Stormwater Pollution Prevention Plan
(SWPPP)

for

STEWART'S SHOPS

3733 US Highway 9W
Highland, NY 12528
Ulster County, New York

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1.0 EXECUTIVE SUMMARY

Stewart's Shops is proposing to construct a 3,851 sf convenient store, a parking lot and covered gas pumps on an approximately 1.19 acre parcel located at 923 Riverview Road in the Town of Lloyd (Highland), Ulster County. This project site is comprised of three (3) separate parcels that will be combined into one (1). One (1) of these parcels is currently in use as a used car dealership and the other two (2) are currently residential properties, of which, one (1) has remained unoccupied for some time. The project area has previously undergone significant development and consists of both fairly vegetated lawn and wooded areas, as well as, areas of impervious cover associated with the existing uses.

Under the proposed Plan, Stewart's is proposing to re-develop the existing parcels which will result in approximately 1.34 acres of soil disturbances (includes off-site disturbances). The development of the project will be subject to the NYSDEC SPDES General Permit No. GP-0-20-001 for water quality and quantity as it will disturb greater than 1 acre for this project.

The Plan addresses the impacts associated with the proposed Stewart's Shops construction project. The objectives of this Plan are to:

1. Preserve existing drainage patterns to the extent practical.
2. Prevent potential stormwater quality impacts and erosion and sedimentation resulting from the proposed project.
3. Limit increases in stormwater runoff resulting from the proposed construction.

Per section 9.2.1.B.II Water Quality Treatment Objectives for Redevelopment Projects states:

"The Plan proposes that a minimum of 25% of the water quality volume (WQv) from disturbed, impervious area is captured and treated by the implementation of standard SMP or reduced by application of green infrastructure techniques (see Chapter 5 of this Manual). For all sites that utilize structural SMPs, these practices should be targeted to treat areas with the greatest pollutant generation potential (e.g. parking areas, service stations, etc.). If the construction project includes both new development and redevelopment activities, treatment would be required for **25% of the existing impervious area plus 100% of the additional impervious area**. As with design of any practice, sizing of structures should be based on all areas contributing to the SMP. Construction projects that involve redevelopment of a portion of the site, may choose diversion or flow splitters to be able to size the control structures for the reconstructed area only. For all sites that utilize green infrastructure techniques (see Table 3.2), a proposed plan is effective when runoff is controlled near the source and managed by infiltration, reuse, and evapotranspiration. "Although encouraged, meeting the Runoff Reduction Volume (RRv) sizing criteria is not required for redevelopment projects".

The objective of controlling water quantity is to ensure that the peak rate of runoff leaving the site does not increase as the result of development. The existing developments located at this location currently provide no quality or quantity controls for stormwater prior to discharge from the site. The proposed management strategy consists of the use of a subsurface stormwater detention system to temporarily hold the stormwater runoff associated with the development of this project and then release the stored stormwater in a controlled manner. Pre versus Post development peak flows for various storm intensities will be maintained at all existing discharge points for this project.

Water quality control for the project will be achieved through the use of a Bioretention Filter Bed (F-5). The sizing of the treatment unit shall meet or exceed the requirements of the NYSDEC SWDM and be adequately sized to treat a minimum of 25% of the WQv from the existing impervious areas and 100% of the WQv from the new impervious areas. The Bioretention Filter Bed will also be sized to adequately reduce the required Runoff Reduction Volume in accordance with Chapter 4 of the NYSDEC SWDM.

Routine maintenance is a key component in the successful operation of the stormwater management practice. Provisions ensuring the upkeep are necessary and are submitted in the accompanying maintenance plan. The Maintenance Plan, SWPPP and draft Notice-of-Intent (NOI) Application have been completed for this project site. The NOI is required to be submitted to the NYSDEC, along with the MS4 Acceptance Form, in order to obtain a SPDES permit to construct the site. Application to the NYSDEC for permit coverage occurs prior to construction activities and after municipal site plan approvals have been obtained.

The following SWPPP quantitatively assesses the pre development and post development runoff conditions of the project site. The report documents that the proposed improvements will meet the water quality parameters as set forth in the NYSDEC guidelines. A copy of this SWPPP will be maintained onsite in a job box and will be available for review upon request.

1.1 DESIGN METHODOLOGY

1. Determine contributory watershed area(s) and subsequent sub-watersheds for the project according to site conditions.
2. Evaluate pre and post development stormwater runoff conditions for various storm intensities, durations and frequencies of occurrences using USDA Technical Release 55 (TR-55) methodology.
3. Evaluate and obtain the RRv.
4. Evaluate peak runoff and storage requirements for the 1, 10 and 100-year storm frequencies.

2.0 SITE CONDITIONS

2.1 Topography

The project area predominately suburban in nature. Areas immediately to the north, south, east and west of the project site are primarily residential with commercial properties located along the US Highway 9W corridor. The proposed project site is currently comprised of an existing used car dealership and two (2) residential parcels. The site is comprised of a mix of moderately vegetated grasses and wooded areas with areas of impervious cover associated with the existing uses. The existing topography of the site generally slopes to the south.

2.2 Soil Data

The United States Department of Agriculture (USDA) classifies soils into four hydrologic soil groups (A, B, C and D). Soil group A consists of soils that have a higher potential for increased rates of infiltration of surface runoff, while soils in group D have much slower rates of runoff infiltration.

Using the USDA's National Resources Conservation (NRCS) Soil Survey Data, the soil maps of the existing watershed area reveal predominately moderate to slowly draining soils. The project soils consist entirely of Mardin-Nassau complex, 3 to 8 percent slopes. This soil type falls into the hydrologic soil group D. The existing drainage area was determined to have a composite curve number (CN) of 88.

See Exhibit A.4 for the NRCS Soil Survey Mapping information. The information in Exhibit A.4 is also provided in Exhibits E.1 and E.2 which shows the hydrologic soil group delineations within the project site.

2.3 Surface and Groundwater

1) Surface Waters

   No surface waters are located on the project site. The nearest significant body of surface water is the Hudson River. The river is located approximately 0.80 miles east of the project site. Stormwater discharges from the project site ultimately make their way to the river via a combination of both open and closed drainage systems.

2) Groundwater

   The project will not affect any wells within the project area. This project will be designed to ensure that there is no adverse effect on any active sources of water or to the quality of the groundwater. Portions of the project site are classified as a "Hot Spot" due to the re-fueling operations that will occur on-site. As such, any water quality/quantity control system that receives runoff from a "Hot Spot" area is designed with a liner system to prevent contaminants from entering groundwater.

   The project is not located within a primary or Federal Sole Source Aquifer.

2.4 Flood Plains

The Flood Hazard Boundary Map for the project area (36111C0780E) dated September 25, 2009, was reviewed (See Exhibit A.5). The Federal Emergency Management Agency (FEMA) mapping indicates that the proposed project site is not located within a 100-year flood zone.

2.5 Wetlands

The project area was reviewed utilizing the online Environmental Resources Mapper provided by the NYSDEC. There are no state or federally regulated wetlands located on the project site.

2.6 Historic and Cultural Resources

Information obtained from the New York State Office of Parks, Recreation and Historic Places (OHRHP) website, revealed that this project site is located in an archeologically sensitive area. As previously stated, the project site has previously undergone significant development.

A “No Impact” letter for the project site, dated March 31, 2021, has been received from OHRHP indicating that the project will not impact any items of historical or cultural significance. A copy of the letter is included as Exhibit A.6.

2.7 Endangered Species

The NYSDEC Environmental Resource Online Mapper was reviewed and it indicated that no known State regulated rare plant, rare animals or significant natural communities prevail on-site.

3.0 STORMWATER EROSION AND SEDIMENT CONTROLS

3.1 Construction Phasing

All erosion and sediment controls measures will be required to be in place prior to any soil disturbances. The following is a summary of the suggested sequence and estimated duration of construction operations. The final placement and extent of proposed erosion and sediment controls are shown on the Construction Drawings.

Construction Activities	Duration
1. Obtain all necessary permits.	2 weeks
2. Install perimeter sediment controls in accordance with NYS DEC Guidelines for Erosion and Sediment Control (silt fence (SF), inlet protection (IP) as needed and Stabilized Construction Entrance (SCE) for construction of road and infrastructure).	4 days
3. Establish staging and storage areas on site for parking area and infrastructure construction and protect from erosion and soil migration.	2 days
4. Clear site of existing trees to limit of disturbance and grub stumps. Remove stumps from site and dispose of in a legal manner off-site. Mulch all areas which will not be disturbed within 14 days.	1 week
5. Strip topsoil from proposed areas, and stockpile. Protect stockpile area from migration with silt fence and temp seeding. Mulch all areas which will not be disturbed within 14 days.	2 days
6. Remove existing structures and utilities.	1 week
7. Rough grade proposed parking areas and building site area. Imported and exported material to be delivered to site through SCE. Contractor to keep all debris off public roadways. Sweep Chapel Hill Road, South Chapel Hill Road and US Highway 9W as necessary during construction.	1 week
8. Construct proposed building, gas canopy, install proposed building utilities and install proposed sanitary force main.	5 weeks
9. Install drainage culverts and stabilize disturbed areas immediately upon completion of grading operation.	2 weeks
10. Install temporary catch basin inlet protection.	2 days
11. Import base material for parking areas and grade to elevations shown on plans.	1 week
12. Install pavement to lines and grades shown on plans.	2 days
13. Fine grade areas outside of paving. Topsoil and permanently seed all disturbed areas.	1 week
14. Stabilize all other disturbed areas. Upon stabilization, remove sediment controls and stabilize any disturbance caused by the removal of controls.	2 weeks
15. Construct Bioretention Filter Beds and Subsurface Detention System only after all up gradient areas have been stabilized.	1 week
16. Remove E&SC measures only when directed by Qualified Inspector.	

3.2 Construction Erosion and Sediment Controls

A site specific Sediment and Erosion Control Plan has been developed for the project to contain and control the migration of water and wind dispersed soil and dust particles. The complete Sediment and Erosion Control Plan is included with the Construction Drawings. All disturbed areas will be maintained in accordance with the SPDES General Permit GP-0-20-001 and the soil erosion and sediment control plan.

The NYSDEC's "New York Standards and Specifications for Erosion and Sediment Control", latest edition addresses protecting all water resources within the project limits and measures to maintain the water quality of receiving bodies. The Contractor shall be held responsible for this issue, to review the Erosion and Sediment Control Plans included in the Contract Documents and, if necessary, modify the Plan for compatibility with the Contractor's intended sequence of construction operations. Any changes to the Erosion and Sediment Control Plans included in the Contract Documents made by the Contractor to facilitate his/her sequence of construction shall be in accordance with the requirements in the "New York Standards and Specifications for Erosion and Sediment Control", latest edition.

3.3 Erosion and Sediment Control Practices

Erosion and sediment control measures will be inspected in accordance with the SPDES General Permit GP-0-20-001 and installed in accordance with "New York Standards and Specifications for Erosion and Sediment Control", latest edition. The Contractor shall inspect all erosion and sediment controls identified in this SWPPP and ensure that they are being maintained in effective operating conditions at all times. A *Qualified Inspector* shall conduct a site inspection at least once every seven (7) calendar days while construction activities are ongoing. Measures identified as deficient, shall be cleaned and/or repaired as necessary. The following measures have been identified for use on the project:

Temporary Surface Stabilization:
Areas within the project limits that may be disturbed more than once during the construction activities will be stabilized using temporary seed and mulch or as directed. Disturbed areas, including stockpiles, remaining exposed for more than fourteen (14) days during construction operations shall be stabilized temporarily.

The contractor shall inspect any areas that have received temporary surface stabilization following each rain event. Any areas that have been found to be devoid of seed and mulch due to runoff or caused by other means, shall have seed and mulch reapplied immediately.

Storm Drain Inlet Protection:
Inlets to drainage structures shall be protected in order to prevent sediments from entering the proposed closed drainage system and migrating off site. The location and type of inlet protection to be provided is shown on the Construction Drawings.

The contractor shall inspect the barrier material after each rain event and make repairs as needed. Sediment shall be removed as necessary. Removed sediment shall be incorporated into the site in a stabilized manner.

Silt Fence:
A silt fence will be constructed along the areas of earthwork. The locations are shown on the Construction Drawings. Additional silt fence may be needed as site conditions warrant. The Contractor and Qualified Inspector are encouraged to identify addition placement opportunities in order to maintain the highest water quality standards possible. The provision of silt fence will prevent/reduce sediment from migrating off the construction site and entering the drainage system.

The contractor shall inspect the silt fence after each rain event and make repairs as needed. Sediment shall be removed

Stabilized Construction Entrance:
The construction entrance shall be fifty (50) feet long by twelve (12) feet wide. The construction entrance captures material and debris before vehicles leave the project site. Refer to the Construction Drawings for placement of the construction entrance.

The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment off the project site. The entrance shall be inspected weekly and if upon inspection it is determined the entrance is no longer functioning as designed, stone will be added to restore the entrance to its original design. Any sediment spilled, dropped, washed or tracked onto public right-of-ways shall be removed immediately and incorporated into the site in a stabilized manner.

Surface Stabilization:
Stabilizing of graded areas will be accomplished by applying topsoil to newly graded areas and using various seed mixes for the establishment of vegetation. Refer to the Construction Drawings for notes and details pertaining to surface stabilization.

Prior to final inspection and the project site being finally accepted, the contractor shall continue to inspect newly graded and seeded areas following each rain event. If prior to final acceptance, any areas are found to be in need additional topsoil or seed due to runoff or caused by other means, additionally topsoil and seed shall be reapplied immediately.

Dust Control:
Water shall be applied at a rate to minimize airborne particles from leaving the construction site as directed by the Qualified Inspector. Water shall be applied at the determined rate as necessary when site conditions warrant.

Concrete Washout Areas:
Concrete trucks shall only be allowed to washout or discharge surplus concrete in specifically designated washout areas that have been prepared to prevent contact between the concrete wash and stormwater. Waste generated from concrete water wash shall not be allowed to flow into **any** location other than the designated Concrete Washout Area. Proper signage designating the "Concrete Washout Area" shall be placed near the facility.

Hardened residue shall be disposed of in the same manner as other non-hazardous construction waste. Maintenance of the wash area is to include removal of hardened concrete. The facility shall have sufficient volume to contain all the concrete waste resulting from washout and a minimum freeboard of 12 inches. The facility shall not be filled beyond 95% capacity and shall be cleaned out once 75% full unless a new facility is constructed. The Contractor shall be responsible for ensuring these procedures are followed.

Catch Basin Sediment Traps:
Each individual catch basin receiving runoff from disturbed areas of the site shall be installed with a corresponding sediment trap until such time as the disturbed area contributing to an individual catch basin has been stabilized. The maximum contributary area is three (3) acres and each individual sediment trap shall be sized with a volume storage capacity of at least 3,600 ft^3 per contributary acre.

Final Inspection:
Prior to the project being finally accepted, it shall be inspected for any evidence of erosion or slope failure. If any such condition becomes apparent upon final inspection, temporary soil erosion and sediment controls shall be installed immediately as directed by the Qualified Inspector. The situation shall be corrected according to a schedule agreed to by the Qualified Inspector and the Contractor.

3.4 Winter Operations

It is not anticipated that soil disturbing operations will extend beyond the initial construction season. If the project enters a state of temporary wintertime shutdown, the owner/operator has the option to modify the SWPPP inspection schedule. Prior to modifying the inspection schedule, all disturbed areas must first have temporary stabilization measures in place in accordance with the Erosion and Sediment Control Plan and to the satisfaction of the Qualified Inspector.

During periods of winter shutdown, SWPPP inspections shall occur a minimum of once every thirty (30) calendar days. Once soil disturbing activities have resumed, the inspection schedule shall return to once every seven (7) calendar days.

3.5 Materials and Substance Management

The materials and substances listed below are expected to be on site during construction.

1. If construction vehicles are to be re-fueled on site, petroleum products will be stored in above ground storage tanks. The tanks will either be steel with an enclosure capable of holding 110% of the storage tank volume or Convault-type, concrete encased type with integral secondary storage. Hydraulic oil and other oils will be stored in their original containers. Concrete and asphalt will be stored in the original delivery trucks.
2. Fertilizer may be stored on site in its original container for a short period of time prior to seeding. Original containers will be safely piled on pallets to protect from moisture.
3. Paints or other similar materials will be stored in their original containers and all empty containers will be disposed of in accordance with label directions.
4. Portable sanitary facilities, which contain chemical disinfectants (deodorants), will be located on site, with the disinfectants held in the tank of the toilet.

All waste materials generated during construction will be disposed of in a suitable landfill, transfer station or Construction & Demolition landfill. Any hazardous waste generated during demolition or construction operations will be disposed of by a licensed hazardous waste carrier at a suitable disposal facility. If unexpected hazardous waste is discovered during construction, the related work in that area will cease until the issue is resolved. Portable temporary sanitary facilities will be serviced regularly.

3.6 Best Management Practices

During construction, the following procedures and practices will be followed on site to reduce the risk of spill or other accidental exposure of materials and substances to stormwater runoff:

1. Equipment cleaning, maintenance and repair will be conducted in designated areas protected by berms.
2. Sediment and erosion controls will be inspected weekly for sediment build-up and failure. The controls will be cleaned at the discretion of the Qualified Inspector.
3. Cleared brush, debris and soils will be stockpiled up slope from and protected by erosion and sediment controls.
4. Materials brought on site shall be in the minimum quantities required.
5. All materials stored on site will be stored in a neat, orderly manner in their appropriate containers, and if possible, under a roof or other enclosure.
6. Products will be kept in original containers with the original manufacturer's labels and safety data sheets will be retained.
7. Substances will not be mixed with one another unless recommended by the manufacturer.
8. Whenever possible, the entire product will be used up before container disposal. Recycle empty containers as applicable.
9. Manufacturer recommendations for proper use and disposal will be followed.
10. All above grade storage tanks are to be protected from vehicle damage by barriers.

3.7 Spill Prevention Practices

The following practices will be followed for spill prevention and cleanup. The site contractor responsible for the day-to-day site operations will be the spill prevention and cleanup coordinator. He/she will designate at least one other site personnel who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel will be posted in the material storage area and in the on-site construction office or trailer.

1. Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and

cleanup supplies. Any spill in excess or suspected to be in excess of two (2) gallons will be reported to the NYSDEC Regional Response Unit. Notification to the NYSDEC (1-800-457-7362) must be completed within **two hours** of the discovery of the spill. **This is a legal requirement that must be complied with**.

2. Materials and equipment necessary for spill cleanup will be kept in the material storage area on site. Equipment and materials will include, by not be limited to, absorbent pads, brooms, dust pans, mops, rags, gloves, goggles, activated clay, sand, sawdust and plastic and metal trash containers specifically for this purpose.
3. All spills will be cleaned up immediately after discovery.
4. The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with spilled substances.
5. Spills of toxic or hazardous materials will be reported to the appropriate State of local government agency, regardless of size.
6. Concrete/Asphalt trucks will not be allowed to wash out or discharge surplus concrete/asphalt or drum water on site, except in areas specified.

4.0 PRE AND POST DEVELOPMENT GRAPHICAL PEAK DISCHARGE

This section describes the stormwater analysis internal to the site, including the runoff generated. Analysis of the greater upstream/downstream watershed to the receiving waters for this project site is not included in the computations for this report. The non-delineated Pre and Post Development upstream/downstream watersheds are considered base flow and the proposed site improvements will not have an effect on the greater stormwater runoff. Therefore, the Pre and Pose Development upstream/downstream watershed will have the exact same stormwater runoff characteristics.

4.1 Pre-Development Area Descriptions and Discharge Points

The pre development stormwater systems were analyzed to estimate runoff generated from the site. To adequately analyze and compare the post development conditions against the pre development conditions, the watershed was analyzed as two (2) subcatchment areas. (See *Pre Development Subcatchments* in Exhibit E.1)

Pre-Development Subcatchment Area #1 (DA1), discharges runoff to the existing closed drainage system along the eastern side of US Highway 9W. Runoff flows in a generally easterly direction either as surface runoff until it reaches the highway, Discharge Point #1 (DP1). This subcatchment area totals approximately 0.20 acres and is comprised of a mixture of moderately vegetated grasses and various areas of impervious cover associated with the existing on-site uses. This subcatchment has a pre development CN of 92.

Pre-Development Subcatchment Area #2 (DA2), discharges runoff to the existing open drainage system located along the west side of South Chapel Hill Road, Discharge Point #1 (DP2). Runoff flows in a generally southerly direction either as surface runoff until it reaches the existing drainage swale along the roadway. This subcatchment area totals approximately 0.92 acres and is comprised of a mixture of moderately vegetated grasses and wooded areas, as well as, various areas of impervious cover associated with the existing on-site uses. This subcatchment has a pre development CN of 95.

4.2 Post-Development Area Descriptions and Discharge Points

The following section describes the post development stormwater management system. The post development watershed has been analyzed and subdivided in order to estimate runoff from the watershed and the effect of the proposed development. To adequately analyze and compare the post development conditions with the pre development conditions, the watershed was divided into four (4) subcatchment areas. (See *Post Development Subcatchments* in Exhibit E.2)

Post Development Subcatchment Area #1 (DA1) consists of the remaining portions of Pre-Development DA1 that will continue to discharge to DP1. As in the predeveloped condition, runoff will continue to flow in a generally easterly direction until it reaches the highway. This subcatchment area totals approximately 0.04 acres and will be comprised entirely of densely vegetated (sodded) grasses. This subcatchment has a post development CN of 80.

Post Development Subcatchment Areas #2 (DA2) consist of the developed portions of the project site. It includes the proposed parking areas, gasoline canopy, building, landscaping features and previous impervious cover that will be transformed to densely vegetated (sodded) grasses. Runoff is collected from these areas of the site and is routed, via the proposed closed drainage system to the proposed Bioretention Filter Bed (F-5) located on-site. Collected runoff flows to a proposed flow diversion structure (Manhole #3) and the Water Quality Volume (WQv) is routed to the bioretention filter for water quality treatment. The WQv is treated and discharged directly to Discharge Point #2 (DP2). The bioretention filter receives runoff from "Hot Spot" areas on-site and therefore is designed with an impermeable liner. Runoff volumes in excess of the WQv are diverted away from the bioretention filter to the proposed subsurface detention system for attenuation. Controlled discharges are ultimately routed to DP2. This subcatchment area total approximately 0.92 acres and has a post development CN of 95.

Post Development Subcatchment Area #3 (DA3) consists of area that flows directly into the proposed Bioretention Filter Bed (F-5). Runoff flows in a generally southerly direction as sheet flow until it reaches the proposed bioretention filter and ultimately combine with additional discharges at DP2. This subcatchment area totals approximately 0.20 acres and is comprised entirely of densely vegetated lawn located to the rear of the proposed building. This subcatchment has a post development CN of 80.

Post Development Area #4 (DA4) consists entirely of runoff collected from densely vegetated lawn areas adjacent to South Chapel Hill Road. Runoff flows in a generally southerly direction until it reaches the existing drainage swale along the roadway where it combines with additional discharges at DP2. This subcatchment is approximately 0.17 acres and has a post development CN of 81.

4.3 Soil Restoration

Per Section 5.1.6 of the NYSDEC SWDM, soil restoration techniques shall be applied to this project. The specifications listed in this section, particularly in areas of cuts/fills and existing impervious areas that will be converted to pervious areas, shall be performed across the project site.

As the project is considered a Redevelopment Activity, Soil Restoration is required in areas where existing impervious areas will be converted to pervious surfaces. The following techniques shall be applied:

- Following removal of the impervious cover, three (3) inches of compost shall be applied over the subsoil surface. Compost shall be aged, from plant derived materials, free of viable weed seeds, have no visible free water or dust produced when handling, pass through a ½" screen and have a suitable pH for plant growth.
- Compost shall be tilled into the subsoil to a depth of at least twelve (12) inches using a cat-mounted ripper, tractor-mounted disk or tiller.
- Any uplifted stone/rock material of four (4) inches or larger in size shall be removed.
- Six (6) inches of topsoil shall be applied and the areas shall be vegetated in accordance with the approved Plan.

The existing soils on-site fall into HSG D and as such, additional soil restoration requirements include aeration of the existing soil and application of six (6) inches of topsoil in areas where only existing topsoil has been stripped. Also, any areas of cuts or fills, outside of converted existing impervious cover, shall require full soil restoration measures.

4.4 Weighted Curve Number (CN)

Within each subcatchment, cover type, hydrologic conditions and the hydrologic soil group are analyzed to determine a runoff curve number for sub-areas of each subcatchment. A weighted runoff curve number (CN), or composite, is then determined for each subcatchment. Calculations supporting the pre development and post development scenarios are presented in Exhibit A.2 and A.3.

4.5 Peak Discharges for Pre and Post Development Areas

Using the TR-55 graphical method and HydroCAD design software, the peak discharges for both the pre and post development subcatchments were determined. The results generated by the software for each subcatchment are shown in the following tables.

