contact a NYS licensed Professional Engineer.*	☐	☐	☐

5. Surrounding Site
(Frequency: Monthly)

	Yes	No	NA
a. Vegetation and ground cover adequate. *<u>Maintenance</u>: Reseed bare areas. Remove any unauthorized plants or any nuisance weeds and vegetation, including their roots. Do not use any herbicides. Topsoil, rake and seed the disturbed area by their removal.*	☐	☐	☐
b. Area free from depressions. *<u>Maintenance</u>: Immediately repair. Re-grade and compact the soil. Topsoil, rake and seed the area. Re-inspect in 6 months.*	☐	☐	☐

	Yes	No	NA
c. Unauthorized plants over system. *<u>Maintenance</u>: Remove any unauthorized plants, including roots. Do not use herbicides. Topsoil, rake and seed the area disturbed by their removal.*	☐	☐	☐
d. Unauthorized structures over system. *<u>Maintenance</u>: Remove any unauthorized structures. Immediately inspect the interior of the chambers using a CCTV or comparable inspection method through the inspection port. If deficiencies are noted immediately contact a NYS licensed Professional Engineer.*	☐	☐	☐

Notes:

1. The site must be returned to the approved conditions when any repairs are made.
2. All seed mixtures shall meet the seed mixture requirements specified on the approved plans.

Comments:

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Actions to be taken:

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