Table 1
Pre-Development Peak Discharge Rates

Catchment	Discharge Point	1-Yr Peak Flow (cfs)	10-Yr Peak Flow (cfs)	100-Yr Peak Flow (cfs)	CN	Area (acres)	Tc (min)
DA1	DP1	0.43	0.86	1.57	93	0.20	6.0
DA2	DP2	1.09	2.51	4.95	87	1.14	28.8

Table 2
Post-Development Peak Discharge Rates (Unattenuated)

Catchment	Discharge Point	1-Yr Peak Flow (cfs)	10-Yr Peak Flow (cfs)	100-Yr Peak Flow (cfs)	CN	Area (acres)	Tc (min)
DA1	DP1	0.05	0.23	0.50	80	0.04	6.0
DA2	DP2	1.77	1.79	2.99	95	0.92	12.2
DA3	DP2	0.21	3.41	5.64	80	0.20	8.7
DA4	DP2	0.18	0.36	0.88	81	0.17	8.6

* TR-55 requires a minimum Tc of 6.0 minutes.

4.6 Pre-Development versus Post Development Peak Discharges at Discharge Points

Post Development Areas DA1 discharges from the project site at DP1 and the resulting post development discharge rate at DP1 is less than the pre development discharge rate. As such, stormwater management facilities will not be required for this post development subcatchment area.

Post Development Areas DA2, DA3 and DA4 combine to discharge stormwater runoff from the site at DP2. As a result of the proposed development, DP2 will have a post development discharge rate that exceeds the pre development discharge rate. Therefore, stormwater management facilities to attenuate the discharge rate will be required. Attenuation of stormwater discharge rates will be accomplished within the proposed Subsurface Stormwater Detention System. Following attenuation of post development stormwater runoff, discharges at DP2 will be equal to or less than the existing discharge rates.

4.7 Graphical Peak Discharge Usage

The graphical peak discharge method was used to determine the following:

1) Preliminary sizing of the stormwater management facilities and discharge rates;
2) Preliminary calculations of WQv and RRv values;
3) Sizing of the proposed closed drainage system;

5.0 UNIFORM SIZING CRITERIA

The United States Environmental Protection Agency (USEPA) and the NYSDEC have placed greater emphasis on ensuring that water quality standards are maintained both onsite as well as downstream of development. Maintaining water quality involves the removal or reduction of pollutants including suspended solids, phosphates, nitrates and other chemicals generated by development. The new water quality standards expand upon the peak flow attenuation concept to include parameters designed to protect downstream channels from stream bank erosion and flooding.

The NYSDEC assumes that, by default, the proposed stormwater management practices meet water quality objectives if the proposed practices are designed in accordance with the List of Acceptable Stormwater Management Practices set forth in the NYSDEC SWDM.

Additionally, updates to the NYSDEC SWDM have mandated additional treatment practices in the form of "green" infrastructure used to further reduce the volume of runoff produced.

5.1 Water Quality Volume (WQv)

The water quality volume is designed to improve the water quality of the discharged stormwater runoff and to capture and treat 90% of the average annual stormwater runoff volume. The WQv is defined as:

$$WQv = [(P)(Rv)(A)]/12$$

Where:
WQv = Water Quality Volume (acre-feet)
P = 90% Rainfall Event Number (inches)
Rv = 0.05+0.009(I); Minimum Rv = 0.20
I = Impervious Cover (percent)
A = Site Area (acres)

The WQv was determined to be 0.055 acre-feet (2,417 ft^3) for Post Development Area DA2 which is directed to the proposed Bioretention Filter Bed (F-5) via Diversion Structure Manhole #3 (see Construction Drawings). The WQv was determined based upon the existing and proposed impervious areas (parking lots, sidewalks, etc.). See Exhibit B.1 for calculations.

5.2 Runoff Reduction Volume (RRv)

Implementation of "green" infrastructure practices aid in the reduction of runoff by proactively reducing runoff volume, peak flow and flow duration. It also promotes infiltration and evapotranspiration to improve groundwater recharge and relieve pollutants for the "end of pipe" stormwater treatment practice. The "green" infrastructure techniques listed below are pre-approved methods that the NYSDEC has deemed acceptable to be used towards planning of development projects and runoff reduction. Some standard SMPs may also be used instead of the options below.

Table 3 **Runoff Reduction Techniques**		
Group	Practice	Project Implementation/Justification
Preservation of Natural Resources	Preservation of Undisturbed Areas	To the extent practical, undisturbed areas have been preserved by adhering to the minimum site development requirements of the Stewart's Shops Corporation, however almost the entire site requires disturbances.
	Preservation of Buffers	None presently exist on the site.
	Reduction of Clearing and Grading	To the extent practical, clearing and grading has been minimized to meet the minimum site development requirements of the Stewart's Shops Corporation.
	Locating Development in Less Sensitive Areas	None presently exist on the site.
	Open Space Design	This site is not conducive to open space design.
	Soil Restoration	Soil restoration measures shall be provided for this project.
Reduction of Impervious Cover	Roadway Reduction	None presently exist on the site.
	Sidewalk Reduction	Minimum practical to meet ADA and Town standards.
	Driveway Reduction	None presently exist on the site.
	Cul-de-sac Reduction	None presently exist on the site.
	Building Footprint Reduction	Per the minimum sizing requirements of the Stewart's Shops Corporation, a second story for a convenient store is not practical for this location.
	Parking Reduction	Parking area and drive aisles are designed to Town standards.
Runoff Reduction Techniques	Conservation of Natural Areas	None presently exist on site.
	Sheet flow to Riparian buffers or filter strips	None presently exist on site.
	Vegetated Open Swale	Not proposed for this location.
	Tree Planting/Tree Box	Not proposed for this location.
	Disconnection of Rooftop Runoff	Not proposed for this location.
	Stream Daylighting for Redevelopment Projects	None presently exist on site.
	Rain Garden	Not allowed on "Hot Spot" sites.
	Green Roof	Not feasible for this location as the structure will have sloped roof.
	Stormwater Planter	Practice is not being proposed as it would make access areas to the building non ADA compliant.
Runoff Reduction Techniques (continued)	Rain Tank/Cistern	Proposed landscaped areas will not require the volume of water needed to be stored in cisterns.
	Porous Pavement	Not allowed on "Hot Spot" sites.

The RRv is the minimum volume of runoff that is to be removed from the runoff volume that is sent to the “end of pipe” treatment practice by utilizing infiltration, evaporation, recycling, recharging, etc. The intent of implementing the “green” infrastructure techniques is to redistribute the WQv prior to runoff being collected by the proposed stormwater drainage system. As it is often difficult to remove the whole WQv, the minimum volume required is set as the RRv. The remaining volume that is not treated (WQv – RRv) will then be treated at the “end of pipe” treatment system. The minimum RRv is defined as:

$$RRv_{(min)} = [(P)(Rv^*)(Ai)]/12$$

Where:
$RRv_{(min)}$ = Minimum runoff reduction volume (acre-feet)
Rv* = 0.05+0.009(I); where I is 100% impervious cover
Ai = (S)(Aic)
Aic = Total area of new impervious cover
S = Hydrologic soil group reduction factor

HSG A; S = 0.55
HSG B; S = 0.40
HSG C; S = 0.30
HSG D; S = 0.20

Based upon the calculations found in Exhibits B.1, the following was determined:

Minimum RRv for Post Development Site = 0.008 ac-ft (361 ft^3)

As a portion of the project site is considered a “Hot Spot” due to the refueling activities, limited RRv practices can be used on the site.

Runoff generated within Post Development Site will be directed into proposed Bioretention Filter Bed #1 (F-5) that has runoff reduction capabilities. In Hydrologic Soil Group D soils, the filter provides a maximum runoff reduction capacity of 40% of the WQv. Based on the sizing of the proposed bioretention filter in D soils, 967 ft^3 is able to be reduced, thus meeting the post development minimum RRv requirements as defined by the NYSDEC SWDM. Calculations supporting this can be found in Exhibit B.3.

5.3 Channel Protection Volume (CPv)

The channel protection storage volume requirements are designed to protect downstream channels from erosion. This goal is accomplished by providing 24-hour extended detention of the one-year, 24-hour rainfall storm event. This volume is held over a 24-hour period.

Per Section 9.2.1.A.II of the SWDM, the CPv requirement for redevelopment activities is not required provided the hydraulic analysis shows that the post development one-year, 24-hour discharge rate is less than or equal to the pre development rate.

As this is a redevelopment activity and the off-site discharge rates for all design storms will be reduced, 24-hour detention of the one-year storm is not required.

5.4 Overbank Flood Protection Volume

The overbank flood protection volume requirements are incorporated to prevent an increase in the frequency of flooding and magnitude of out-of-bank flooding downstream of the stormwater management practice. Overbank control requires storage to attenuate the post development 10-year, 24-hour peak discharge rate to the pre development rates.

5.5 Extreme Flood Protection Volume

The intent of the extreme flood protection volume is utilized to prevent the increased risk of flood damage from large storm events, maintain the boundaries of the pre development 100-year flood plain and protect the physical integrity of the stormwater management practices. Extreme flood protection control requires storage to attenuate the 100-year, 24-hour peak discharge rate to the pre development rates.

5.6 Safe Passage of the 100-Year Design Storm

The physical integrity of the stormwater management practice must be maintained. The outlet structure(s) must be designed to accommodate the 100-year design storm. Used in conjunction with the stage-storage relationship, the safe passage of the 100-year design storm reveals the maximum water surface elevation anticipated for the management practice.

6.0 PROPOSED WATER QUALITY AND QUANTITY CONTROLS

6.1 Proposed Stormwater Management Strategy

Stormwater is to be collected in catch basins and routed via a closed drainage system to a proposed subsurface stormwater detention system for attenuation.

The proposed subsurface stormwater storage system is an ADS Storm Tech® SC-740 Chamber System. Details of the Storm Tech® chambers can be found in the Construction Drawings. The chambers are placed on top of a 6" stone foundation layer and surrounded with 12" of stone on the sides. The chambers are then covered with a minimum of 6" of additional stone. The stone is then surrounded with an impermeable liner to protect groundwater from potential "hotspot" contamination. A 6" perforated HDPE pipe is embedded in the foundation stone to completely drain the system and the outlet structure has been designed with a low flow orifice and additional orifices for extended detention and safe passage of the various design storms. To the extent practical, "green" infrastructure practices, as described in previous sections, shall be implemented for improved water quality on the project site.

The stormwater analysis was performed using HydroCAD. HydroCAD is a computer aided design program, developed by HydroCAD Software Solutions, used for the analysis of hydrologic and hydraulic properties of a watershed. The software uses the NRCS hydrologic methods to compute the 24-hour precipitation event. The runoff curve numbers were computed using TR-55 tabular methodology based on site conditions. The 24-hour rainfall amounts for Ulster County are documented in Exhibit A.1.

The hydrograph model is set to simulate pre development areas versus post development areas. Exhibits C.1 and C.2 show a schematics of the model elements. It is the goal of the hydraulic model to demonstrate the water surface elevation within the Storm Tech® system and the net increase in peak discharge rates that occur between the pre development and post development conditions for the 1, 10 and 100-year storm events.

6.2 Water Quality Treatment for Post Development Areas DA2

Post development areas DA2 has been designed in accordance with the NYSDEC water quality requirements. Per Table 4.3 of the NYSDEC SWDM, the proposed site is classified as a "Hot Spot" due to the re-fueling activities that will occur on the site. As such, constraints are placed on stormwater management facilities with regard to infiltration and recharge of stormwater on the site. Stormwater runoff generated within DA2 will contain runoff from the area of the refueling pumps and therefore cannot be infiltrated on-site. Water quality for this subcatchment will be achieved within the proposed Bioretention Filter Bed (F-5). The filter media will be surrounded with a 30 mil impermeable pond liner to prevent contamination of groundwater with "Hot Spot" runoff. All seams and penetrations in the liner will be field welded in order to make the system water tight The bioretention filter will be constructed in accordance with Appendix C of the NYSDEC SWDM.

Using the SWDM, the WQv for DA2 was determined to be 2,417 ft^3. This calculation can be found in Exhibit B.1. Appendix B.2 of the SWDM provides calculations for determining the WQv Peak Flow

Rate. Utilizing this equation, the peak discharge rate for the WQv in DA2 has been determined to be 0.64 cfs. This equation can be found in Exhibit B.2. The proposed pretreatment device for the bioretention filter will be a Hydro International First Defense 3' ID hydrodynamic separator, Model FD-3HC. According to literature provided by the manufacturer, a Model FD-3HC hydrodynamic separator is capable of providing pretreatment of stormwater discharges up to 0.84 cfs and can bypass higher discharge rates up to 15.00 cfs. Based on the results of the post development HydroCAD model, the maximum discharge rate expected to be directed to the hydrodynamic separator will be 1.05 cfs for the 100-year design storm. A copy of the manufacturer's performance literature is provided in Exhibit B.4.

6.3 Water Quantity Control for Post Development Areas DA2

Under the proposed condition, stormwater runoff in excess of the WQv from post development area DA2 will require attenuation due to post development increases in the discharge rate at DP2. To manage the increase in stormwater runoff associated with the site improvements in the post developed conditions, an ADS Storm Tech® SC-740 Subsurface Stormwater Detention System will be utilized.

The Storm Tech® System designed for area these subcatchments is comprised of 56 individual SC-740 HDPE arches. Each arch is 7.56' (L) x 4.25' (W) x 2.50' (H). The arch chambers are aligned in rows with a 24" HDPE manifold connecting the rows on the inlet end and outlet ends. Each row receives an end cap on each end. The arches are placed on a 6" stone foundation layer and void stone is placed in between the rows and along the perimeter of the system. As seen in the Construction Drawings, not every row needs to be connected via the manifolds as stormwater is also free to move from row through the void stone placed around the arches. A 6" layer of void stone is then placed above the arches. A void ratio of 40% was used in modeling the stone. As previously mentioned, a liner will be installed encapsulating the void stone to prevent infiltration of stormwater runoff due to DA2 receiving "hotspot" runoff from the area of the refueling pumps. All seams and penetrations in the liner will be field welded in order to make the system watertight.

Details pertaining to the design and installation of the proposed StormTech® SC-740 system can be found in the Construction Drawings.

HydroCAD software was used to develop a hydraulic model of the proposed Storm Tech® system. The software was used to calculate the effectiveness of the proposed outlet structure with orifice restrictions in attenuating the flows from area DA2/2A and DA3. The model demonstrates that the proposed Storm Tech® system will store and safely pass up to the 100-year storm event. The hydraulic modeling was simulated for the 1, 10 and 100-year storm events. See Exhibit C.1 and C.3 for model information and design.

Table 4
Pre versus Post Discharge Rates (Attenuated)

Discharge Point (DP)	1-Year Flow (cfs)		10-Year Flow (cfs)		100-Year Flow (cfs)	
	Pre	Post	Pre	Post	Pre	Post
DP1	0.43	0.05	0.86	0.13	1.57	0.29
DP2	1.09	1.07	2.51	2.49	4.95	4.80

To obtain the peak outflow from the proposed Storm Tech® System for DA2 labeled “Storm Tech SC740” in the software model, multiple orifices were set and designed to safely discharge all anticipated storm events to DP2 (See Construction Drawings).

In order to obtain the results in Table 4, inflow versus outflow hydrographs and routing tables were calculated for the proposed Storm Tech® System. The results are as follows:

Table 6 Storm Tech® SC-740 System Summary			
	1-Year (cfs)	**10-Year (cfs)**	**100-Year (cfs)**
DA2 Peak Inflow	1.09	2.55	5.02
Peak Outflow from System	0.15	1.09	2.71
Max. Water Surface Elevation (WSEL)	357.04	357.77	359.62

The 100-year WSEL for area DA2 has been determined to be 359.62. The lowest top of frame within the closed drainage system in DA2 is elevation 360.99 (CB#2). This allows for approximately 1.37 feet of additional storage within the closed drainage system in DA2 before catch basin surcharges begin to occur.

It should be noted that the additional storage volume within the closed drainage system itself was not considered when analyzing available storage volumes in HydroCAD.

7.0 PROPOSED CONVEYANCE SYSTEM

The proposed closed drainage system was designed and checked to pass the 10-year storm event. Calculations for anticipated flow through each pipe run can be found in Exhibit D.1. The anticipated flows through each were based on the percentage of each area of the project site flowing to each proposed run of pipe.

8.0 MAINTENANCE REQUIREMENTS FOR PERMANENT PRACTICES

Stewart's Shops, as the owner and operator of the proposed convenient store location, will be responsible for the long term maintenance and operation of each permanent practice in place. Inspection of the proposed practices shall be conducted by a professional engineer. Additionally, the municipality has the authority to enter the site and perform their own inspections. The municipal inspection schedule shall be determined at a later date. Example inspection checklists can be found in Exhibit H.

8.1 Closed Drainage System

At a minimum, the private closed drainage system located on site shall be inspected annually. During the inspection, the depth of sediment and condition of the pipe, drainage structures and hydrodynamic separator should be recorded and maintained on file. Sediment shall be removed when six (6) inches of sediment has accumulated within the system. It is anticipated that this will occur approximately every ten (10) years. Removal of sediment will require the use of high pressure water to clean the system. Water and accumulated sediment can be removed from the system using a Vacuum Truck at the next downstream drainage structure. If it is noted that any drainage pipes or catch basins are in need of repair or replacement, repairs will be scheduled at that time.

8.2 Bioretention Filter

At a minimum, the bioretention filter will be inspected annually. An inspection shall also be required if at any time, the amount of precipitation in a twenty-four (24) hour period exceeds three (3) inches. During the inspection, the depth of sediment, condition of the outlets and the height of vegetation should be recorded and maintained on file. Silt/sediment shall be removed from the filter bed when accumulation exceeds one (1) inch. When the filtering capacity of the filter diminishes substantially (i.e. when water ponds on the surface of the filter bed for longer than 48 hours), the top few inches of discolored material shall be removed and replaced with fresh material. Trash and debris shall be removed as necessary. The maximum allowable height of vegetation within the bioretention filter is eighteen (18) inches. Trimming of vegetation shall be required when the maximum height is reached. Any areas devoid of mulch shall be replaced on an annual basis and any dead or diseased plant material shall be replaced as necessary.

8.3 Storm Tech® Subsurface Stormwater Detention System

At a minimum, Storm Tech recommends annual inspections. Initially, the system should be inspected every six (6) months for the first year of operation. For subsequent years, the inspection should be adjusted based upon the previous observation of sediment deposition.

The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes. If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds three (3) inches throughout the length of a row, clean-out should be performed.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high-pressure water nozzle to propel itself down the row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming.

It is imperative that accumulated sediment within the system be tested per NYSDEC requirements to determine levels of toxicity **prior** to removal and disposal.

8.4 Hydro International First Defense Model FD-3HC Hydrodynamic Separator

The First Defense® protects the environment by removing a wide range of pollutants from stormwater runoff. Periodic removal of these captured pollutants is essential to the continuous, long-term functioning of the First Defense®. The First Defense® will capture and retain sediment and oil until the sediment and oil storage volumes are full to capacity. When sediment and oil storage capacities are reached, the First Defense® will no longer be able to store removed sediment and oil. Maximum pollutant storage capacities are provided in the table below.

The First Defense® allows for easy and safe inspection, monitoring and clean-out procedures. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables. Access ports are located in the top of the manhole.

Maintenance events may include Inspection, Oil & Floatables Removal, and Sediment Removal. Maintenance events do not require entry into the First Defense®, nor do they require the internal components of the First Defense® to be removed. In the case of inspection and floatables removal, a vactor truck is not required. However, a vactor truck is required if the maintenance event is to include oil removal and/or sediment removal.

The frequency of clean out is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. A simple probe such as a Sludge-Judge® can be used to determine the level of accumulated solids stored in the sump. This information can be recorded in the maintenance log to establish a routine maintenance schedule. Sediment removal shall occur when the sediment storage volume in the table below has been reached. Based upon the internal dimensions of the FD-3HC manhole, an accumulated sediment volume of 0.4 cy will be reached when sediment depths approach 1.5 feet.

First Defense® High Capacity Model Number	Diameter	Typical TSS Treatment Flow Rates NJDEP Certified	Peak Online Flow Rate	Maximum Pipe Diameter[1]	Oil Storage Capacity	Typical Sediment Storage Capacity[2]	Minimum Distance from Outlet Invert to Top of Rim[3]	Chamber Depth
	(ft / m)	(cfs / L/s)	(cfs / L/s)	(in / mm)	(gal / L)	(yd^3 / m^3)	(ft / m)	(ft / m)
FD-3HC	3 / 0.9	0.85 / 24.0	15 / 424	18 / 457	125 / 473	0.4 / 0.3	2.0 - 3.5 / 0.6 - 1.0	3.75 / 1.14
FD-4HC	4 / 1.2	1.50 / 42.4	18 / 510	24 / 600	191 / 723	0.7 / 0.5	2.3 - 3.9 / 0.7 - 1.2	5.00 / 1.52
FD-5HC	5 / 1.5	2.35 / 66.2	20 / 566	24 / 609	300 / 1135	1.1 / .84	2.5 - 4.5 / 0.7 - 1.3	5.25 / 1.60
FD-6HC	6 / 1.8	3.38 / 95.7	32 / 906	30 / 750	496 / 1878	1.6 / 1.2	3.0 - 5.1 / 0.9 - 1.6	6.25 / 1.90
FD-7HC	7 / 2.1	4.60 / 130.2	40 / 1133	42 / 1067	750 / 2839	2.1 / 1.9	3.0 - 5.5 / 0.9 - 1.7	7.25 / 2.20
FD-8HC	8 / 2.4	6.00 / 169.9	50 / 1,415	48 / 1219	1120 / 4239	2.8 / 2.1	3.0 - 6.0 / 0.9 -1.8	8.00 / 2.43

Should an oil or fuel spill occur, it should be immediately cleaned out. Motor oil and other hydrocarbons that occur on a more routine basis should be removed when an appreciable layer has been captured. The preferred method of removing these pollutants is the use of absorbent pads, which solidify the oil. These are usually easier to remove from the unit and less expensive to dispose of than the oil/water emulsion created by vacuuming the oily layer. Floating trash can be netted out to separate it from other pollutants. Disposal of all materials from the unit should be done so at an appropriate disposal facility.

9.0 CONCLUSION

The design intent of providing the required pretreatment/treatment of the WQv is achieved by the hydrodynamic separator and bioretention filter bed proposed for this project. Through these mitigative measures, stormwater quality impacts from the proposed finished project will be minimized.

Based on hydrological modeling of the stormwater management system and professional analysis of site conditions, the proposed site improvements will function to provide stormwater management for the proposed project as required by applicable state and local regulations. This system will not adversely affect adjacent or downstream structures, groundwater or properties beyond what is already experienced at this location.

10.0 EXHIBITS

<u>Exhibit A – Project Site Information</u>

.1 24-hour Rainfall Intensities for Ulster County

.2 Pre Development CN

.3 Post Development CN

.4 NRCS Soil Information

.5 FEMA Floodplain Mapping

.6 OPRHP “No Impact” Letter

Appendix 1. County rainfall database (county.NY)

	24 Hour Storm Frequency						
County Name	**1**	**2**	**5**	**10**	**25**	**50**	**100**
Albany N NRCC-B	2.20	2.54	3.11	3.63	4.46	5.22	6.11
Albany S NRCC-B	2.25	2.67	3.31	3.88	4.81	5.67	6.68
Albany S NRCC-C	2.25	2.67	3.31	3.88	4.81	5.67	6.68
Allegany N NRCC-A	1.94	2.26	2.78	3.25	4.00	4.68	5.48
Allegany N NRCC-B	1.94	2.26	2.78	3.25	4.00	4.68	5.48
Allegany S NRCC-A	1.97	2.33	2.87	3.35	4.13	4.84	5.66
Bronx NRCC-C	2.84	3.42	4.28	5.08	6.36	7.54	8.95
Brooklyn NRCC-C	2.84	3.40	4.28	5.09	6.42	7.65	9.12
Broome NRCC-A	2.08	2.40	2.98	3.51	4.36	5.14	6.07
Broome NRCC-B	2.08	2.40	2.98	3.51	4.36	5.14	6.07
Cattaraugus N NRCC-A	1.94	2.22	2.73	3.19	3.91	4.57	5.34
Cattaraugus N NRCC-B	1.94	2.22	2.73	3.19	3.91	4.57	5.34
Cattaraugus S NRCC-A	1.99	2.36	2.91	3.41	4.20	4.92	5.77
Cattaraugus S NRCC-B	1.99	2.36	2.91	3.41	4.20	4.92	5.77
Cayuga N NRCC-A	1.94	2.28	2.80	3.26	4.01	4.68	5.47
Cayuga N NRCC-B	1.94	2.28	2.80	3.26	4.01	4.68	5.47
Cayuga S NRCC-A	1.98	2.33	2.87	3.35	4.13	4.84	5.66
Cayuga S NRCC-B	1.98	2.33	2.87	3.35	4.13	4.84	5.66
Chautauqua N NRCC-A	1.87	2.28	2.82	3.31	4.10	4.82	5.66
Chautauqua N NRCC-B	1.87	2.28	2.82	3.31	4.10	4.82	5.66
Chautauqua S NRCC-A	2.02	2.38	2.97	3.50	4.36	5.15	6.09
Chautauqua S NRCC-B	2.02	2.38	2.97	3.50	4.36	5.15	6.09
Chemung NRCC-A	1.98	2.35	2.90	3.41	4.22	4.96	5.83
Chemung NRCC-B	1.98	2.35	2.90	3.41	4.22	4.96	5.83
Chenango NRCC-A	2.05	2.41	2.95	3.45	4.24	4.96	5.79
Chenango NRCC-B	2.05	2.41	2.95	3.45	4.24	4.96	5.79
Clinton NRCC-A	1.85	2.13	2.62	3.06	3.75	4.39	5.13
Clinton NRCC-B	1.85	2.13	2.62	3.06	3.75	4.39	5.13
Columbia N NRCC-B	2.37	2.80	3.48	4.12	5.13	6.06	7.17
Columbia N NRCC-C	2.37	2.80	3.48	4.12	5.13	6.06	7.17
Columbia S NRCC C	2.48	2.95	3.67	4.33	5.40	6.39	7.57
Columbia S NRCC D	2.48	2.95	3.67	4.33	5.40	6.39	7.57
Cortland NRCC-A	1.97	2.35	2.87	3.34	4.09	4.76	5.55
Cortland NRCC-B	1.97	2.35	2.87	3.34	4.09	4.76	5.55
Delaware NW NRCC-A	2.10	2.51	3.08	3.61	4.45	5.21	6.10
Delaware NW NRCC-B	2.10	2.51	3.08	3.61	4.45	5.21	6.10
Delaware SE NRCC-B	2.23	2.66	3.28	3.84	4.73	5.55	6.51
Delaware SE NRCC-C	2.23	2.66	3.28	3.84	4.73	5.55	6.51

Dutchess N NRCC-C	2.58	3.11	3.90	4.63	5.81	6.91	8.23
Dutchess N NRCC-D	2.58	3.11	3.90	4.63	5.81	6.91	8.23
Dutchess S NRCC-C	2.64	3.18	3.98	4.71	5.91	7.01	8.32
Erie NRCC-A	1.87	2.20	2.69	3.14	3.84	4.48	5.23
Erie NRCC-B	1.87	2.20	2.69	3.14	3.84	4.48	5.23
Essex N NRCC-A	1.98	2.25	2.74	3.19	3.89	4.53	5.28
Essex N NRCC-B	1.98	2.25	2.74	3.19	3.89	4.53	5.28
Essex S NRCC-A	2.09	2.40	2.90	3.34	4.04	4.67	5.40
Essex S NRCC-B	2.09	2.40	2.90	3.34	4.04	4.67	5.40
Franklin NRCC-A	1.94	2.21	2.73	3.21	3.97	4.67	5.49
Franklin NRCC-B	1.94	2.21	2.73	3.21	3.97	4.67	5.49
Fulton NRCC-B	2.19	2.52	3.05	3.53	4.27	4.93	5.71
Genesee NRCC-A	1.86	2.18	2.65	3.07	3.73	4.33	5.02
Greene NW NRCC-C	2.31	2.77	3.48	4.13	5.19	6.17	7.35
Greene NW NRCC-D	2.31	2.77	3.48	4.13	5.19	6.17	7.35
Greene SE NRCC-C	2.52	3.05	3.84	4.57	5.76	6.88	8.21
Greene SE NRCC-D	2.52	3.05	3.84	4.57	5.76	6.88	8.21
Hamilton N NRCC-A	1.98	2.31	2.79	3.21	3.88	4.48	5.18
Hamilton N NRCC-B	1.98	2.31	2.79	3.21	3.88	4.48	5.18
Hamilton S NRCC-A	2.13	2.47	2.98	3.45	4.17	4.82	5.58
Hamilton S NRCC-B	2.13	2.47	2.98	3.45	4.17	4.82	5.58
Herkimer NRCC-A	2.17	2.51	3.07	3.59	4.40	5.14	6.01
Herkimer NRCC-B	2.17	2.51	3.07	3.59	4.40	5.14	6.01
Jefferson NW NRCC-A	1.96	2.27	2.80	3.27	4.02	4.71	5.51
Jefferson NW NRCC-B	1.96	2.27	2.80	3.27	4.02	4.71	5.51
Jefferson SE NRCC-A	2.00	2.33	2.86	3.33	4.07	4.75	5.54
Jefferson SE NRCC-B	2.00	2.33	2.86	3.33	4.07	4.75	5.54
Lewis N NRCC-A	2.00	2.33	2.83	3.28	3.99	4.64	5.39
Lewis N NRCC-B	2.00	2.33	2.83	3.28	3.99	4.64	5.39
Lewis S NRCC-A	2.05	2.38	2.90	3.36	4.10	4.76	5.53
Lewis S NRCC-B	2.05	2.38	2.90	3.36	4.10	4.76	5.53
Livingston NRCC-A	1.86	2.14	2.64	3.11	3.84	4.51	5.30
Madison NRCC-A	2.09	2.42	2.97	3.47	4.26	4.98	5.82
Madison NRCC-B	2.09	2.42	2.97	3.47	4.26	4.98	5.82
Manhattan NRCC-C	2.83	3.40	4.26	5.06	6.34	7.53	8.94
Monroe NRCC-A	1.83	2.15	2.64	3.08	3.79	4.43	5.18
Montgomery NRCC-B	2.16	2.48	3.01	3.50	4.27	4.96	5.77
Nassau NRCC-C	2.84	3.40	4.26	5.05	6.33	7.51	8.92
Niagara NRCC-A	1.77	2.12	2.58	2.99	3.63	4.22	4.90
Oneida NRCC-A	2.18	2.50	3.06	3.56	4.36	5.08	5.93
Oneida NRCC-B	2.18	2.50	3.06	3.56	4.36	5.08	5.93
Onondaga E NRCC-A	2.01	2.35	2.89	3.37	4.14	4.84	5.66
Onondaga W NRCC-A	1.99	2.30	2.82	3.29	4.03	4.70	5.49

Ontario NRCC-A	1.89	2.19	2.69	3.14	3.87	4.52	5.29
Ontario NRCC-B	1.89	2.19	2.69	3.14	3.87	4.52	5.29
Orange NRCC-C	2.64	3.21	4.04	4.80	6.04	7.19	8.57
Orleans NRCC-A	1.82	2.14	2.60	3.02	3.69	4.28	4.97
Oswego E NRCC-A	2.12	2.40	2.92	3.38	4.11	4.77	5.54
Oswego E NRCC-B	2.12	2.40	2.92	3.38	4.11	4.77	5.54
Oswego W NRCC-A	1.97	2.29	2.80	3.25	3.98	4.63	5.40
Oswego W NRCC-B	1.97	2.29	2.80	3.25	3.98	4.63	5.40
Otsego NRCC-A	2.12	2.48	3.03	3.53	4.33	5.05	5.90
Otsego NRCC-B	2.12	2.48	3.03	3.53	4.33	5.05	5.90
Putnam NRCC-C	2.73	3.29	4.13	4.90	6.16	7.32	8.70
Putnam NRCC-D	2.73	3.29	4.13	4.90	6.16	7.32	8.70
Queens NRCC-C	2.84	3.41	4.28	5.09	6.39	7.59	9.03
Rensselaer NRCC-B	2.31	2.69	3.31	3.88	4.78	5.60	6.58
Rensselaer NRCC-C	2.31	2.69	3.31	3.88	4.78	5.60	6.58
Rockland NRCC-C	2.77	3.38	4.25	5.05	6.35	7.56	9.00
Rockland NRCC-D	2.77	3.38	4.25	5.05	6.35	7.56	9.00
Saratoga E NRCC-B	2.24	2.62	3.22	3.77	4.64	5.44	6.38
Saratoga W NRCC-B	2.21	2.57	3.12	3.61	4.39	5.09	5.90
Schenectady NRCC-B	2.16	2.51	3.05	3.54	4.32	5.03	5.85
Schoharie N NRCC-B	2.15	2.51	3.10	3.64	4.50	5.28	6.21
Schoharie S NRCC-B	2.18	2.62	3.25	3.83	4.76	5.61	6.63
Schoharie S NRCC-C	2.18	2.62	3.25	3.83	4.76	5.61	6.63
Schuyler NRCC-A	1.93	2.34	2.92	3.45	4.30	5.08	6.01
Schuyler NRCC-B	1.93	2.34	2.92	3.45	4.30	5.08	6.01
Seneca NRCC-A	1.91	2.24	2.76	3.23	3.98	4.67	5.47
Seneca NRCC-B	1.91	2.24	2.76	3.23	3.98	4.67	5.47
St Lawrence NRCC-A	1.92	2.23	2.72	3.17	3.87	4.51	5.25
St Lawrence NRCC-B	1.92	2.23	2.72	3.17	3.87	4.51	5.25
Staten Island NRCC-C	2.85	3.39	4.27	5.09	6.41	7.64	9.12
Steuben N NRCC-A	1.97	2.30	2.82	3.29	4.04	4.71	5.50
Steuben N NRCC-B	1.97	2.30	2.82	3.29	4.04	4.71	5.50
Steuben S NRCC-A	1.98	2.32	2.88	3.38	4.19	4.94	5.82
Steuben S NRCC-B	1.98	2.32	2.88	3.38	4.19	4.94	5.82
Suffolk NRCC-C	2.79	3.38	4.25	5.05	6.36	7.57	9.02
Suffolk NRCC-D	2.79	3.38	4.25	5.05	6.36	7.57	9.02
Sullivan NW NRCC-B	2.39	2.82	3.49	4.10	5.07	5.97	7.03
Sullivan NW NRCC-C	2.39	2.82	3.49	4.10	5.07	5.97	7.03
Sullivan SE NRCC-B	2.52	3.00	3.72	4.37	5.42	6.38	7.52
Sullivan SE NRCC-C	2.52	3.00	3.72	4.37	5.42	6.38	7.52
Tioga NRCC-A	2.02	2.37	2.93	3.45	4.27	5.03	5.92
Tioga NRCC-B	2.02	2.37	2.93	3.45	4.27	5.03	5.92
Tompkins NRCC-A	2.01	2.34	2.91	3.43	4.27	5.04	5.94

Tompkins NRCC-B	2.01	2.34	2.91	3.43	4.27	5.04	5.94
Ulster Central NRCC-C	2.68	3.24	4.03	4.76	5.93	7.01	8.30
Ulster Central NRCC-D	2.68	3.24	4.03	4.76	5.93	7.01	8.30
Ulster NW NRCC-B	2.40	2.86	3.53	4.14	5.11	6.00	7.05
Ulster NW NRCC-C	2.40	2.86	3.53	4.14	5.11	6.00	7.05
Ulster NW NRCC-D	2.40	2.86	3.53	4.14	5.11	6.00	7.05
Ulster SE NRCC-C	2.62	3.18	3.97	4.69	5.86	6.94	8.22
Ulster SE NRCC-D	2.62	3.18	3.97	4.69	5.86	6.94	8.22
Warren NRCC-A	2.12	2.45	2.95	3.39	4.09	4.71	5.42
Warren NRCC-B	2.12	2.45	2.95	3.39	4.09	4.71	5.42
Washington N NRCC-B	2.11	2.52	3.08	3.58	4.38	5.10	5.94
Washington S NRCC-B	2.22	2.60	3.21	3.76	4.63	5.43	6.37
Wayne NRCC-A	1.89	2.23	2.73	3.18	3.90	4.54	5.30
Wayne NRCC-B	1.89	2.23	2.73	3.18	3.90	4.54	5.30
Westchester NRCC-C	2.78	3.41	4.30	5.13	6.49	7.76	9.28
Westchester NRCC-D	2.78	3.41	4.30	5.13	6.49	7.76	9.28
Wyoming NRCC-A	1.90	2.21	2.69	3.13	3.81	4.42	5.14
Yates NRCC-A	1.90	2.23	2.75	3.23	4.00	4.70	5.52
Yates NRCC-B	1.90	2.23	2.75	3.23	4.00	4.70	5.52

Project #		Sheet # 1 of 1	Page # 1 of 1
		Created By: S. Kitchner	*Date:* 4/26/2021
		Checked By:	*Date:*
Project:	**Highland**	*Revised By:*	*Date:*
Subject:	**Pre Development Weighted CN**	*Checked By:*	*Date:*

Applicable Standards:

Urban Hydrology for Small Watersheds, Techincal Release 55. USDA, June 1986

PRE-DEVELOPMENT

Drainage Area	Land Use Area (feet^2)	Land Use / Cover Description	Hydrologic Soil Group	Actual CN	Area (feet^2)	Factored CN %	Factored CN CN	Weighted CN
#1	5,885	Paved Parking, Roof, etc.	D	98	**8,707**	68%	66.2	**93**
	2,822	Open, Grass (Fair)	D	84	**sq. feet**	32%	27.2	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.200	0%	0.0	
					acres	0%	0.0	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.000	0%	0.0	
					sq. miles	0%	0.0	
	8,707					100%		

Area	Land Use Area (feet^2)	Land Use / Cover Description	Hydrologic Soil Group	Actual CN	Area (feet^2)	Factored CN %	Factored CN CN	Weighted CN
#2	14,956	Paved Parking, Roof, etc.	D	98	**49,774**	30%	29.4	**87**
	18,312	Open, Grass (Fair)	D	84	**sq. feet**	37%	30.9	
	14,387	Wooded (Fair)	D	79		29%	22.8	
	2,119	Gravel (Good)	D	96	**=**	4%	4.1	
						0%	0.0	
					1.143	0%	0.0	
					acres	0%	0.0	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.002	0%	0.0	
					sq. miles	0%	0.0	
	49,774					100%		

Area	Land Use Area (feet^2)	Land Use / Cover Description	Hydrologic Soil Group	Actual CN	Area (feet^2)	Factored CN %	Factored CN CN	Weighted CN
					0	0%	0.0	**0**
					sq. feet	0%	0.0	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.000	0%	0.0	
					acres	0%	0.0	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.000	0%	0.0	
					sq. miles	0%	0.0	
	0					0%		

Project #		Sheet # 1 of 1	Page # 1 of 2
		Created By: S. Kitchner	*Date:* 4/27/2021
		Checked By:	*Date:*
Project:	**Highland**	*Revised By:*	*Date:*
Subject:	**Post Development Weighted CN**	*Checked By:*	*Date:*

Applicable Standards:
Urban Hydrology for Small Watersheds, Techincal Release 55. USDA, June 1986

POST-DEVELOPMENT

Drainage Area	Land Use Area (feet^2)	Land Use / Cover Description	Hydrologic Soil Group	Actual CN	Area (feet^2)	Factored CN %	Factored CN CN	Weighted CN
#1	1,903	Lawn Area, Good	D	80	**1,903**	100%	80.0	**80**
					sq. feet	0%	0.0	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.044	0%	0.0	
					acres	0%	0.0	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.000	0%	0.0	
					sq. miles	0%	0.0	
	1,903					100%		

Area	Land Use Area (feet^2)	Land Use / Cover Description	Hydrologic Soil Group	Actual CN	Area (feet^2)	Factored CN %	Factored CN CN	Weighted CN
#2	32,805	Paved Parking, Roof, etc	D	98	**40,196**	82%	80.0	**95**
	7,391	Lawn Area, Good	D	80	**sq. feet**	18%	14.7	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.923	0%	0.0	
					acres	0%	0.0	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.001	0%	0.0	
					sq. miles	0%	0.0	
	40,196					100%		

Area	Land Use Area (feet^2)	Land Use / Cover Description	Hydrologic Soil Group	Actual CN	Area (feet^2)	Factored CN %	Factored CN CN	Weighted CN
#3	8,907	Lawn Area, Good	D	80	**8,907**	100%	80.0	**80**
					sq. feet	0%	0.0	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.204	0%	0.0	
					acres	0%	0.0	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.000	0%	0.0	
					sq. miles	0%	0.0	
	8,907					100%		

Project #		Sheet # 1 of 1	Page # 2 of 2
		Created By: S. Kitchner	*Date:* 4/27/2021
		Checked By:	*Date:*
Project:	**Highland**	*Revised By:*	*Date:*
Subject:	**Post Development Weighted CN**	*Checked By:*	*Date:*

Applicable Standards:

Urban Hydrology for Small Watersheds, Techincal Release 55. USDA, June 1986

POST-DEVELOPMENT

Drainage Area	Land Use Area ($feet^2$)	Land Use / Cover Description	Hydrologic Soil Group	Actual CN	Area ($feet^2$)	Factored CN %	Factored CN CN	Weighted CN
#4	495	Paved Parking, Roof, etc	D	98	**7,458**	7%	6.5	**81**
	6,963	Lawn Area, Good	D	80	**sq. feet**	93%	74.7	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.171	0%	0.0	
					acres	0%	0.0	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.000	0%	0.0	
					sq. miles	0%	0.0	
	7,458					100%		

Area	Land Use Area ($feet^2$)	Land Use / Cover Description	Hydrologic Soil Group	Actual CN	Area ($feet^2$)	Factored CN %	Factored CN CN	Weighted CN
					0	0%	0.0	**0**
					sq. feet	0%	0.0	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.000	0%	0.0	
					acres	0%	0.0	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.000	0%	0.0	
					sq. miles	0%	0.0	
	0					0%		

Area	Land Use Area ($feet^2$)	Land Use / Cover Description	Hydrologic Soil Group	Actual CN	Area ($feet^2$)	Factored CN %	Factored CN CN	Weighted CN
					0	0%	0.0	**0**
					sq. feet	0%	0.0	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.000	0%	0.0	
					acres	0%	0.0	
						0%	0.0	
					=	0%	0.0	
						0%	0.0	
					0.000	0%	0.0	
					sq. miles	0%	0.0	
	0					0%		

Hydrologic Soil Group—Ulster County, New York
(Stewart's Shops - 3733 US Highway 9W - Highland, NY 12528)

Map Scale: 1:1,570 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 20, 40, 80, 120

Feet: 0, 50, 100, 200, 300

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

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

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

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

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

Soil Survey Area: Ulster County, New York
Survey Area Data: Version 19, Jun 11, 2020

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

Date(s) aerial images were photographed: Oct 7, 2013—Feb 26, 2017

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MgB	Mardin-Nassau complex, 3 to 8 percent slopes	D	8.9	89.5%
VoB	Volusia gravelly silt loam, 3 to 8 percent slopes	D	1.0	10.5%
Totals for Area of Interest			**9.9**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

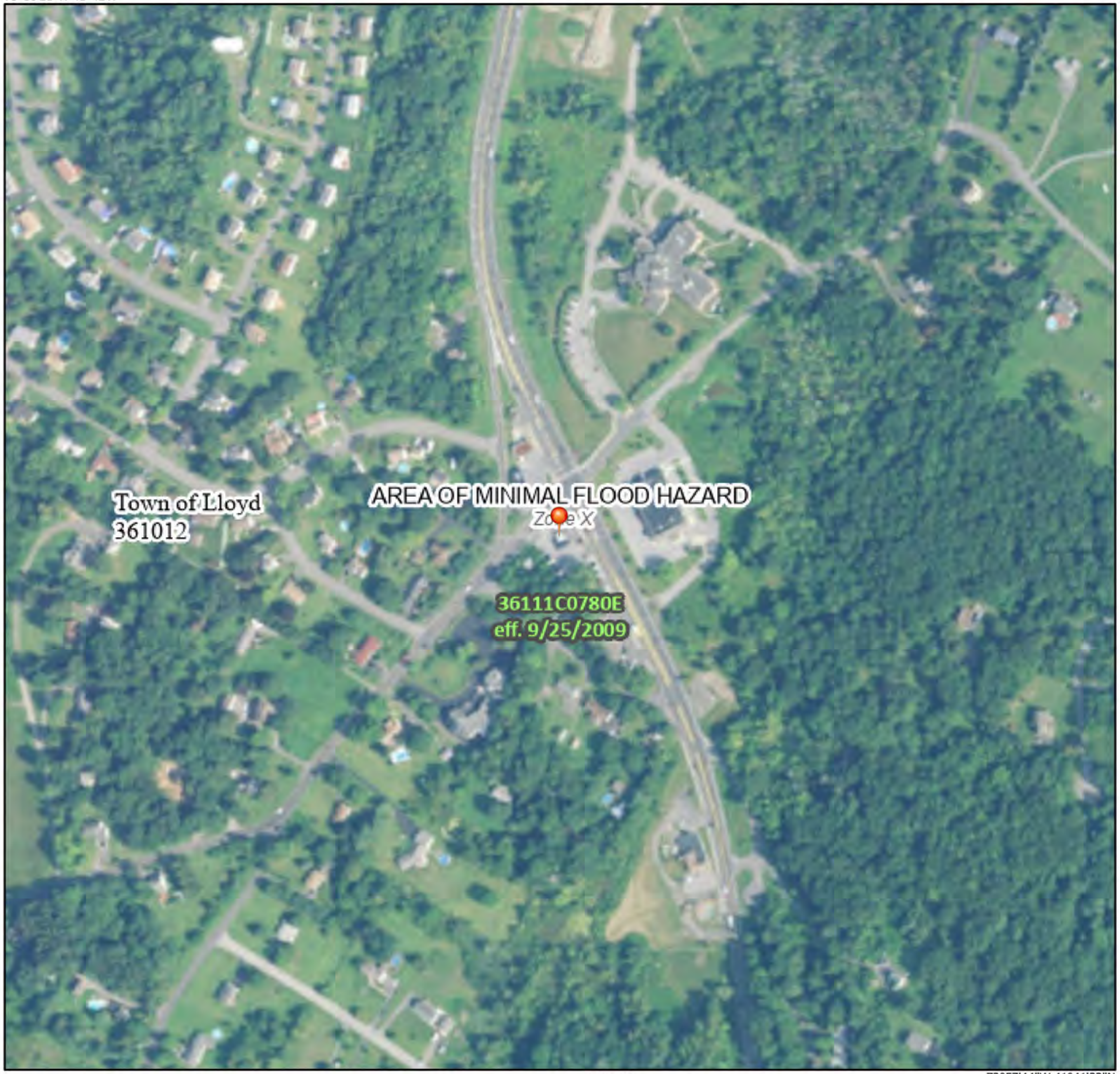
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

National Flood Hazard Layer FIRMette

73°58'21"W 41°42'N



73°57'44"W 41°41'33"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- B 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/22/2021 at 9:07 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

NEW YORK STATE OF OPPORTUNITY. | Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ERIK KULLESEID
Commissioner

March 31, 2021

Tyler Fronte
Stewart's Shops
PO Box 435
Saratoga Springs, NY 12866

Re: SEQRA
Stewart's Shops - Highland: Demolition & New Construction
3733 United States Route 9W, Highland, NY 12528
21PR01372

Dear Tyler Fronte:

Thank you for requesting the comments of the Division for Historic Preservation of the Office of Parks, Recreation and Historic Preservation (OPRHP) as part of your SEQRA process. These comments are those of OPRHP and relate only to Historic/Cultural resources.

If this project will involve state or federal permitting, funding or licensing, it may require additional review for potential impacts to architectural and archaeological resources, in accordance with Section 106 of the National Historic Preservation Act or Section 14.09 of NYS Parks Recreation and Historic Preservation Law.

Based on the information provided, OPHRP has no concerns regarding the proposed project under SEQRA. Should the project design be changed, we recommend further consultation with this office.

If you have any questions, please don't hesitate to contact me.

Sincerely,

Philip A. Perazio, Historic Preservation Program Analyst - Archaeology Unit
Phone: 518-268-2175
e-mail: philip.perazio@parks.ny.gov via email only

cc: David Barton, Town of Lloyd

Exhibit B – WQv and CPv

.1 Post Development Water Quality Volume (WQV) and Minimum Runoff Reduction Volume (RRv)

.2 Post Development Water Quality Peak Flow Calculation

.3 Bioretention Filter Sizing Calculation

.4 Hydro International First Defense Manufacturers Data

Project #		Sheet # 1 of 1	Page # 1 of 1
		Created By: S. Kitchner	*Date:* 4/27/2021
		Checked By:	*Date:*
Project:	**Highland**	*Revised By:*	*Date:*
Subject:	**Water Quality Volume - DA2**	*Checked By:*	*Date:*

Computation of Preliminary Stormwater Storage Volumes and Peak Discharges
(Designed for compliance with New York State Stormwater Management Design Manual)

Hydrologic Input Parameters and Site Hydrology

Rainfall Distribution Type: 3 (1, 1A, 2 or 3)

90% Storm Event (P): 1.5 inches

Weighted Hydrologic Soil Group (HSG): D (A, B, C or D)

Redevelopment Project: 1 (Yes = 1, No = 2)

Water Quality Volume, WQv

Compute Impervious Cover	
New Impervious Cover Within Site:	0.361
Existing Impervious Cover Within Site:	0.392
Total Impervious Cover:	0.753
Impervious Area for WQv Calculation (New Const):	NA
Impervious Area for WQv Calculation (Redevelopment):	0.459

Total Watershed Area: 0.923 acres

I = Impervious Area / Total Watershed Area: 0.497
I = 49.7 %

Compute Runoff Coefficient, Rv

Rv = 0.05 + 0.009 (I)
Rv = 0.50 (Min Rv = 0.20, use 0.50)

Compute WQv, (Includes both on-site and off-site drainage)
(Use the 90% capture rule, Figure 4.1 NYS-SWDM)

$$WQv = \frac{(P)(Rv)(A)}{12}$$

WQv = 0.055 ac-ft = 2417 ft^3

Runoff Reduction Volume, RRv

WQv = 2417
S = 0.20

$$RRv_{(MIN)} = \frac{(P)(0.95)(S)(Aic)}{12}$$

$RRv_{(MIN)}$ = 0.008 ac-ft = 361 ft^3

Specific Reduction Factors (S) for HSGs	
HSG A =	0.55
HSG B =	0.40
HSG C =	0.30
HSG D =	0.20

Cell requires a direct entry

Project # ______________ Sheet # 1 of 1 Page # 1 of 1

		Created By: S. Kitchner	*Date:* 4/27/2021
		Checked By:	*Date:*
Project: **Highland**		*Revised By:*	*Date:*
Subject: **WQv Peak Flow - DA2**		*Checked By:*	*Date:*

Computation of Preliminary Stormwater Storage Volumes and Peak Discharges
(Designed for compliance with New York State Stormwater Management Design Manual)

Determination of q_u

One-year Storm Event (P) = 2.62

Weighted CN for this post-development drainage area: 95

Time of concentration, Tc = 0.19

Calculate the initial absraction, Ia = (200 / CN) -2
Ia = 0.11

Calculate Ia/P = 0.04

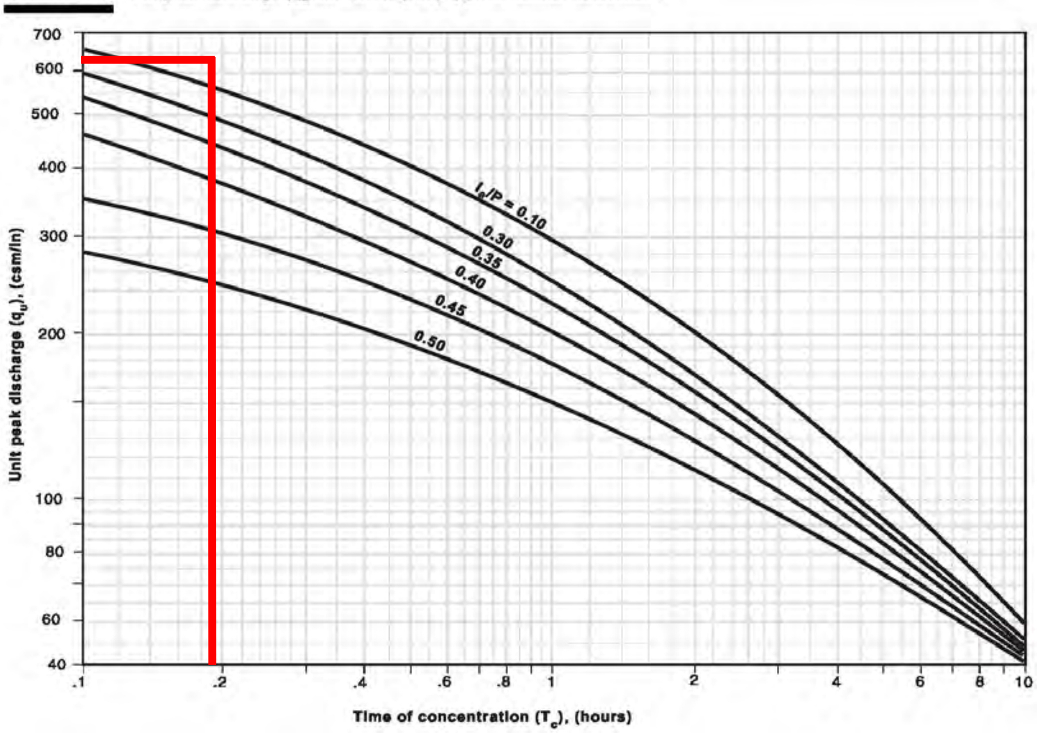
Total Drainage Area = 0.923 acres
= 0.0014 sq. miles
= 5,789,979 square in.

Calculated WQv = 0.055 ac-ft
(See Exhibit B.1)
= 4,139,850 cubic in.

WQv (in inches) = 0.715 in.

Determine q_u based on Tc and Ia/P

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



q_u = 625 csm/in (where csm = cubic feet per second per square mile per year)

From Appendix B.2 of the NYSDEC SWDM:

$Q_p = q_u \times A \times WQv$
Q_p = (625 csm/in) (0.0014 sq. mi.) (0.715 in.)
Q_p = 0.64 cfs

Where:

Q_p	=	peak discharge (cfs)
q_u	=	unit peak discharge (cfs/mi²/inch)
A	=	drainage area (square miles)
WQv	=	water quality volume (watershed inches)

Cell requires a direct entry

Project #		Sheet # 1 of 1	Page # 1 of 1
		Created By: S. Kitchner	*Date:* 4/27/2021
		Checked By:	*Date:*
Project:	**Highland**	*Revised By:*	*Date:*
Subject:	**Bioretention Filter Sizing - DA2**	*Checked By:*	*Date:*

Post Development - Water Quality Volume Requirements (WQv)

Post Development WQV=2,417 cf

Bioretention Filter Sizing

$A_f=(WQv)(d_f) / [(k)(h_f+d_f)(t_f)]$

A_f= Surface Area of Filter (sf)

WQv= Water Quality Volume (cf)	WQv=	2417	cf
d_f= Filter Bed Depth (ft)	d_f=	2.5	ft
k= Coefficient of permeability of filter medial (ft/day)	k=	0.5	ft/day
h_f= Average Height of Water Above Filter Bed (ft)	h_f=	0.5	ft
t_f= Design Filter Bed Drain Time (days)	t_f=	2.0	days

A_f= 2,014 sf

Proposed contour 357.50 area is 2,136.15 sf which is greater than 2,014 sf; Therefore OK

Standard SMP (Bioretention)

Bioretention practice treats 40% of RRv in HSG D

RRv from system = 40% x 2,417 cf = 967 cf

RRv from system = WQv - recalculated WQv = 2,417 - 967 = 1450 cf (WQv required for subcatchment)

Total Runoff Reduction Volume (RRv) Summary

Original WQv = 2,417 cf

Minimum RRv = 361 cf (See WQv calculation sheet)

Total RRv provided = 967 cf

Total RRv provided of 967 cf is greater than minimum RRv of 361 cf; Therefore OK

Cell requires a direct entry

First Defense® High Capacity

A Simple Solution for your Trickiest Sites

Product Profile

The First Defense® High Capacity is an enhanced vortex separator that combines an effective stormwater treatment chamber with an integral peak flow bypass. It efficiently removes sediment total suspended solids (TSS), trash and hydrocarbons from stormwater runoff without washing out previously captured pollutants. The First Defense® High Capacity is available in several model configurations to accommodate a wide range of pipe sizes, peak flows and depth constraints (**Table 1**, next page).

Applications

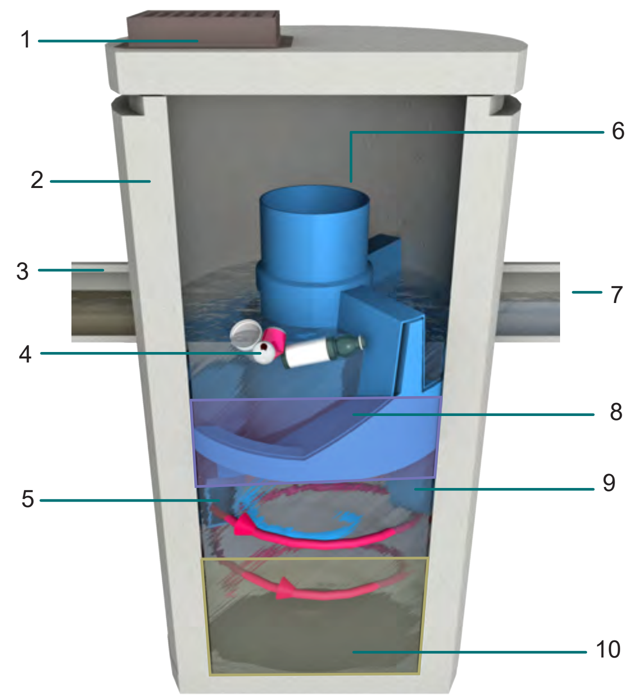
- Stormwater treatment at the point of entry into the drainage line
- Sites constrained by space, topography or drainage profiles with limited slope and depth of cover
- Retrofit installations where stormwater treatment is placed on or tied into an existing storm drain line
- Pretreatment for filters, infiltration and storage

Advantages

- Inlet options include surface grate or multiple inlet pipes
- Integral high capacity bypass conveys large peak flows without the need for "offline" arrangements using separate junction manholes
- Proven to prevent pollutant washout at up to 450% of its treatment flow
- Long flow path through the device ensures a long residence time within the treatment chamber, enhancing pollutant settling
- Delivered to site pre-assembled and ready for installation

Verified by NJCAT and NJDEP

Fig.1 The First Defense® High Capacity has internal components designed to efficiently capture pollutants and prevent washout at peak flows.



Components

1. Inlet Grate (optional)
2. Precast chamber
3. Inlet Pipe (optional)
4. Floatables Draw Off Slot (not pictured)
5. Inlet Chute
6. Internal Bypass
7. Outlet pipe
8. Oil and Floatables Storage
9. Outlet chute
10. Sediment Storage Sump

How it Works

The First Defense® High Capacity has internal components designed to remove and retain gross debris, total suspended solids (TSS) and hydrocarbons (**Fig.1**).

Contaminated stormwater runoff enters the inlet chute from a surface grate and/or inlet pipe. The inlet chute introduces flow into the chamber tangentially to create a low energy vortex flow regime (magenta arrow) that directs sediment into the sump while oils, floating trash and debris rise to the surface.

Treated stormwater exits through a submerged outlet chute located opposite to the direction of the rotating flow (blue arrow). Enhanced vortex separation is provided by forcing the rotating flow within the vessel to follow the longest path possible rather than directly from inlet to outlet.

Higher flows bypass the treatment chamber to prevent turbulence and washout of captured pollutants. An internal bypass conveys infrequent peak flows directly to the outlet eliminating the need for, and expense of, external bypass control structures. A floatables draw off slot functions to convey floatables into the treatment chamber prior to bypass.

First Defense® High Capacity

Sizing & Design

This adaptable online treatment system works easily with large pipes, multiple inlet pipes, inlet grates and now, contains a high capacity bypass for the conveyance of large peak flows. Designed with site flexibility in mind, the First Defense® High Capacity allows engineers to maximize available site space without compromising treatment level.

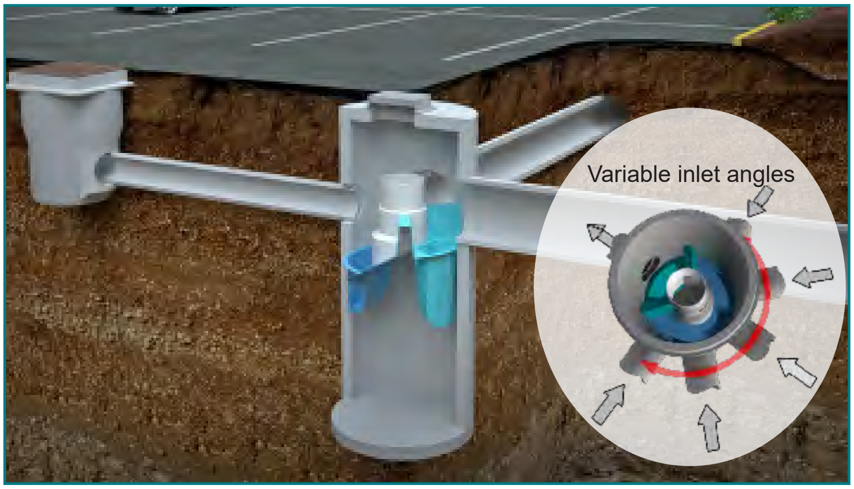


Fig 2. Works with multiple inlet pipes and grates

Sizing Calcula t or for Engineers

This simple online tool will recommend the best separatror, model size and online/offline arrangement based on site-specific data entered by the user.

Go to hydro-int.com/sizing to access the tool.

Inspection and Maintenance

Nobody maintains our systems better than we do. To ensure optimal, ongoing device performance, be sure to recommend Hydro International as a preferred service and maintenance provider to your clients.

Call **1 (800) 848-2706** to schedule an inspection and cleanout or learn more at **hydro-int.com/service**

Fig 3. Maintenance is done with a vactor truck

Table 1. First Defense® High Capacity Design Criteria.

First Defense® High Capacity Model Number	Diameter	Typical TSS Treatment Flow Rates		Peak Online Flow Rate	Maximum Pipe Diameter[1]	Oil Storage Capacity	Typical Sediment Storage Capacity[2]	Minimum Distance from Outlet Invert to Top of Rim[3]	Standard Distance from Outlet Invert to Sump Floor
		NJDEP Certified	110µm						
	(ft / m)	(cfs / L/s)	(cfs / L/s)	(cfs / L/s)	(in / mm)	(gal / L)	(yd^3 / m^3)	(ft / m)	(ft / m)
FD-3HC	3 / 0.9	0.84 / 23.7	1.06 / 45.3	15 / 424	18 / 457	125 / 473	0.4 / 0.3	2.0 - 3.5 / 0.6 - 1.0	3.71 / 1.13
FD-4HC	4 / 1.2	1.50 / 42.4	1.88 / 50.9	18 / 510	24 / 600	191 / 723	0.7 / 0.5	2.3 - 3.9 / 0.7 - 1.2	4.97 / 1.5
FD-5HC	5 / 1.5	2.34 / 66.2	2.94 / 82.1	20 / 566	24 / 600	300 / 1135	1.1 / .84	2.5 - 4.5 / 0.7 - 1.3	5.19 / 1.5
FD-6HC	6 / 1.8	3.38 / 95.7	4.23 / 133.9	32 / 906	30 / 750	496 / 1,878	1.6 / 1.2	3.0 - 5.1 / 0.9 - 1.6	5.97 / 1.8
FD-8HC	8 / 2.4	6.00 / 169.9	7.52 / 212.9	50 / 1,415	48 / 1219	1120 / 4239	2.8 / 2.1	3.0 - 6.0 / 0.9 -1.8	7.40 / 2.2

[1]Contact Hydro International when larger pipe sizes are required.
[2]Contact Hydro International when custom sediment storage capacity is required.
[3]Minimum distance for models depends on pipe diameter.

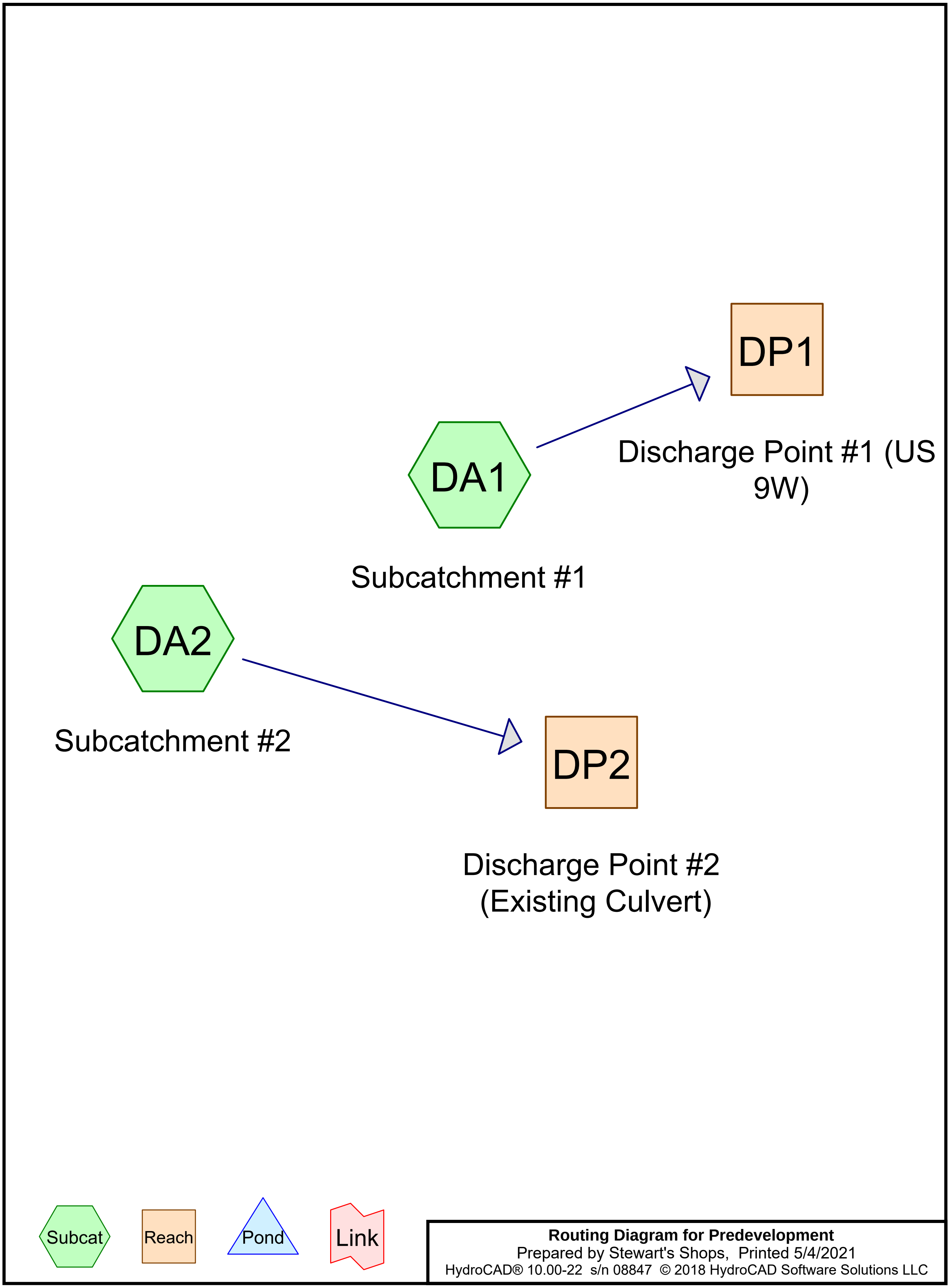
Hydro International, 94 Hutchins Drive, Portland, ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212
Email: stormwaterinquiry@hydro-int.com Web: www.hydro-int.com

Exhibit C – Hydrologic Model Simulations Using HydroCAD

.1 Pre Development

.2 Post Development

.3 Post Development Without Controls



Routing Diagram for Predevelopment
Prepared by Stewart's Shops, Printed 5/4/2021
HydroCAD® 10.00-22 s/n 08847 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.485	84	50-75% Grass cover, Fair, HSG D (DA1, DA2)
0.049	96	Gravel surface, HSG D (DA2)
0.478	98	Paved parking, HSG D (DA1, DA2)
0.330	79	Woods, Fair, HSG D (DA2)
1.343	**88**	**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: Subcatchment #1 Runoff Area=8,707 sf 67.59% Impervious Runoff Depth=1.89"
Tc=6.0 min CN=93 Runoff=0.43 cfs 0.032 af

Subcatchment DA2: Subcatchment #2 Runoff Area=49,774 sf 30.05% Impervious Runoff Depth=1.41"
Flow Length=395' Tc=28.8 min CN=87 Runoff=1.09 cfs 0.134 af

Reach DP1: Discharge Point #1 (US 9W) Inflow=0.43 cfs 0.032 af
Outflow=0.43 cfs 0.032 af

Reach DP2: Discharge Point #2 (Existing Culvert) Inflow=1.09 cfs 0.134 af
Outflow=1.09 cfs 0.134 af

Total Runoff Area = 1.343 ac Runoff Volume = 0.166 af Average Runoff Depth = 1.48"
64.36% Pervious = 0.864 ac 35.64% Impervious = 0.478 ac

Summary for Subcatchment DA1: Subcatchment #1

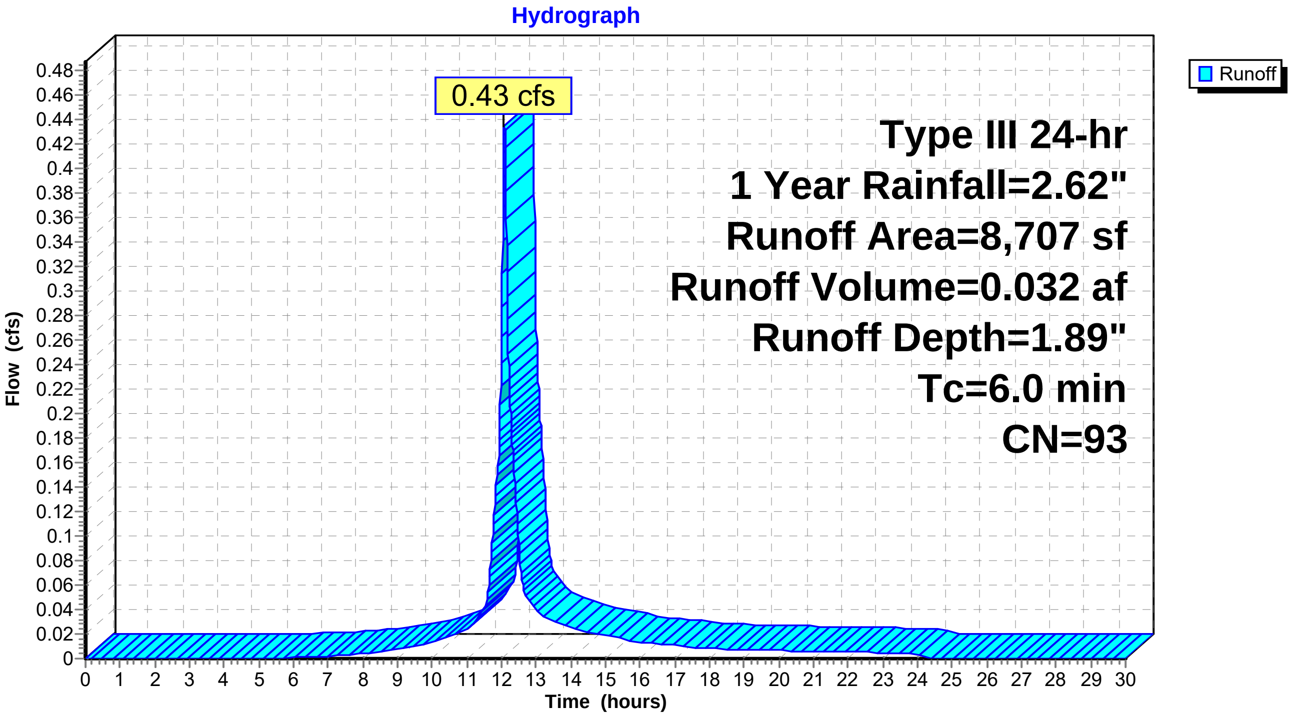
Runoff = 0.43 cfs @ 12.09 hrs, Volume= 0.032 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.62"

Area (sf)	CN	Description
5,885	98	Paved parking, HSG D
2,822	84	50-75% Grass cover, Fair, HSG D
8,707	93	Weighted Average
2,822		32.41% Pervious Area
5,885		67.59% Impervious Area

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

Subcatchment DA1: Subcatchment #1



Hydrograph for Subcatchment DA1: Subcatchment #1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.01	0.00	0.00
1.00	0.03	0.00	0.00
1.50	0.04	0.00	0.00
2.00	0.05	0.00	0.00
2.50	0.07	0.00	0.00
3.00	0.08	0.00	0.00
3.50	0.10	0.00	0.00
4.00	0.11	0.00	0.00
4.50	0.13	0.00	0.00
5.00	0.15	0.00	0.00
5.50	0.17	0.00	0.00
6.00	0.19	0.00	0.00
6.50	0.21	0.00	0.00
7.00	0.24	0.01	0.00
7.50	0.27	0.02	0.00
8.00	0.30	0.02	0.00
8.50	0.34	0.04	0.01
9.00	0.38	0.05	0.01
9.50	0.43	0.08	0.01
10.00	0.50	0.11	0.01
10.50	0.57	0.15	0.02
11.00	0.65	0.20	0.02
11.50	0.78	0.29	0.04
12.00	1.31	0.70	**0.26**
12.50	1.84	1.17	**0.10**
13.00	1.96	1.28	0.04
13.50	2.05	1.36	0.03
14.00	2.12	1.43	0.02
14.50	2.19	1.49	0.02
15.00	2.24	1.53	0.02
15.50	2.28	1.58	0.02
16.00	2.32	1.61	0.01
16.50	2.35	1.64	0.01
17.00	2.38	1.67	0.01
17.50	2.41	1.69	0.01
18.00	2.43	1.71	0.01
18.50	2.45	1.73	0.01
19.00	2.47	1.75	0.01
19.50	2.49	1.77	0.01
20.00	2.51	1.79	0.01
20.50	2.52	1.80	0.01
21.00	2.54	1.82	0.01
21.50	2.56	1.83	0.01
22.00	2.57	1.84	0.01
22.50	2.58	1.86	0.01
23.00	2.60	1.87	0.00
23.50	2.61	1.88	0.00
24.00	**2.62**	**1.89**	0.00
24.50	2.62	1.89	0.00
25.00	2.62	1.89	0.00
25.50	2.62	1.89	0.00
26.00	2.62	1.89	0.00
26.50	2.62	1.89	0.00
27.00	2.62	1.89	0.00
27.50	2.62	1.89	0.00
28.00	2.62	1.89	0.00
28.50	2.62	1.89	0.00
29.00	2.62	1.89	0.00
29.50	2.62	1.89	0.00
30.00	2.62	1.89	0.00

Summary for Subcatchment DA2: Subcatchment #2

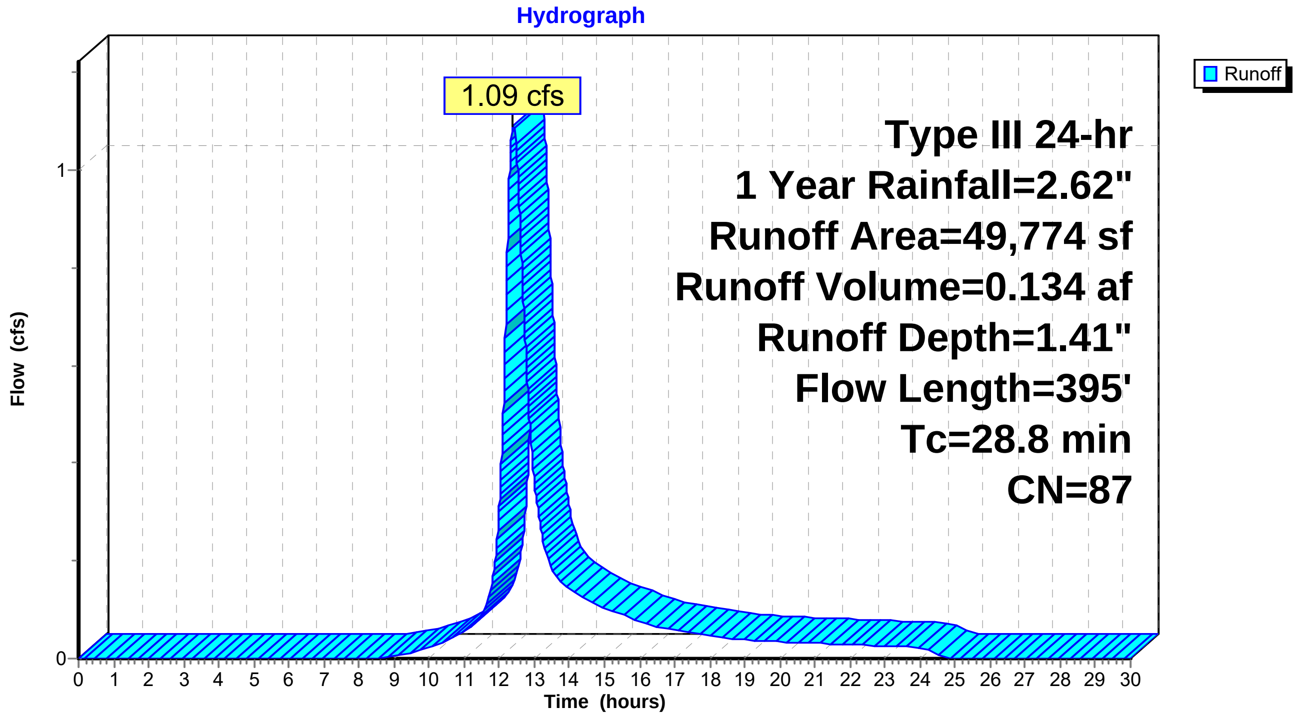
Runoff = 1.09 cfs @ 12.39 hrs, Volume= 0.134 af, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.62"

Area (sf)	CN	Description
14,956	98	Paved parking, HSG D
18,312	84	50-75% Grass cover, Fair, HSG D
14,387	79	Woods, Fair, HSG D
2,119	96	Gravel surface, HSG D
49,774	87	Weighted Average
34,818		69.95% Pervious Area
14,956		30.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.9	130	0.0290	0.08		**Sheet Flow, Sheet Flow 1** Woods: Light underbrush n= 0.400 P2= 2.48"
2.2	158	0.0300	1.21		**Shallow Concentrated Flow, Shallow Concnetrated Flow 1** Short Grass Pasture Kv= 7.0 fps
0.0	4	0.6480	5.63		**Shallow Concentrated Flow, Shallow Concentrated Flow 2** Short Grass Pasture Kv= 7.0 fps
0.7	103	0.0060	2.63	11.85	**Channel Flow, Channel 1** Area= 4.5 sf Perim= 12.6' r= 0.36' n= 0.022 Earth, clean & straight
28.8	395	Total			

Subcatchment DA2: Subcatchment #2



Hydrograph for Subcatchment DA2: Subcatchment #2

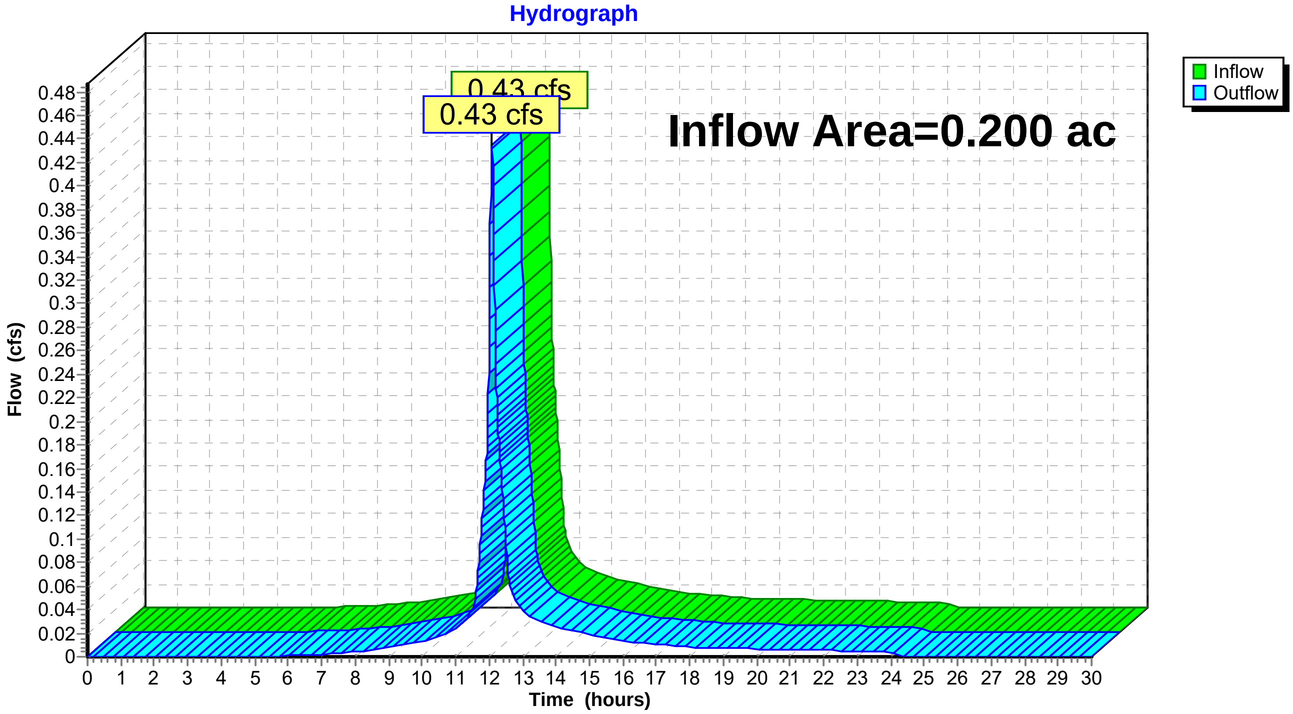
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.01	0.00	0.00
1.00	0.03	0.00	0.00
1.50	0.04	0.00	0.00
2.00	0.05	0.00	0.00
2.50	0.07	0.00	0.00
3.00	0.08	0.00	0.00
3.50	0.10	0.00	0.00
4.00	0.11	0.00	0.00
4.50	0.13	0.00	0.00
5.00	0.15	0.00	0.00
5.50	0.17	0.00	0.00
6.00	0.19	0.00	0.00
6.50	0.21	0.00	0.00
7.00	0.24	0.00	0.00
7.50	0.27	0.00	0.00
8.00	0.30	0.00	0.00
8.50	0.34	0.00	0.00
9.00	0.38	0.00	0.01
9.50	0.43	0.01	0.01
10.00	0.50	0.02	0.02
10.50	0.57	0.04	0.04
11.00	0.65	0.07	0.05
11.50	0.78	0.12	0.09
12.00	1.31	0.41	**0.31**
12.50	1.84	0.78	**1.02**
13.00	1.96	0.88	0.36
13.50	2.05	0.95	0.19
14.00	2.12	1.00	0.14
14.50	2.19	1.05	0.12
15.00	2.24	1.10	0.10
15.50	2.28	1.13	0.09
16.00	2.32	1.16	0.08
16.50	2.35	1.19	0.06
17.00	2.38	1.21	0.06
17.50	2.41	1.24	0.05
18.00	2.43	1.25	0.05
18.50	2.45	1.27	0.04
19.00	2.47	1.29	0.04
19.50	2.49	1.30	0.04
20.00	2.51	1.32	0.03
20.50	2.52	1.33	0.03
21.00	2.54	1.34	0.03
21.50	2.56	1.36	0.03
22.00	2.57	1.37	0.03
22.50	2.58	1.38	0.03
23.00	2.60	1.39	0.03
23.50	2.61	1.40	0.02
24.00	**2.62**	**1.41**	0.02
24.50	2.62	1.41	0.01
25.00	2.62	1.41	0.00
25.50	2.62	1.41	0.00
26.00	2.62	1.41	0.00
26.50	2.62	1.41	0.00
27.00	2.62	1.41	0.00
27.50	2.62	1.41	0.00
28.00	2.62	1.41	0.00
28.50	2.62	1.41	0.00
29.00	2.62	1.41	0.00
29.50	2.62	1.41	0.00
30.00	2.62	1.41	0.00

Summary for Reach DP1: Discharge Point #1 (US 9W)

Inflow Area =	0.200 ac, 67.59% Impervious, Inflow Depth = 1.89" for 1 Year event				
Inflow =	0.43 cfs @	12.09 hrs, Volume=	0.032 af		
Outflow =	0.43 cfs @	12.09 hrs, Volume=	0.032 af,	Atten= 0%,	Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach DP1: Discharge Point #1 (US 9W)



Hydrograph for Reach DP1: Discharge Point #1 (US 9W)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.00		0.00
7.00	0.00		0.00
7.50	0.00		0.00
8.00	0.00		0.00
8.50	0.01		0.01
9.00	0.01		0.01
9.50	0.01		0.01
10.00	0.01		0.01
10.50	0.02		0.02
11.00	0.02		0.02
11.50	0.04		0.04
12.00	**0.26**		**0.26**
12.50	**0.10**		**0.10**
13.00	0.04		0.04
13.50	0.03		0.03
14.00	0.02		0.02
14.50	0.02		0.02
15.00	0.02		0.02
15.50	0.02		0.02
16.00	0.01		0.01
16.50	0.01		0.01
17.00	0.01		0.01
17.50	0.01		0.01
18.00	0.01		0.01
18.50	0.01		0.01
19.00	0.01		0.01
19.50	0.01		0.01
20.00	0.01		0.01
20.50	0.01		0.01
21.00	0.01		0.01
21.50	0.01		0.01
22.00	0.01		0.01
22.50	0.01		0.01
23.00	0.00		0.00
23.50	0.00		0.00
24.00	0.00		0.00
24.50	0.00		0.00
25.00	0.00		0.00
25.50	0.00		0.00

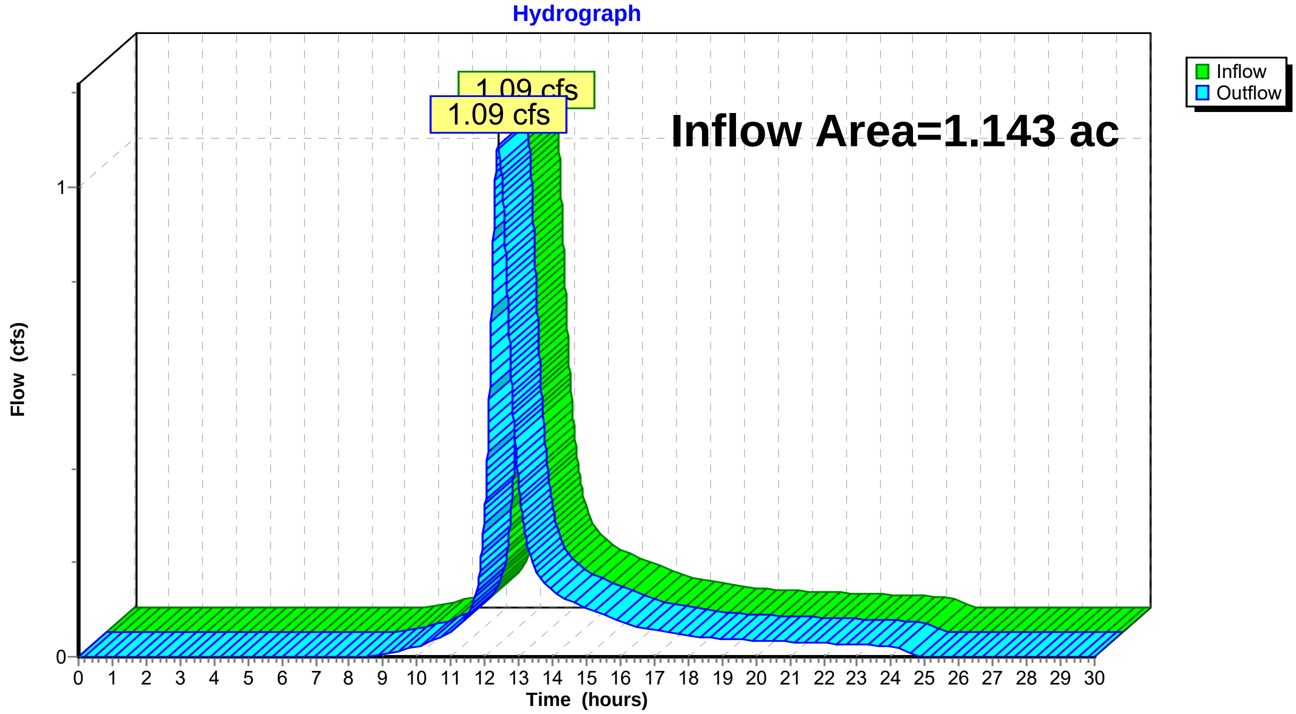
Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
26.00	0.00		0.00
26.50	0.00		0.00
27.00	0.00		0.00
27.50	0.00		0.00
28.00	0.00		0.00
28.50	0.00		0.00
29.00	0.00		0.00
29.50	0.00		0.00
30.00	0.00		0.00

Summary for Reach DP2: Discharge Point #2 (Existing Culvert)

Inflow Area =	1.143 ac, 30.05% Impervious, Inflow Depth = 1.41"	for 1 Year event	
Inflow =	1.09 cfs @ 12.39 hrs, Volume=	0.134 af	
Outflow =	1.09 cfs @ 12.39 hrs, Volume=	0.134 af, Atten= 0%, Lag= 0.0 min	

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach DP2: Discharge Point #2 (Existing Culvert)



Hydrograph for Reach DP2: Discharge Point #2 (Existing Culvert)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.00		0.00
7.00	0.00		0.00
7.50	0.00		0.00
8.00	0.00		0.00
8.50	0.00		0.00
9.00	0.01		0.01
9.50	0.01		0.01
10.00	0.02		0.02
10.50	0.04		0.04
11.00	0.05		0.05
11.50	0.09		0.09
12.00	**0.31**		**0.31**
12.50	**1.02**		**1.02**
13.00	0.36		0.36
13.50	0.19		0.19
14.00	0.14		0.14
14.50	0.12		0.12
15.00	0.10		0.10
15.50	0.09		0.09
16.00	0.08		0.08
16.50	0.06		0.06
17.00	0.06		0.06
17.50	0.05		0.05
18.00	0.05		0.05
18.50	0.04		0.04
19.00	0.04		0.04
19.50	0.04		0.04
20.00	0.03		0.03
20.50	0.03		0.03
21.00	0.03		0.03
21.50	0.03		0.03
22.00	0.03		0.03
22.50	0.03		0.03
23.00	0.03		0.03
23.50	0.02		0.02
24.00	0.02		0.02
24.50	0.01		0.01
25.00	0.00		0.00
25.50	0.00		0.00
26.00	0.00		0.00
26.50	0.00		0.00
27.00	0.00		0.00
27.50	0.00		0.00
28.00	0.00		0.00
28.50	0.00		0.00
29.00	0.00		0.00
29.50	0.00		0.00
30.00	0.00		0.00

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: Subcatchment #1 Runoff Area=8,707 sf 67.59% Impervious Runoff Depth=3.89"
Tc=6.0 min CN=93 Runoff=0.86 cfs 0.065 af

Subcatchment DA2: Subcatchment #2 Runoff Area=49,774 sf 30.05% Impervious Runoff Depth=3.28"
Flow Length=395' Tc=28.8 min CN=87 Runoff=2.51 cfs 0.312 af

Reach DP1: Discharge Point #1 (US 9W) Inflow=0.86 cfs 0.065 af
Outflow=0.86 cfs 0.065 af

Reach DP2: Discharge Point #2 (Existing Culvert) Inflow=2.51 cfs 0.312 af
Outflow=2.51 cfs 0.312 af

Total Runoff Area = 1.343 ac Runoff Volume = 0.377 af Average Runoff Depth = 3.37"
64.36% Pervious = 0.864 ac 35.64% Impervious = 0.478 ac

Summary for Subcatchment DA1: Subcatchment #1

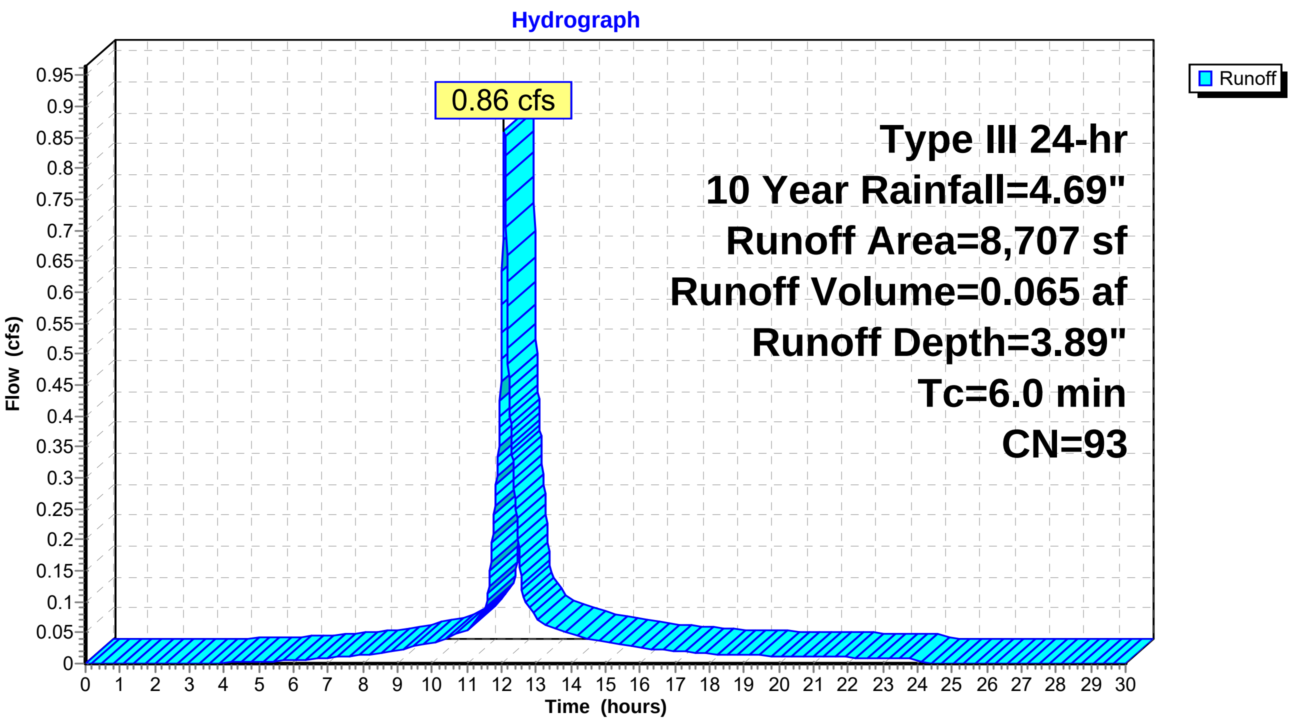
Runoff = 0.86 cfs @ 12.08 hrs, Volume= 0.065 af, Depth= 3.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.69"

Area (sf)	CN	Description
5,885	98	Paved parking, HSG D
2,822	84	50-75% Grass cover, Fair, HSG D
8,707	93	Weighted Average
2,822		32.41% Pervious Area
5,885		67.59% Impervious Area

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

Subcatchment DA1: Subcatchment #1



Hydrograph for Subcatchment DA1: Subcatchment #1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.09	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.14	0.00	0.00
3.50	0.17	0.00	0.00
4.00	0.20	0.00	0.00
4.50	0.23	0.01	0.00
5.00	0.27	0.02	0.00
5.50	0.30	0.03	0.00
6.00	0.34	0.04	0.01
6.50	0.38	0.05	0.01
7.00	0.42	0.07	0.01
7.50	0.48	0.10	0.01
8.00	0.53	0.13	0.01
8.50	0.60	0.17	0.02
9.00	0.68	0.22	0.02
9.50	0.78	0.29	0.03
10.00	0.89	0.36	0.03
10.50	1.02	0.46	0.04
11.00	1.17	0.59	0.05
11.50	1.40	0.78	0.09
12.00	2.34	1.63	**0.53**
12.50	3.29	2.53	**0.18**
13.00	3.52	2.75	0.07
13.50	3.67	2.90	0.06
14.00	3.80	3.03	0.05
14.50	3.91	3.13	0.04
15.00	4.01	3.23	0.04
15.50	4.09	3.31	0.03
16.00	4.16	3.37	0.02
16.50	4.21	3.43	0.02
17.00	4.27	3.48	0.02
17.50	4.31	3.52	0.02
18.00	4.35	3.56	0.02
18.50	4.39	3.60	0.01
19.00	4.42	3.63	0.01
19.50	4.46	3.67	0.01
20.00	4.49	3.70	0.01
20.50	4.52	3.73	0.01
21.00	4.55	3.75	0.01
21.50	4.57	3.78	0.01
22.00	4.60	3.81	0.01
22.50	4.62	3.83	0.01
23.00	4.65	3.85	0.01
23.50	4.67	3.87	0.01
24.00	**4.69**	**3.89**	0.01
24.50	4.69	3.89	0.00
25.00	4.69	3.89	0.00
25.50	4.69	3.89	0.00

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
26.00	4.69	3.89	0.00
26.50	4.69	3.89	0.00
27.00	4.69	3.89	0.00
27.50	4.69	3.89	0.00
28.00	4.69	3.89	0.00
28.50	4.69	3.89	0.00
29.00	4.69	3.89	0.00
29.50	4.69	3.89	0.00
30.00	4.69	3.89	0.00

Summary for Subcatchment DA2: Subcatchment #2

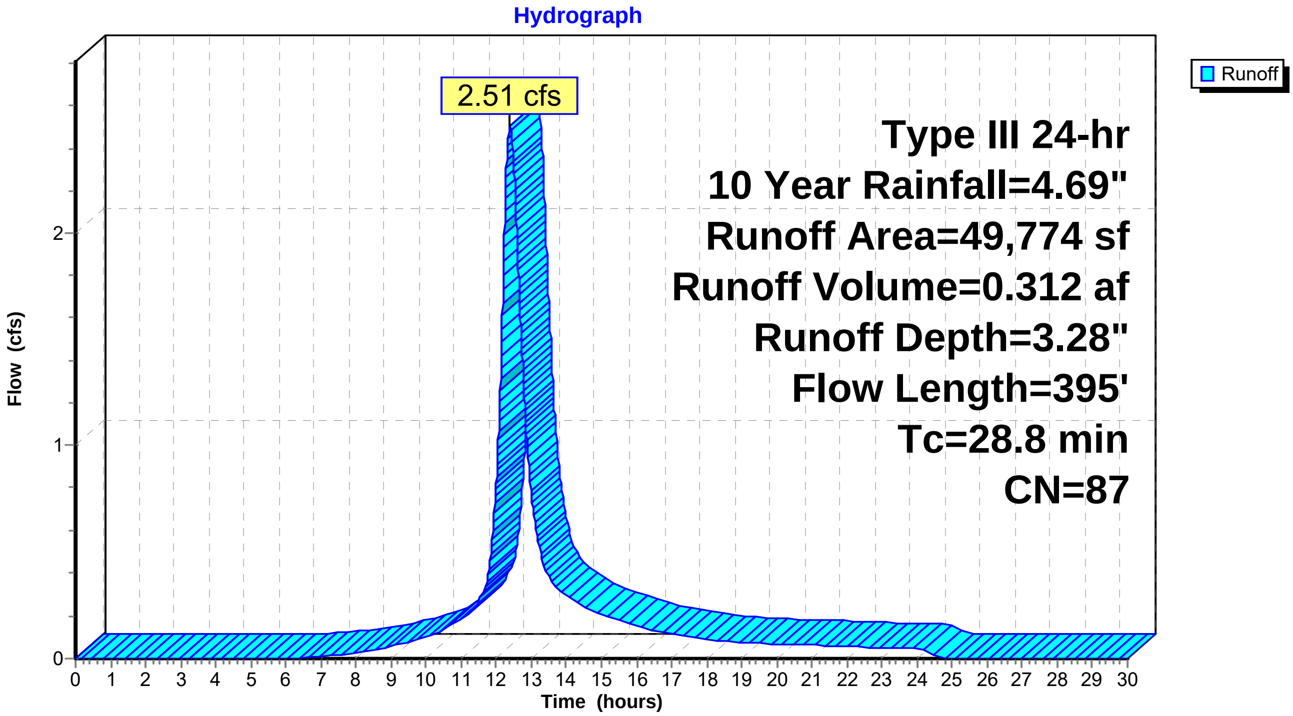
Runoff = 2.51 cfs @ 12.39 hrs, Volume= 0.312 af, Depth= 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.69"

Area (sf)	CN	Description
14,956	98	Paved parking, HSG D
18,312	84	50-75% Grass cover, Fair, HSG D
14,387	79	Woods, Fair, HSG D
2,119	96	Gravel surface, HSG D
49,774	87	Weighted Average
34,818		69.95% Pervious Area
14,956		30.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.9	130	0.0290	0.08		**Sheet Flow, Sheet Flow 1** Woods: Light underbrush n= 0.400 P2= 2.48"
2.2	158	0.0300	1.21		**Shallow Concentrated Flow, Shallow Concnetrated Flow 1** Short Grass Pasture Kv= 7.0 fps
0.0	4	0.6480	5.63		**Shallow Concentrated Flow, Shallow Concentrated Flow 2** Short Grass Pasture Kv= 7.0 fps
0.7	103	0.0060	2.63	11.85	**Channel Flow, Channel 1** Area= 4.5 sf Perim= 12.6' r= 0.36' n= 0.022 Earth, clean & straight
28.8	395	Total			

Subcatchment DA2: Subcatchment #2



Hydrograph for Subcatchment DA2: Subcatchment #2

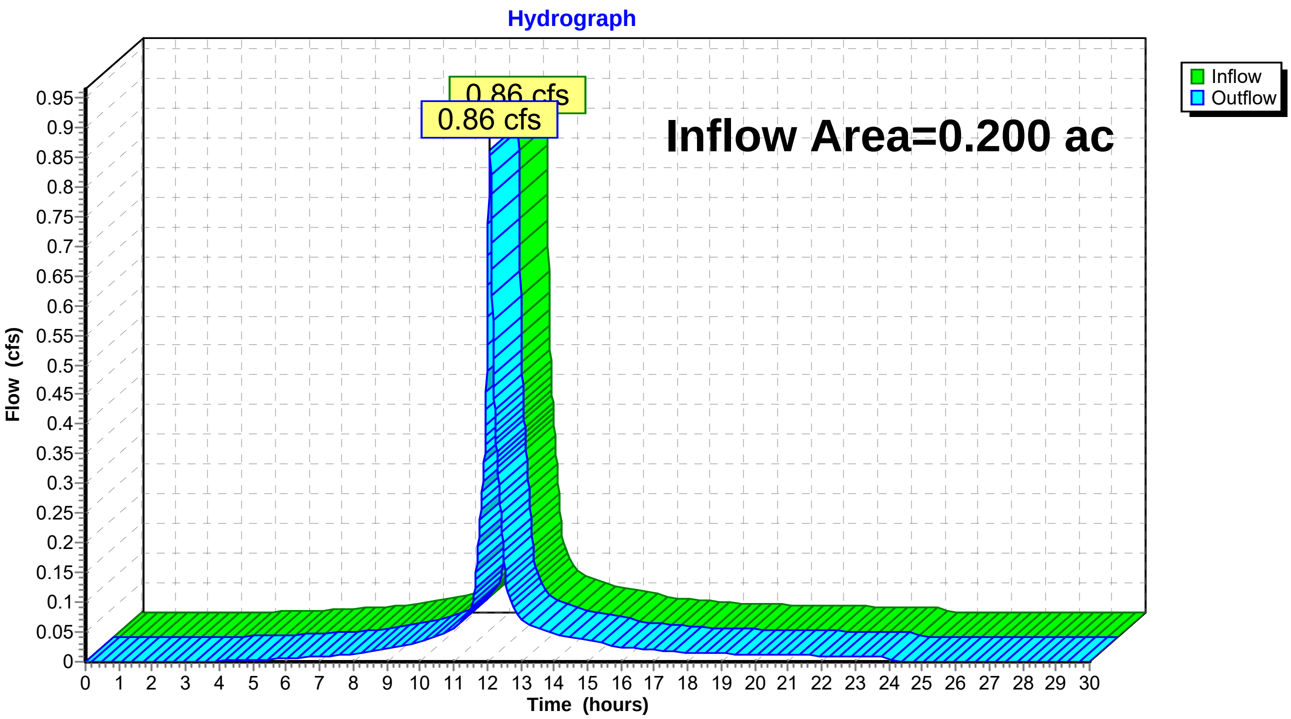
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.09	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.14	0.00	0.00
3.50	0.17	0.00	0.00
4.00	0.20	0.00	0.00
4.50	0.23	0.00	0.00
5.00	0.27	0.00	0.00
5.50	0.30	0.00	0.00
6.00	0.34	0.00	0.00
6.50	0.38	0.00	0.01
7.00	0.42	0.01	0.01
7.50	0.48	0.02	0.02
8.00	0.53	0.03	0.03
8.50	0.60	0.05	0.04
9.00	0.68	0.08	0.06
9.50	0.78	0.12	0.08
10.00	0.89	0.17	0.10
10.50	1.02	0.23	0.14
11.00	1.17	0.32	0.19
11.50	1.40	0.47	0.27
12.00	2.34	1.18	**0.82**
12.50	3.29	2.00	**2.31**
13.00	3.52	2.20	0.77
13.50	3.67	2.34	0.38
14.00	3.80	2.46	0.29
14.50	3.91	2.56	0.24
15.00	4.01	2.64	0.21
15.50	4.09	2.72	0.18
16.00	4.16	2.78	0.15
16.50	4.21	2.83	0.13
17.00	4.27	2.88	0.12
17.50	4.31	2.92	0.10
18.00	4.35	2.96	0.09
18.50	4.39	3.00	0.08
19.00	4.42	3.03	0.08
19.50	4.46	3.06	0.07
20.00	4.49	3.09	0.07
20.50	4.52	3.12	0.07
21.00	4.55	3.14	0.06
21.50	4.57	3.17	0.06
22.00	4.60	3.19	0.06
22.50	4.62	3.21	0.05
23.00	4.65	3.24	0.05
23.50	4.67	3.26	0.05
24.00	**4.69**	**3.28**	0.05
24.50	4.69	3.28	0.01
25.00	4.69	3.28	0.00
25.50	4.69	3.28	0.00
26.00	4.69	3.28	0.00
26.50	4.69	3.28	0.00
27.00	4.69	3.28	0.00
27.50	4.69	3.28	0.00
28.00	4.69	3.28	0.00
28.50	4.69	3.28	0.00
29.00	4.69	3.28	0.00
29.50	4.69	3.28	0.00
30.00	4.69	3.28	0.00

Summary for Reach DP1: Discharge Point #1 (US 9W)

Inflow Area =	0.200 ac, 67.59% Impervious, Inflow Depth = 3.89"	for 10 Year event
Inflow =	0.86 cfs @ 12.08 hrs, Volume=	0.065 af
Outflow =	0.86 cfs @ 12.08 hrs, Volume=	0.065 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach DP1: Discharge Point #1 (US 9W)



Hydrograph for Reach DP1: Discharge Point #1 (US 9W)

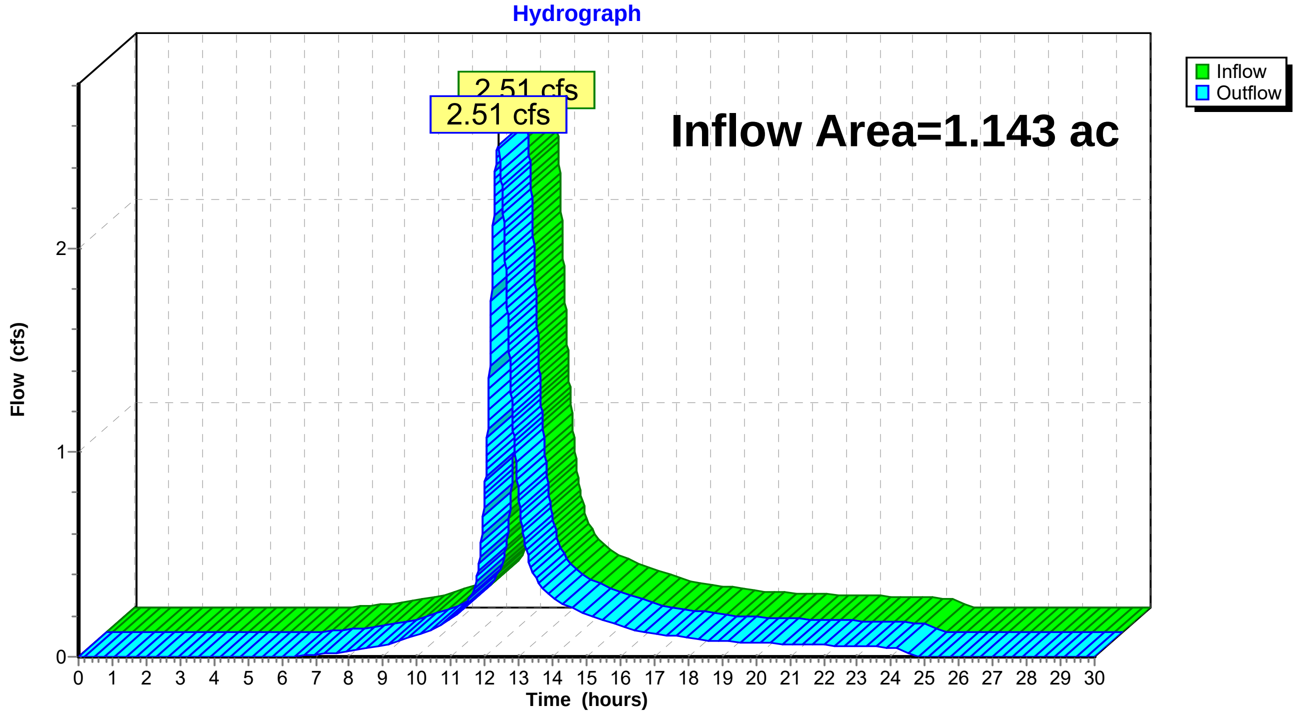
Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.01		0.01
6.50	0.01		0.01
7.00	0.01		0.01
7.50	0.01		0.01
8.00	0.01		0.01
8.50	0.02		0.02
9.00	0.02		0.02
9.50	0.03		0.03
10.00	0.03		0.03
10.50	0.04		0.04
11.00	0.05		0.05
11.50	0.09		0.09
12.00	**0.53**		**0.53**
12.50	**0.18**		**0.18**
13.00	0.07		0.07
13.50	0.06		0.06
14.00	0.05		0.05
14.50	0.04		0.04
15.00	0.04		0.04
15.50	0.03		0.03
16.00	0.02		0.02
16.50	0.02		0.02
17.00	0.02		0.02
17.50	0.02		0.02
18.00	0.02		0.02
18.50	0.01		0.01
19.00	0.01		0.01
19.50	0.01		0.01
20.00	0.01		0.01
20.50	0.01		0.01
21.00	0.01		0.01
21.50	0.01		0.01
22.00	0.01		0.01
22.50	0.01		0.01
23.00	0.01		0.01
23.50	0.01		0.01
24.00	0.01		0.01
24.50	0.00		0.00
25.00	0.00		0.00
25.50	0.00		0.00
26.00	0.00		0.00
26.50	0.00		0.00
27.00	0.00		0.00
27.50	0.00		0.00
28.00	0.00		0.00
28.50	0.00		0.00
29.00	0.00		0.00
29.50	0.00		0.00
30.00	0.00		0.00

Summary for Reach DP2: Discharge Point #2 (Existing Culvert)

Inflow Area =	1.143 ac, 30.05% Impervious, Inflow Depth = 3.28"	for 10 Year event	
Inflow =	2.51 cfs @ 12.39 hrs, Volume=	0.312 af	
Outflow =	2.51 cfs @ 12.39 hrs, Volume=	0.312 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach DP2: Discharge Point #2 (Existing Culvert)



Hydrograph for Reach DP2: Discharge Point #2 (Existing Culvert)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.01		0.01
7.00	0.01		0.01
7.50	0.02		0.02
8.00	0.03		0.03
8.50	0.04		0.04
9.00	0.06		0.06
9.50	0.08		0.08
10.00	0.10		0.10
10.50	0.14		0.14
11.00	0.19		0.19
11.50	0.27		0.27
12.00	**0.82**		**0.82**
12.50	**2.31**		**2.31**
13.00	0.77		0.77
13.50	0.38		0.38
14.00	0.29		0.29
14.50	0.24		0.24
15.00	0.21		0.21
15.50	0.18		0.18
16.00	0.15		0.15
16.50	0.13		0.13
17.00	0.12		0.12
17.50	0.10		0.10
18.00	0.09		0.09
18.50	0.08		0.08
19.00	0.08		0.08
19.50	0.07		0.07
20.00	0.07		0.07
20.50	0.07		0.07
21.00	0.06		0.06
21.50	0.06		0.06
22.00	0.06		0.06
22.50	0.05		0.05
23.00	0.05		0.05
23.50	0.05		0.05
24.00	0.05		0.05
24.50	0.01		0.01
25.00	0.00		0.00
25.50	0.00		0.00
26.00	0.00		0.00
26.50	0.00		0.00
27.00	0.00		0.00
27.50	0.00		0.00
28.00	0.00		0.00
28.50	0.00		0.00
29.00	0.00		0.00
29.50	0.00		0.00
30.00	0.00		0.00

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: Subcatchment #1 Runoff Area=8,707 sf 67.59% Impervious Runoff Depth=7.38"
Tc=6.0 min CN=93 Runoff=1.57 cfs 0.123 af

Subcatchment DA2: Subcatchment #2 Runoff Area=49,774 sf 30.05% Impervious Runoff Depth=6.66"
Flow Length=395' Tc=28.8 min CN=87 Runoff=4.95 cfs 0.635 af

Reach DP1: Discharge Point #1 (US 9W) Inflow=1.57 cfs 0.123 af
Outflow=1.57 cfs 0.123 af

Reach DP2: Discharge Point #2 (Existing Culvert) Inflow=4.95 cfs 0.635 af
Outflow=4.95 cfs 0.635 af

Total Runoff Area = 1.343 ac Runoff Volume = 0.758 af Average Runoff Depth = 6.77"
64.36% Pervious = 0.864 ac 35.64% Impervious = 0.478 ac

Summary for Subcatchment DA1: Subcatchment #1

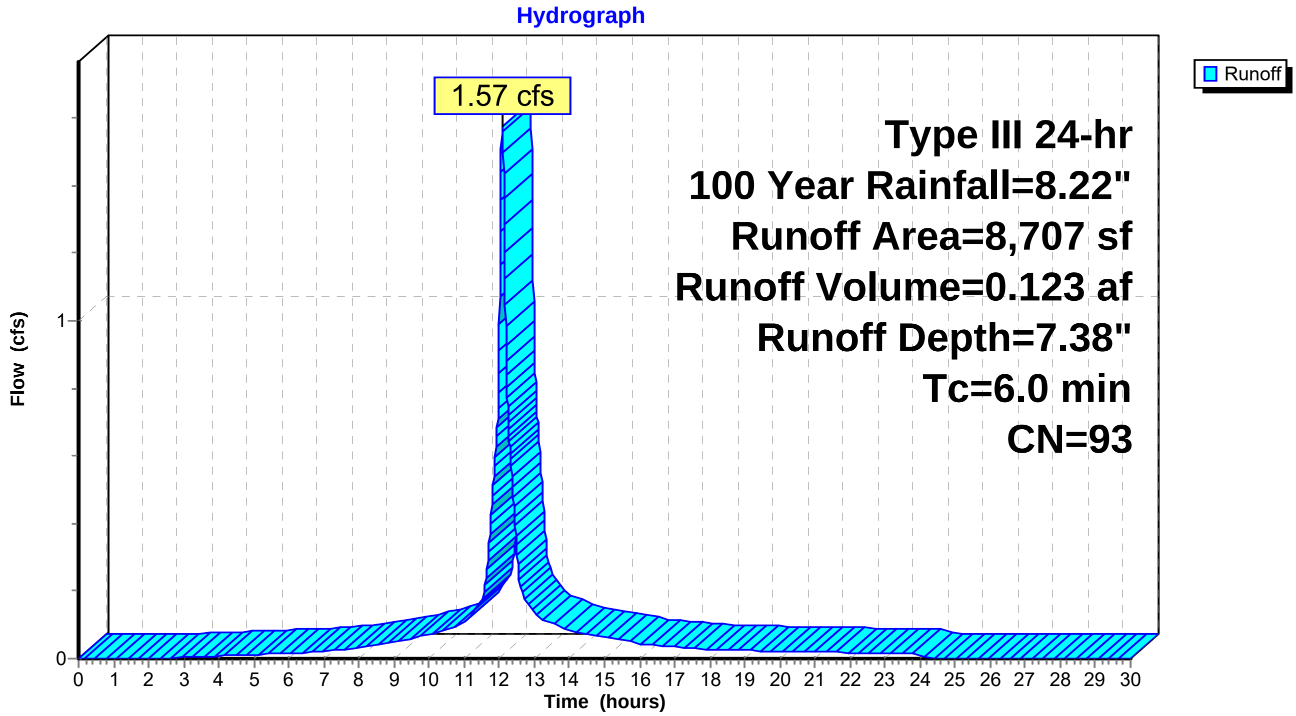
Runoff = 1.57 cfs @ 12.08 hrs, Volume= 0.123 af, Depth= 7.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.22"

Area (sf)	CN	Description
5,885	98	Paved parking, HSG D
2,822	84	50-75% Grass cover, Fair, HSG D
8,707	93	Weighted Average
2,822		32.41% Pervious Area
5,885		67.59% Impervious Area

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

Subcatchment DA1: Subcatchment #1



Hydrograph for Subcatchment DA1: Subcatchment #1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.08	0.00	0.00
1.50	0.12	0.00	0.00
2.00	0.16	0.00	0.00
2.50	0.21	0.00	0.00
3.00	0.25	0.01	0.00
3.50	0.30	0.03	0.01
4.00	0.35	0.04	0.01
4.50	0.41	0.07	0.01
5.00	0.47	0.09	0.01
5.50	0.53	0.13	0.01
6.00	0.59	0.16	0.02
6.50	0.66	0.21	0.02
7.00	0.74	0.26	0.02
7.50	0.84	0.33	0.03
8.00	0.94	0.40	0.03
8.50	1.06	0.49	0.04
9.00	1.20	0.61	0.05
9.50	1.36	0.75	0.06
10.00	1.55	0.91	0.07
10.50	1.78	1.11	0.09
11.00	2.06	1.36	0.11
11.50	2.45	1.73	0.17
12.00	4.11	3.33	**0.99**
12.50	5.77	4.96	**0.33**
13.00	6.16	5.35	0.13
13.50	6.44	5.62	0.10
14.00	6.67	5.84	0.08
14.50	6.86	6.03	0.07
15.00	7.02	6.19	0.06
15.50	7.16	6.33	0.05
16.00	7.28	6.45	0.04
16.50	7.38	6.55	0.04
17.00	7.48	6.64	0.04
17.50	7.56	6.72	0.03
18.00	7.63	6.79	0.03
18.50	7.69	6.86	0.03
19.00	7.75	6.92	0.02
19.50	7.81	6.98	0.02
20.00	7.87	7.03	0.02
20.50	7.92	7.08	0.02
21.00	7.97	7.13	0.02
21.50	8.02	7.18	0.02
22.00	8.06	7.22	0.02
22.50	8.10	7.27	0.02
23.00	8.15	7.31	0.02
23.50	8.18	7.35	0.02
24.00	**8.22**	**7.38**	0.01
24.50	8.22	7.38	0.00
25.00	8.22	7.38	0.00
25.50	8.22	7.38	0.00
26.00	8.22	7.38	0.00
26.50	8.22	7.38	0.00
27.00	8.22	7.38	0.00
27.50	8.22	7.38	0.00
28.00	8.22	7.38	0.00
28.50	8.22	7.38	0.00
29.00	8.22	7.38	0.00
29.50	8.22	7.38	0.00
30.00	8.22	7.38	0.00

Summary for Subcatchment DA2: Subcatchment #2

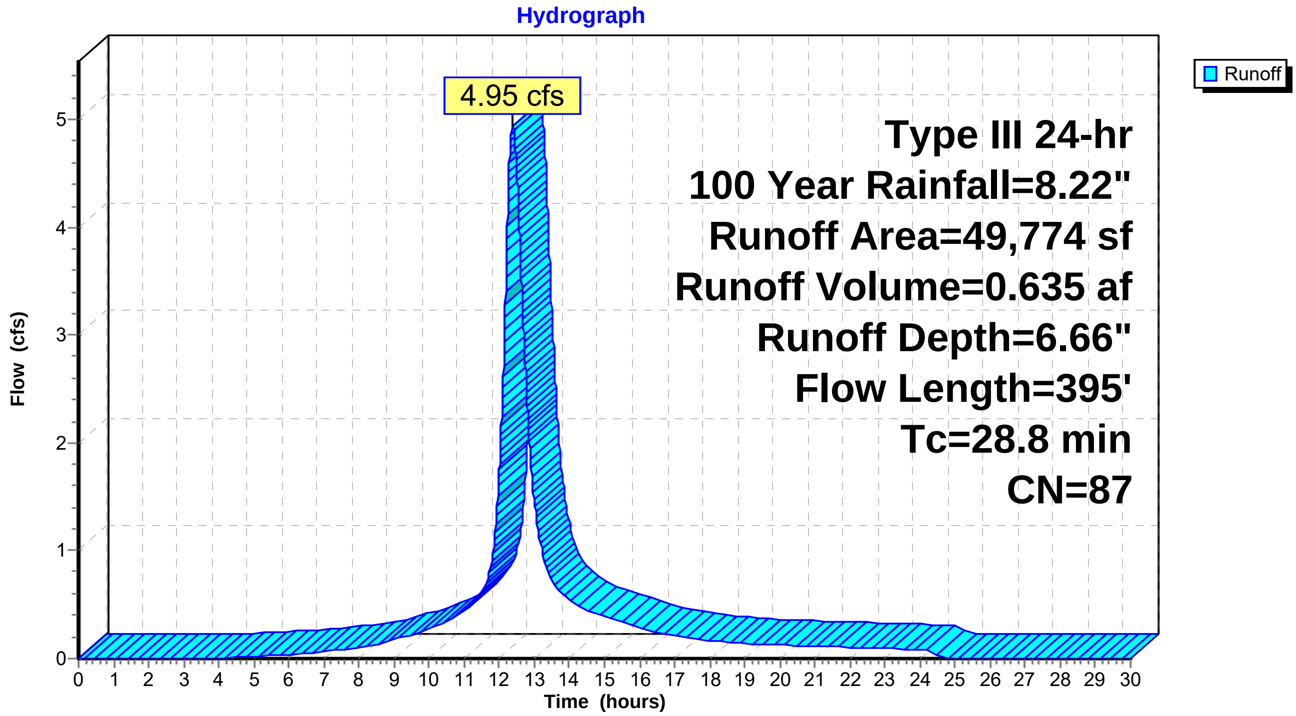
Runoff = 4.95 cfs @ 12.38 hrs, Volume= 0.635 af, Depth= 6.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.22"

Area (sf)	CN	Description
14,956	98	Paved parking, HSG D
18,312	84	50-75% Grass cover, Fair, HSG D
14,387	79	Woods, Fair, HSG D
2,119	96	Gravel surface, HSG D
49,774	87	Weighted Average
34,818		69.95% Pervious Area
14,956		30.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.9	130	0.0290	0.08		**Sheet Flow, Sheet Flow 1** Woods: Light underbrush n= 0.400 P2= 2.48"
2.2	158	0.0300	1.21		**Shallow Concentrated Flow, Shallow Concnetrated Flow 1** Short Grass Pasture Kv= 7.0 fps
0.0	4	0.6480	5.63		**Shallow Concentrated Flow, Shallow Concentrated Flow 2** Short Grass Pasture Kv= 7.0 fps
0.7	103	0.0060	2.63	11.85	**Channel Flow, Channel 1** Area= 4.5 sf Perim= 12.6' r= 0.36' n= 0.022 Earth, clean & straight
28.8	395	Total			

Subcatchment DA2: Subcatchment #2



Hydrograph for Subcatchment DA2: Subcatchment #2

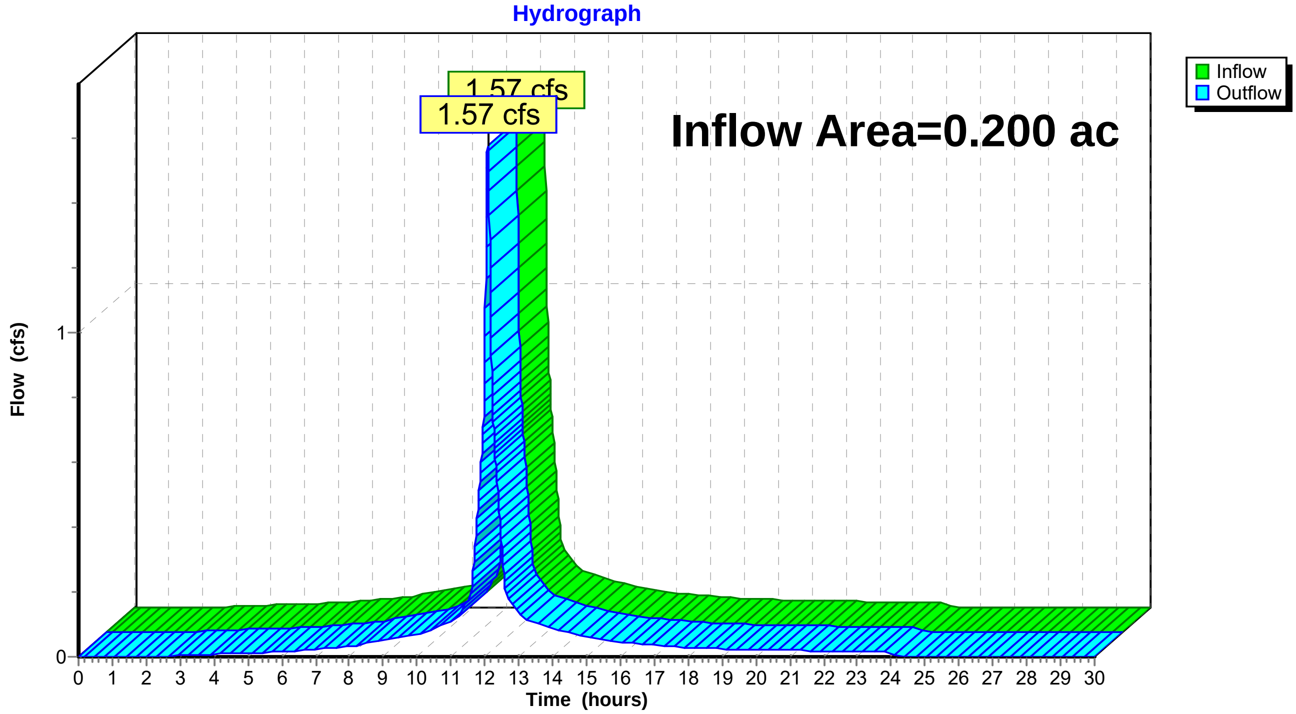
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.08	0.00	0.00
1.50	0.12	0.00	0.00
2.00	0.16	0.00	0.00
2.50	0.21	0.00	0.00
3.00	0.25	0.00	0.00
3.50	0.30	0.00	0.00
4.00	0.35	0.00	0.00
4.50	0.41	0.01	0.01
5.00	0.47	0.02	0.02
5.50	0.53	0.03	0.03
6.00	0.59	0.05	0.04
6.50	0.66	0.07	0.05
7.00	0.74	0.10	0.06
7.50	0.84	0.14	0.08
8.00	0.94	0.19	0.10
8.50	1.06	0.25	0.13
9.00	1.20	0.34	0.17
9.50	1.36	0.44	0.22
10.00	1.55	0.57	0.28
10.50	1.78	0.74	0.34
11.00	2.06	0.95	0.44
11.50	2.45	1.27	0.62
12.00	4.11	2.74	**1.75**
12.50	5.77	4.30	**4.51**
13.00	6.16	4.68	1.46
13.50	6.44	4.94	0.72
14.00	6.67	5.16	0.55
14.50	6.86	5.34	0.45
15.00	7.02	5.50	0.39
15.50	7.16	5.64	0.34
16.00	7.28	5.75	0.29
16.50	7.38	5.85	0.24
17.00	7.48	5.94	0.21
17.50	7.56	6.02	0.19
18.00	7.63	6.09	0.17
18.50	7.69	6.15	0.15
19.00	7.75	6.21	0.14
19.50	7.81	6.27	0.13
20.00	7.87	6.32	0.13
20.50	7.92	6.37	0.12
21.00	7.97	6.42	0.11
21.50	8.02	6.47	0.11
22.00	8.06	6.51	0.10
22.50	8.10	6.55	0.10
23.00	8.15	6.59	0.09
23.50	8.18	6.63	0.09
24.00	**8.22**	**6.66**	0.08
24.50	8.22	6.66	0.03
25.00	8.22	6.66	0.00
25.50	8.22	6.66	0.00
26.00	8.22	6.66	0.00
26.50	8.22	6.66	0.00
27.00	8.22	6.66	0.00
27.50	8.22	6.66	0.00
28.00	8.22	6.66	0.00
28.50	8.22	6.66	0.00
29.00	8.22	6.66	0.00
29.50	8.22	6.66	0.00
30.00	8.22	6.66	0.00

Summary for Reach DP1: Discharge Point #1 (US 9W)

Inflow Area =	0.200 ac, 67.59% Impervious, Inflow Depth = 7.38"	for 100 Year event
Inflow =	1.57 cfs @ 12.08 hrs, Volume=	0.123 af
Outflow =	1.57 cfs @ 12.08 hrs, Volume=	0.123 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach DP1: Discharge Point #1 (US 9W)



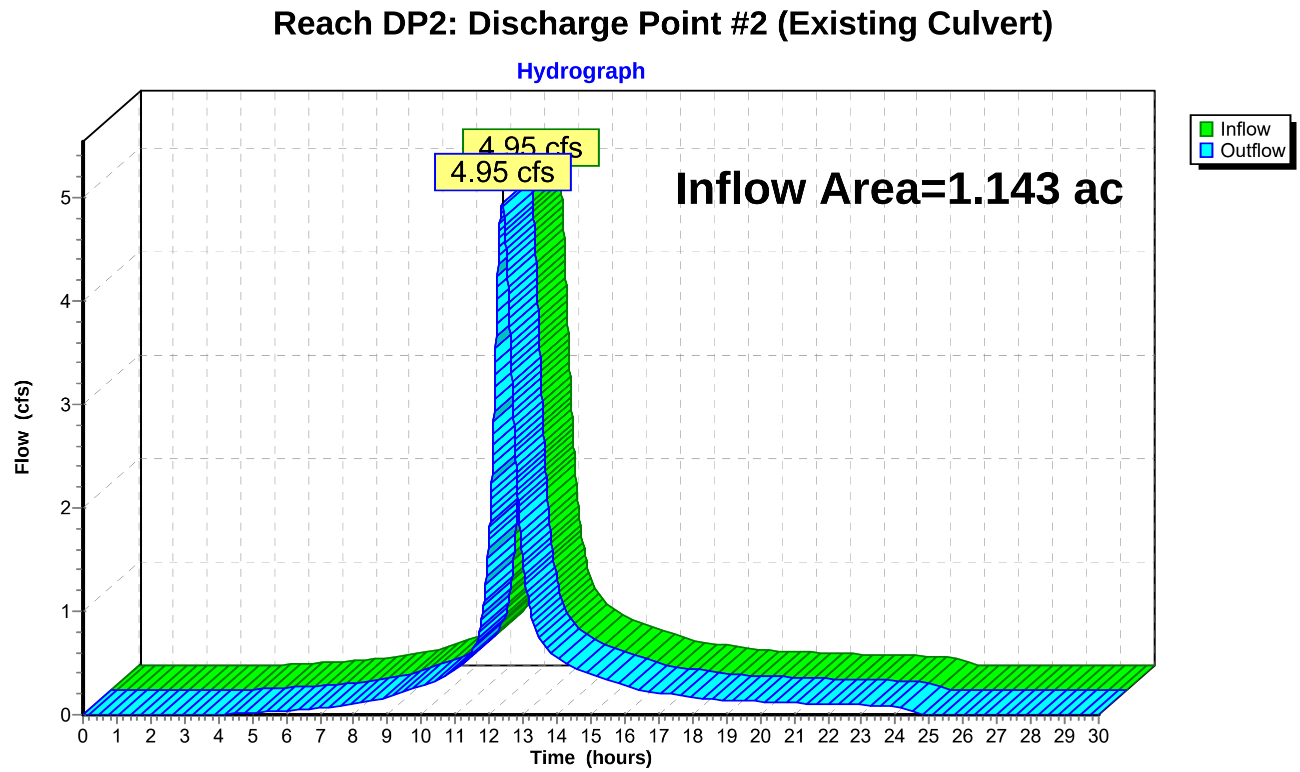
Hydrograph for Reach DP1: Discharge Point #1 (US 9W)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.01		0.01
4.00	0.01		0.01
4.50	0.01		0.01
5.00	0.01		0.01
5.50	0.01		0.01
6.00	0.02		0.02
6.50	0.02		0.02
7.00	0.02		0.02
7.50	0.03		0.03
8.00	0.03		0.03
8.50	0.04		0.04
9.00	0.05		0.05
9.50	0.06		0.06
10.00	0.07		0.07
10.50	0.09		0.09
11.00	0.11		0.11
11.50	0.17		0.17
12.00	**0.99**		**0.99**
12.50	**0.33**		**0.33**
13.00	0.13		0.13
13.50	0.10		0.10
14.00	0.08		0.08
14.50	0.07		0.07
15.00	0.06		0.06
15.50	0.05		0.05
16.00	0.04		0.04
16.50	0.04		0.04
17.00	0.04		0.04
17.50	0.03		0.03
18.00	0.03		0.03
18.50	0.03		0.03
19.00	0.02		0.02
19.50	0.02		0.02
20.00	0.02		0.02
20.50	0.02		0.02
21.00	0.02		0.02
21.50	0.02		0.02
22.00	0.02		0.02
22.50	0.02		0.02
23.00	0.02		0.02
23.50	0.02		0.02
24.00	0.01		0.01
24.50	0.00		0.00
25.00	0.00		0.00
25.50	0.00		0.00
26.00	0.00		0.00
26.50	0.00		0.00
27.00	0.00		0.00
27.50	0.00		0.00
28.00	0.00		0.00
28.50	0.00		0.00
29.00	0.00		0.00
29.50	0.00		0.00
30.00	0.00		0.00

Summary for Reach DP2: Discharge Point #2 (Existing Culvert)

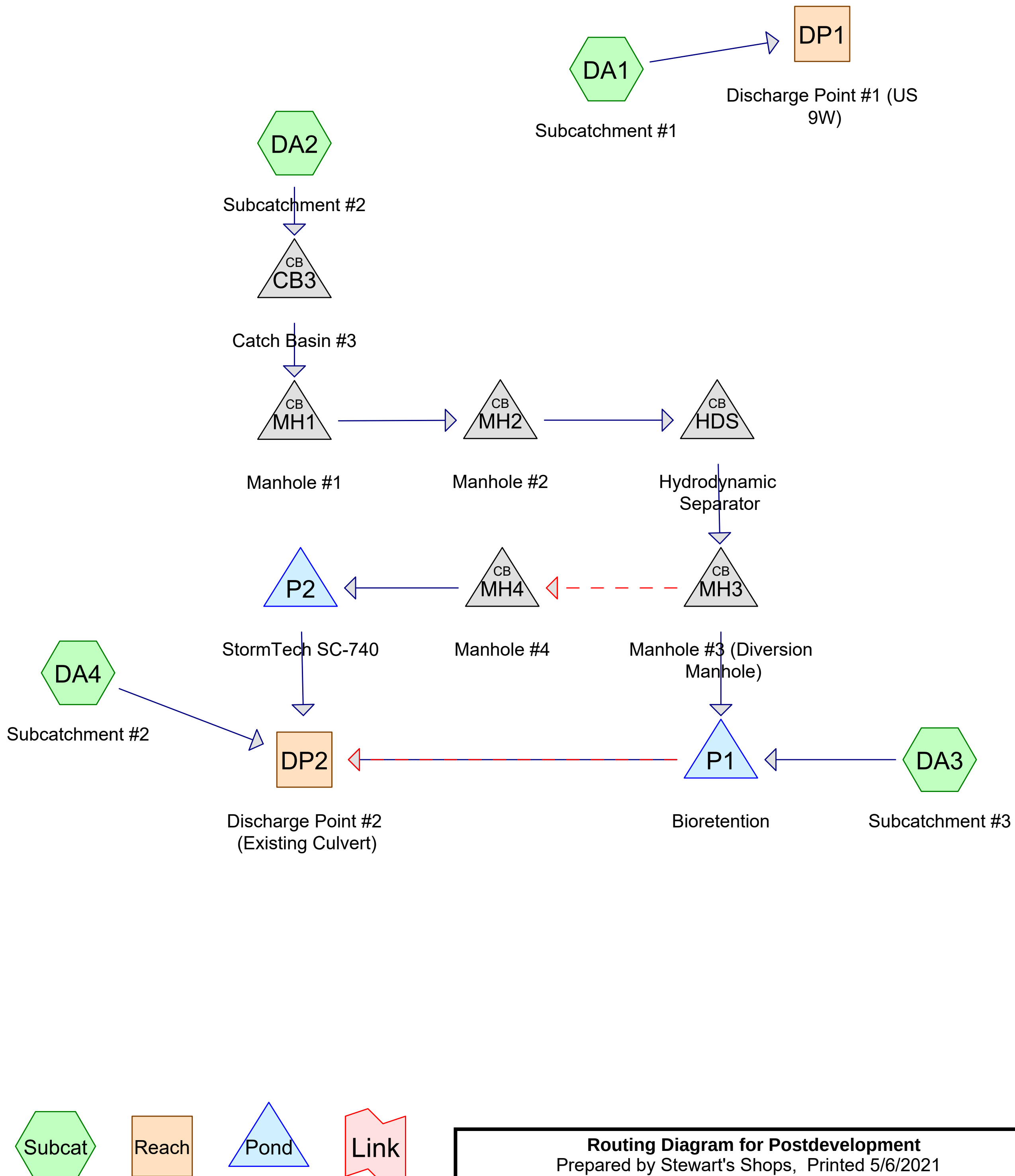
Inflow Area =	1.143 ac, 30.05% Impervious,	Inflow Depth = 6.66"	for 100 Year event	
Inflow =	4.95 cfs @	12.38 hrs, Volume=	0.635 af	
Outflow =	4.95 cfs @	12.38 hrs, Volume=	0.635 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs



Hydrograph for Reach DP2: Discharge Point #2 (Existing Culvert)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00	26.00	0.00		0.00
0.50	0.00		0.00	26.50	0.00		0.00
1.00	0.00		0.00	27.00	0.00		0.00
1.50	0.00		0.00	27.50	0.00		0.00
2.00	0.00		0.00	28.00	0.00		0.00
2.50	0.00		0.00	28.50	0.00		0.00
3.00	0.00		0.00	29.00	0.00		0.00
3.50	0.00		0.00	29.50	0.00		0.00
4.00	0.00		0.00	30.00	0.00		0.00
4.50	0.01		0.01				
5.00	0.02		0.02				
5.50	0.03		0.03				
6.00	0.04		0.04				
6.50	0.05		0.05				
7.00	0.06		0.06				
7.50	0.08		0.08				
8.00	0.10		0.10				
8.50	0.13		0.13				
9.00	0.17		0.17				
9.50	0.22		0.22				
10.00	0.28		0.28				
10.50	0.34		0.34				
11.00	0.44		0.44				
11.50	0.62		0.62				
12.00	**1.75**		**1.75**				
12.50	**4.51**		**4.51**				
13.00	1.46		1.46				
13.50	0.72		0.72				
14.00	0.55		0.55				
14.50	0.45		0.45				
15.00	0.39		0.39				
15.50	0.34		0.34				
16.00	0.29		0.29				
16.50	0.24		0.24				
17.00	0.21		0.21				
17.50	0.19		0.19				
18.00	0.17		0.17				
18.50	0.15		0.15				
19.00	0.14		0.14				
19.50	0.13		0.13				
20.00	0.13		0.13				
20.50	0.12		0.12				
21.00	0.11		0.11				
21.50	0.11		0.11				
22.00	0.10		0.10				
22.50	0.10		0.10				
23.00	0.09		0.09				
23.50	0.09		0.09				
24.00	0.08		0.08				
24.50	0.03		0.03				
25.00	0.00		0.00				
25.50	0.00		0.00				



Routing Diagram for Postdevelopment
Prepared by Stewart's Shops, Printed 5/6/2021
HydroCAD® 10.00-22 s/n 08847 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.578	80	>75% Grass cover, Good, HSG D (DA1, DA2, DA3, DA4)
0.764	98	Paved parking, HSG D (DA2, DA4)
1.342	**90**	**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: Subcatchment #1 Runoff Area=1,903 sf 0.00% Impervious Runoff Depth=0.97"
Tc=6.0 min CN=80 Runoff=0.05 cfs 0.004 af

Subcatchment DA2: Subcatchment #2 Runoff Area=40,196 sf 81.61% Impervious Runoff Depth=2.08"
Flow Length=128' Tc=12.2 min CN=95 Runoff=1.77 cfs 0.160 af

Subcatchment DA3: Subcatchment #3 Runoff Area=8,907 sf 0.00% Impervious Runoff Depth=0.97"
Flow Length=72' Tc=8.7 min CN=80 Runoff=0.21 cfs 0.017 af

Subcatchment DA4: Subcatchment #2 Runoff Area=7,458 sf 6.64% Impervious Runoff Depth=1.03"
Flow Length=334' Tc=8.6 min CN=81 Runoff=0.18 cfs 0.015 af

Reach DP1: Discharge Point #1 (US 9W) Inflow=0.05 cfs 0.004 af
Outflow=0.05 cfs 0.004 af

Reach DP2: Discharge Point #2 (Existing Culvert) Inflow=1.07 cfs 0.165 af
Outflow=1.07 cfs 0.165 af

Pond CB3: Catch Basin #3 Peak Elev=359.75' Inflow=1.77 cfs 0.160 af
12.0" Round Culvert n=0.012 L=19.0' S=0.0368 '/' Outflow=1.77 cfs 0.160 af

Pond HDS: Hydrodynamic Separator Peak Elev=358.48' Inflow=1.77 cfs 0.160 af
15.0" Round Culvert n=0.012 L=2.0' S=0.0050 '/' Outflow=1.77 cfs 0.160 af

Pond MH1: Manhole #1 Peak Elev=359.11' Inflow=1.77 cfs 0.160 af
12.0" Round Culvert n=0.012 L=35.0' S=0.0049 '/' Outflow=1.77 cfs 0.160 af

Pond MH2: Manhole #2 Peak Elev=358.89' Inflow=1.77 cfs 0.160 af
12.0" Round Culvert n=0.012 L=84.0' S=0.0050 '/' Outflow=1.77 cfs 0.160 af

Pond MH3: Manhole #3 (Diversion Manhole) Peak Elev=358.87' Inflow=1.77 cfs 0.160 af
Primary=0.68 cfs 0.131 af Secondary=1.09 cfs 0.029 af Outflow=1.77 cfs 0.160 af

Pond MH4: Manhole #4 Peak Elev=357.43' Inflow=1.09 cfs 0.029 af
24.0" Round Culvert n=0.012 L=2.0' S=0.0000 '/' Outflow=1.09 cfs 0.029 af

Pond P1: Bioretention Peak Elev=358.11' Storage=1,390 cf Inflow=0.88 cfs 0.147 af
Primary=0.83 cfs 0.129 af Secondary=0.00 cfs 0.000 af Outflow=0.83 cfs 0.129 af

Pond P2: StormTech SC-740 Peak Elev=357.04' Storage=0.025 af Inflow=1.09 cfs 0.029 af
Outflow=0.15 cfs 0.022 af

Total Runoff Area = 1.342 ac Runoff Volume = 0.195 af Average Runoff Depth = 1.74"
43.04% Pervious = 0.578 ac 56.96% Impervious = 0.764 ac

Summary for Subcatchment DA1: Subcatchment #1

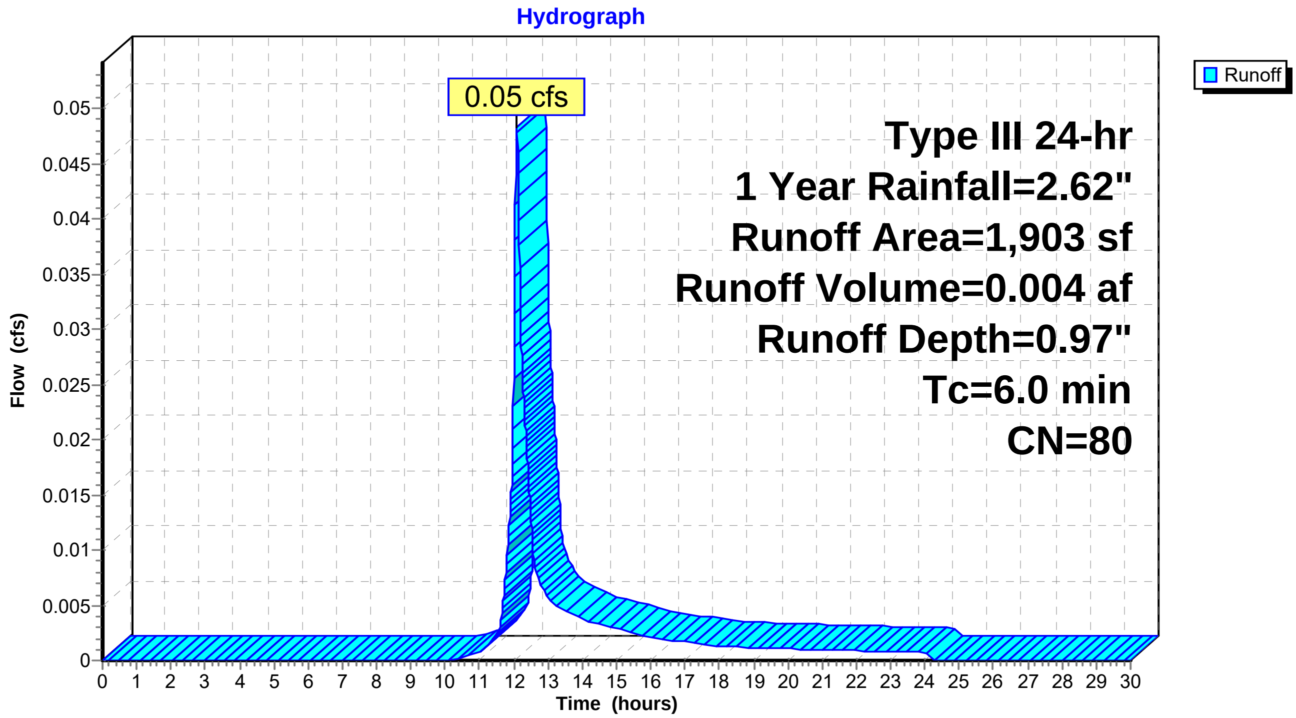
Runoff = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.62"

Area (sf)	CN	Description
1,903	80	>75% Grass cover, Good, HSG D
1,903		100.00% Pervious Area

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

Subcatchment DA1: Subcatchment #1



Hydrograph for Subcatchment DA1: Subcatchment #1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.01	0.00	0.00
1.00	0.03	0.00	0.00
1.50	0.04	0.00	0.00
2.00	0.05	0.00	0.00
2.50	0.07	0.00	0.00
3.00	0.08	0.00	0.00
3.50	0.10	0.00	0.00
4.00	0.11	0.00	0.00
4.50	0.13	0.00	0.00
5.00	0.15	0.00	0.00
5.50	0.17	0.00	0.00
6.00	0.19	0.00	0.00
6.50	0.21	0.00	0.00
7.00	0.24	0.00	0.00
7.50	0.27	0.00	0.00
8.00	0.30	0.00	0.00
8.50	0.34	0.00	0.00
9.00	0.38	0.00	0.00
9.50	0.43	0.00	0.00
10.00	0.50	0.00	0.00
10.50	0.57	0.00	0.00
11.00	0.65	0.01	0.00
11.50	0.78	0.03	0.00
12.00	1.31	0.20	**0.03**
12.50	1.84	0.47	**0.01**
13.00	1.96	0.54	0.01
13.50	2.05	0.59	0.00
14.00	2.12	0.64	0.00
14.50	2.19	0.68	0.00
15.00	2.24	0.71	0.00
15.50	2.28	0.74	0.00
16.00	2.32	0.77	0.00
16.50	2.35	0.79	0.00
17.00	2.38	0.81	0.00
17.50	2.41	0.83	0.00
18.00	2.43	0.84	0.00
18.50	2.45	0.86	0.00
19.00	2.47	0.87	0.00
19.50	2.49	0.88	0.00
20.00	2.51	0.89	0.00
20.50	2.52	0.91	0.00
21.00	2.54	0.92	0.00
21.50	2.56	0.93	0.00
22.00	2.57	0.94	0.00
22.50	2.58	0.95	0.00
23.00	2.60	0.96	0.00
23.50	2.61	0.96	0.00
24.00	**2.62**	**0.97**	0.00
24.50	2.62	0.97	0.00
25.00	2.62	0.97	0.00
25.50	2.62	0.97	0.00
26.00	2.62	0.97	0.00
26.50	2.62	0.97	0.00
27.00	2.62	0.97	0.00
27.50	2.62	0.97	0.00
28.00	2.62	0.97	0.00
28.50	2.62	0.97	0.00
29.00	2.62	0.97	0.00
29.50	2.62	0.97	0.00
30.00	2.62	0.97	0.00

Summary for Subcatchment DA2: Subcatchment #2

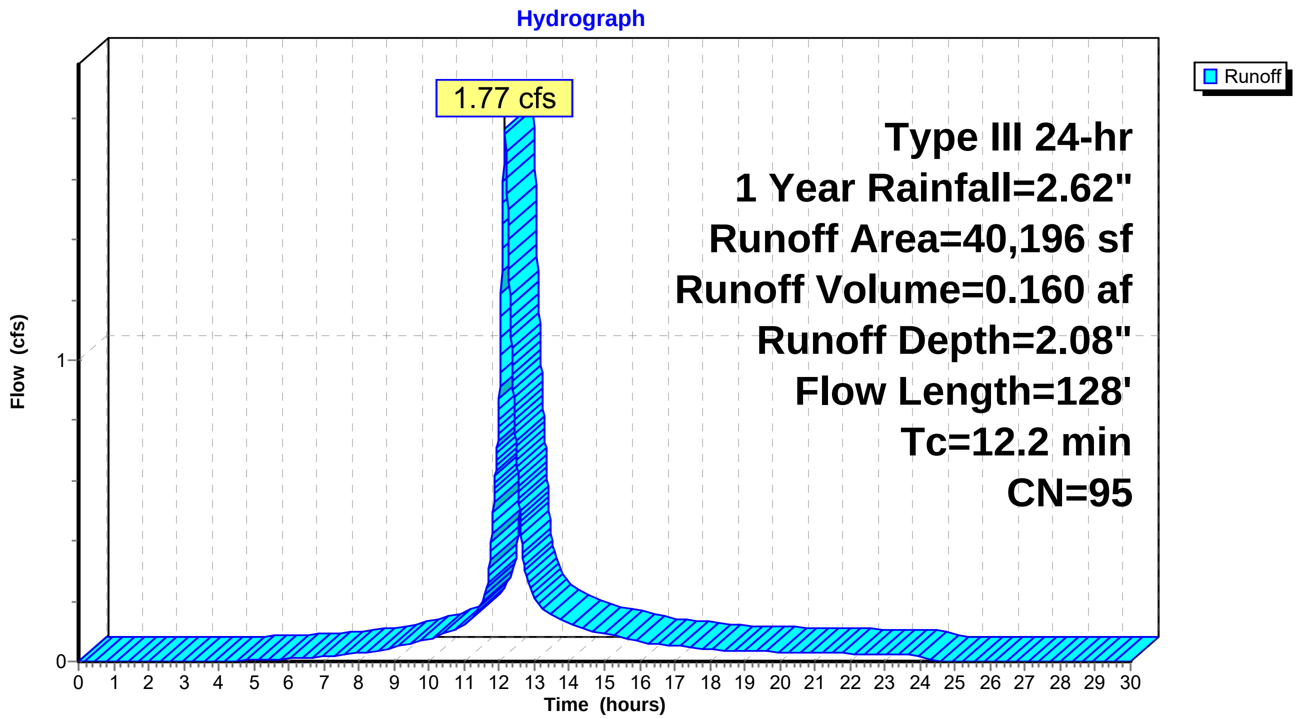
Runoff = 1.77 cfs @ 12.16 hrs, Volume= 0.160 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.62"

Area (sf)	CN	Description
32,805	98	Paved parking, HSG D
7,391	80	>75% Grass cover, Good, HSG D
40,196	95	Weighted Average
7,391		18.39% Pervious Area
32,805		81.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	72	0.0250	0.11		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
0.5	28	0.0200	0.94		**Sheet Flow, Sheet Flow 2** Smooth surfaces n= 0.011 P2= 2.48"
0.3	28	0.0050	1.44		**Shallow Concentrated Flow, Shallow Concnetrated Flow 1** Paved Kv= 20.3 fps
12.2	128	Total			

Subcatchment DA2: Subcatchment #2



Hydrograph for Subcatchment DA2: Subcatchment #2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.01	0.00	0.00
1.00	0.03	0.00	0.00
1.50	0.04	0.00	0.00
2.00	0.05	0.00	0.00
2.50	0.07	0.00	0.00
3.00	0.08	0.00	0.00
3.50	0.10	0.00	0.00
4.00	0.11	0.00	0.00
4.50	0.13	0.00	0.00
5.00	0.15	0.00	0.00
5.50	0.17	0.01	0.01
6.00	0.19	0.01	0.01
6.50	0.21	0.02	0.01
7.00	0.24	0.03	0.02
7.50	0.27	0.04	0.02
8.00	0.30	0.05	0.03
8.50	0.34	0.07	0.04
9.00	0.38	0.10	0.05
9.50	0.43	0.13	0.06
10.00	0.50	0.17	0.07
10.50	0.57	0.22	0.10
11.00	0.65	0.28	0.12
11.50	0.78	0.38	0.20
12.00	1.31	0.84	**0.87**
12.50	1.84	1.33	**0.67**
13.00	1.96	1.45	0.21
13.50	2.05	1.53	0.15
14.00	2.12	1.60	0.12
14.50	2.19	1.66	0.11
15.00	2.24	1.71	0.09
15.50	2.28	1.75	0.08
16.00	2.32	1.79	0.07
16.50	2.35	1.82	0.06
17.00	2.38	1.85	0.05
17.50	2.41	1.88	0.05
18.00	2.43	1.90	0.04
18.50	2.45	1.92	0.04
19.00	2.47	1.94	0.03
19.50	2.49	1.95	0.03
20.00	2.51	1.97	0.03
20.50	2.52	1.99	0.03
21.00	2.54	2.00	0.03
21.50	2.56	2.02	0.03
22.00	2.57	2.03	0.03
22.50	2.58	2.04	0.02
23.00	2.60	2.06	0.02
23.50	2.61	2.07	0.02
24.00	**2.62**	**2.08**	0.02
24.50	2.62	2.08	0.00
25.00	2.62	2.08	0.00
25.50	2.62	2.08	0.00
26.00	2.62	2.08	0.00
26.50	2.62	2.08	0.00
27.00	2.62	2.08	0.00
27.50	2.62	2.08	0.00
28.00	2.62	2.08	0.00
28.50	2.62	2.08	0.00
29.00	2.62	2.08	0.00
29.50	2.62	2.08	0.00
30.00	2.62	2.08	0.00

Summary for Subcatchment DA3: Subcatchment #3

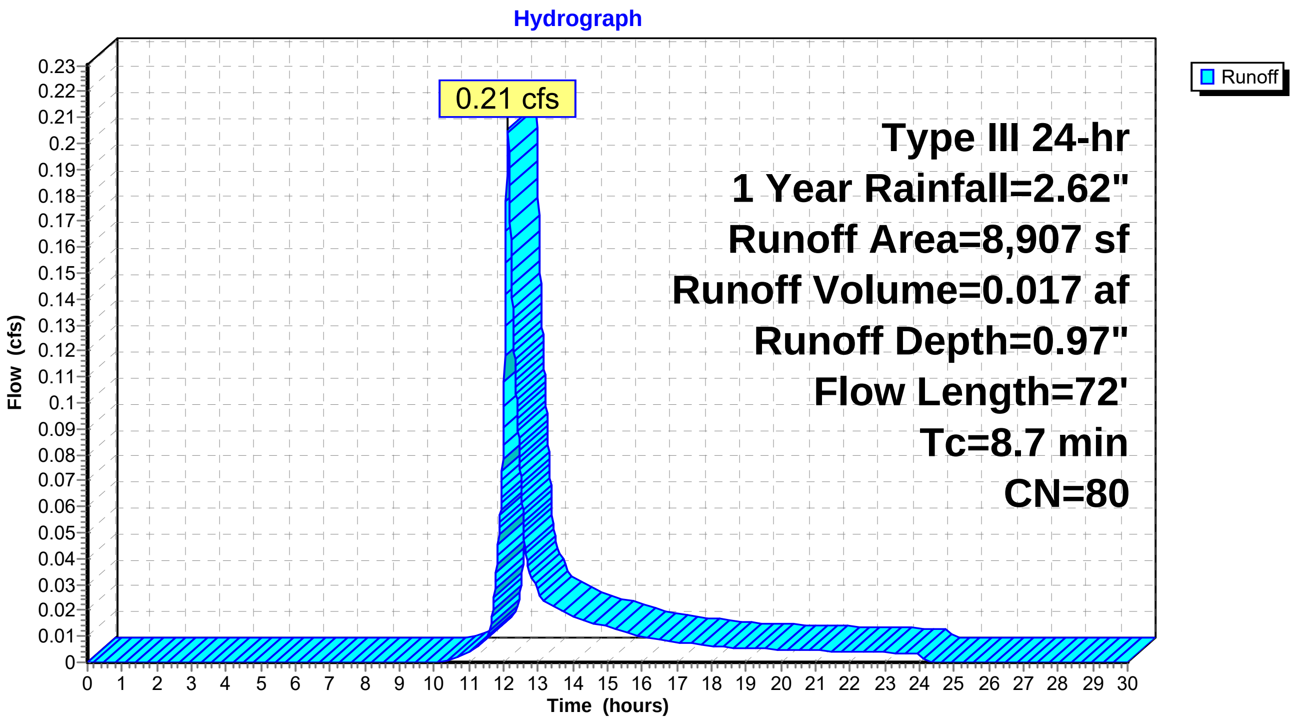
Runoff = 0.21 cfs @ 12.13 hrs, Volume= 0.017 af, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.62"

Area (sf)	CN	Description
8,907	80	>75% Grass cover, Good, HSG D
8,907		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	44	0.0550	0.13		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
3.1	28	0.1000	0.15		**Sheet Flow, Sheet Flow 2** Grass: Dense n= 0.240 P2= 2.48"
8.7	72	Total			

Subcatchment DA3: Subcatchment #3



Hydrograph for Subcatchment DA3: Subcatchment #3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.01	0.00	0.00
1.00	0.03	0.00	0.00
1.50	0.04	0.00	0.00
2.00	0.05	0.00	0.00
2.50	0.07	0.00	0.00
3.00	0.08	0.00	0.00
3.50	0.10	0.00	0.00
4.00	0.11	0.00	0.00
4.50	0.13	0.00	0.00
5.00	0.15	0.00	0.00
5.50	0.17	0.00	0.00
6.00	0.19	0.00	0.00
6.50	0.21	0.00	0.00
7.00	0.24	0.00	0.00
7.50	0.27	0.00	0.00
8.00	0.30	0.00	0.00
8.50	0.34	0.00	0.00
9.00	0.38	0.00	0.00
9.50	0.43	0.00	0.00
10.00	0.50	0.00	0.00
10.50	0.57	0.00	0.00
11.00	0.65	0.01	0.00
11.50	0.78	0.03	0.01
12.00	1.31	0.20	**0.09**
12.50	1.84	0.47	**0.07**
13.00	1.96	0.54	0.03
13.50	2.05	0.59	0.02
14.00	2.12	0.64	0.02
14.50	2.19	0.68	0.02
15.00	2.24	0.71	0.01
15.50	2.28	0.74	0.01
16.00	2.32	0.77	0.01
16.50	2.35	0.79	0.01
17.00	2.38	0.81	0.01
17.50	2.41	0.83	0.01
18.00	2.43	0.84	0.01
18.50	2.45	0.86	0.01
19.00	2.47	0.87	0.01
19.50	2.49	0.88	0.01
20.00	2.51	0.89	0.00
20.50	2.52	0.91	0.00
21.00	2.54	0.92	0.00
21.50	2.56	0.93	0.00
22.00	2.57	0.94	0.00
22.50	2.58	0.95	0.00
23.00	2.60	0.96	0.00
23.50	2.61	0.96	0.00
24.00	**2.62**	**0.97**	0.00
24.50	2.62	0.97	0.00
25.00	2.62	0.97	0.00
25.50	2.62	0.97	0.00
26.00	2.62	0.97	0.00
26.50	2.62	0.97	0.00
27.00	2.62	0.97	0.00
27.50	2.62	0.97	0.00
28.00	2.62	0.97	0.00
28.50	2.62	0.97	0.00
29.00	2.62	0.97	0.00
29.50	2.62	0.97	0.00
30.00	2.62	0.97	0.00

Summary for Subcatchment DA4: Subcatchment #2

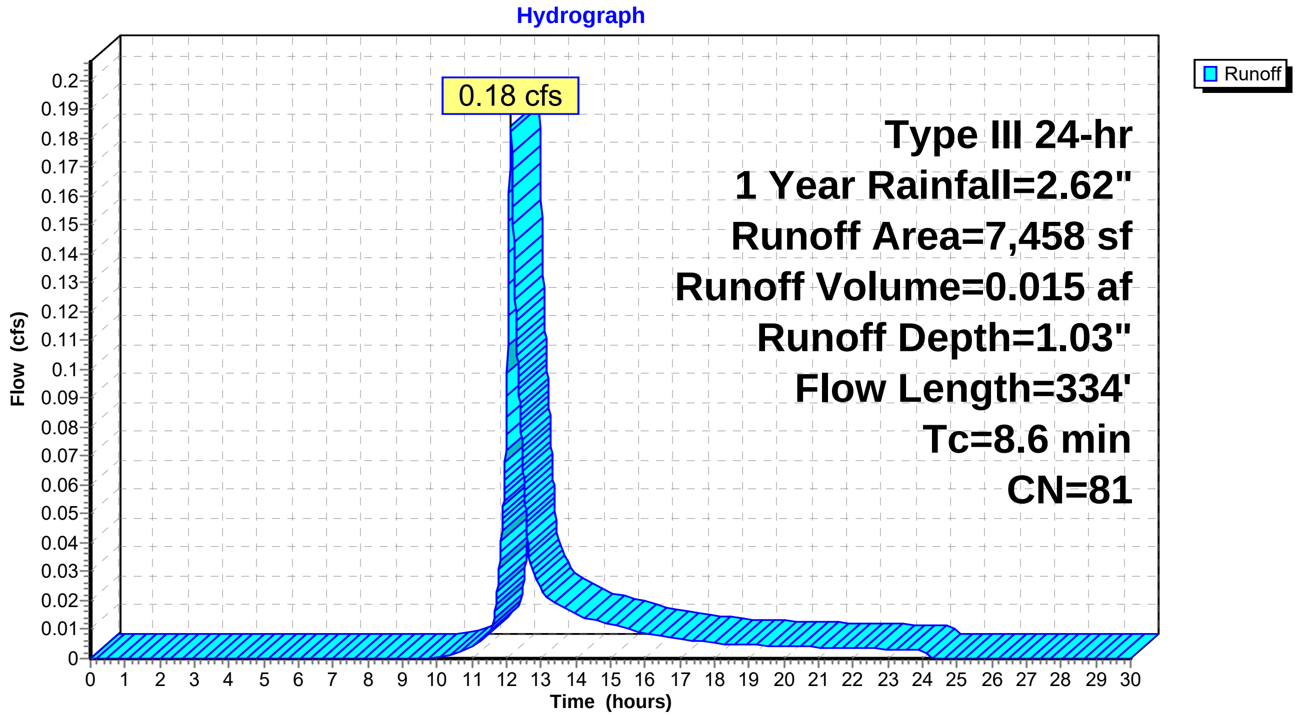
Runoff = 0.18 cfs @ 12.13 hrs, Volume= 0.015 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.62"

Area (sf)	CN	Description
495	98	Paved parking, HSG D
6,963	80	>75% Grass cover, Good, HSG D
7,458	81	Weighted Average
6,963		93.36% Pervious Area
495		6.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	56	0.0480	0.13		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
0.7	158	0.0300	3.52		**Shallow Concentrated Flow, Shallow Concnetrated Flow 1** Paved Kv= 20.3 fps
0.0	7	0.3700	4.26		**Shallow Concentrated Flow, Shallow Concentrated Flow 2** Short Grass Pasture Kv= 7.0 fps
0.7	113	0.0060	2.63	11.85	**Channel Flow, Channel 1** Area= 4.5 sf Perim= 12.6' r= 0.36' n= 0.022 Earth, clean & straight
8.6	334	Total			

Subcatchment DA4: Subcatchment #2



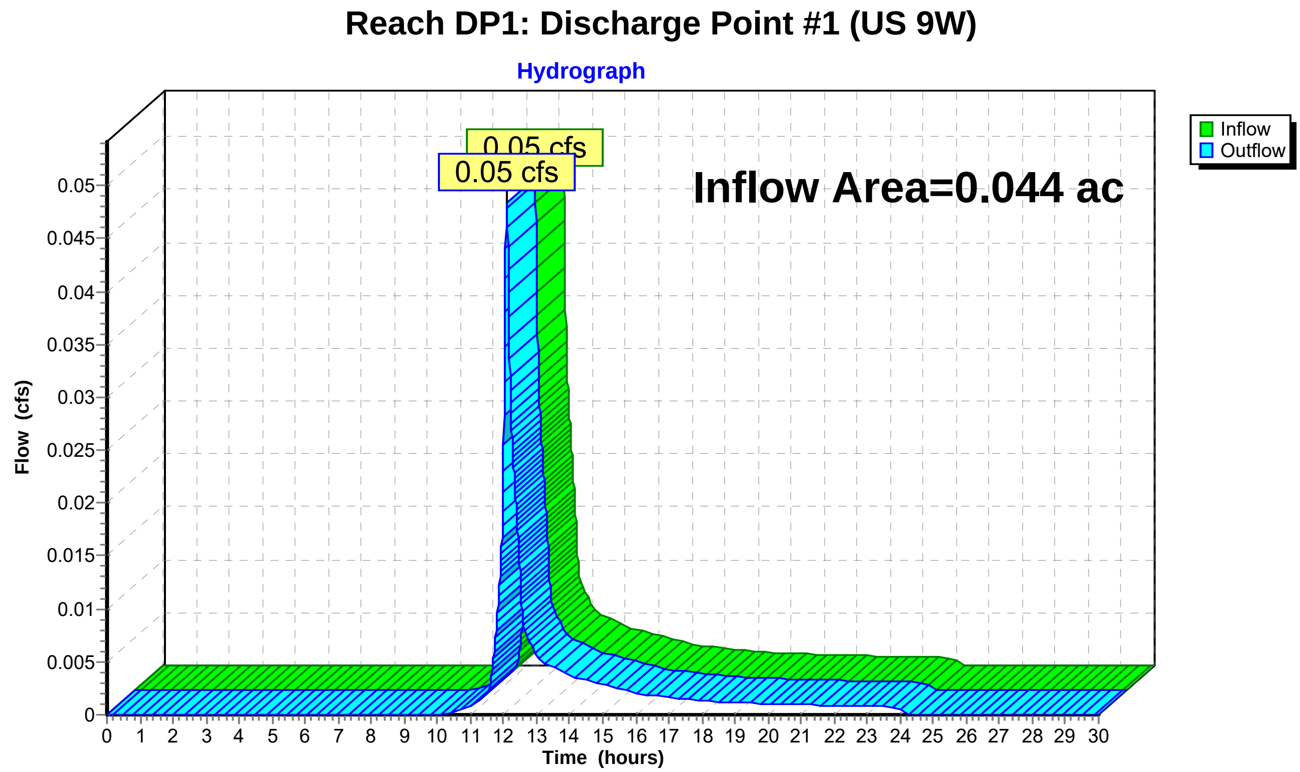
Hydrograph for Subcatchment DA4: Subcatchment #2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.01	0.00	0.00
1.00	0.03	0.00	0.00
1.50	0.04	0.00	0.00
2.00	0.05	0.00	0.00
2.50	0.07	0.00	0.00
3.00	0.08	0.00	0.00
3.50	0.10	0.00	0.00
4.00	0.11	0.00	0.00
4.50	0.13	0.00	0.00
5.00	0.15	0.00	0.00
5.50	0.17	0.00	0.00
6.00	0.19	0.00	0.00
6.50	0.21	0.00	0.00
7.00	0.24	0.00	0.00
7.50	0.27	0.00	0.00
8.00	0.30	0.00	0.00
8.50	0.34	0.00	0.00
9.00	0.38	0.00	0.00
9.50	0.43	0.00	0.00
10.00	0.50	0.00	0.00
10.50	0.57	0.00	0.00
11.00	0.65	0.01	0.00
11.50	0.78	0.04	0.01
12.00	1.31	0.22	**0.08**
12.50	1.84	0.51	**0.06**
13.00	1.96	0.58	0.02
13.50	2.05	0.64	0.02
14.00	2.12	0.69	0.02
14.50	2.19	0.73	0.01
15.00	2.24	0.76	0.01
15.50	2.28	0.79	0.01
16.00	2.32	0.82	0.01
16.50	2.35	0.84	0.01
17.00	2.38	0.86	0.01
17.50	2.41	0.88	0.01
18.00	2.43	0.89	0.01
18.50	2.45	0.91	0.00
19.00	2.47	0.92	0.00
19.50	2.49	0.94	0.00
20.00	2.51	0.95	0.00
20.50	2.52	0.96	0.00
21.00	2.54	0.97	0.00
21.50	2.56	0.98	0.00
22.00	2.57	0.99	0.00
22.50	2.58	1.00	0.00
23.00	2.60	1.01	0.00
23.50	2.61	1.02	0.00
24.00	**2.62**	**1.03**	0.00
24.50	2.62	1.03	0.00
25.00	2.62	1.03	0.00
25.50	2.62	1.03	0.00
26.00	2.62	1.03	0.00
26.50	2.62	1.03	0.00
27.00	2.62	1.03	0.00
27.50	2.62	1.03	0.00
28.00	2.62	1.03	0.00
28.50	2.62	1.03	0.00
29.00	2.62	1.03	0.00
29.50	2.62	1.03	0.00
30.00	2.62	1.03	0.00

Summary for Reach DP1: Discharge Point #1 (US 9W)

Inflow Area = 0.044 ac, 0.00% Impervious, Inflow Depth = 0.97" for 1 Year event
Inflow = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af
Outflow = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs



Hydrograph for Reach DP1: Discharge Point #1 (US 9W)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.00		0.00
7.00	0.00		0.00
7.50	0.00		0.00
8.00	0.00		0.00
8.50	0.00		0.00
9.00	0.00		0.00
9.50	0.00		0.00
10.00	0.00		0.00
10.50	0.00		0.00
11.00	0.00		0.00
11.50	0.00		0.00
12.00	**0.03**		**0.03**
12.50	**0.01**		**0.01**
13.00	0.01		0.01
13.50	0.00		0.00
14.00	0.00		0.00
14.50	0.00		0.00
15.00	0.00		0.00
15.50	0.00		0.00
16.00	0.00		0.00
16.50	0.00		0.00
17.00	0.00		0.00
17.50	0.00		0.00
18.00	0.00		0.00
18.50	0.00		0.00
19.00	0.00		0.00
19.50	0.00		0.00
20.00	0.00		0.00
20.50	0.00		0.00
21.00	0.00		0.00
21.50	0.00		0.00
22.00	0.00		0.00
22.50	0.00		0.00
23.00	0.00		0.00
23.50	0.00		0.00
24.00	0.00		0.00
24.50	0.00		0.00
25.00	0.00		0.00
25.50	0.00		0.00

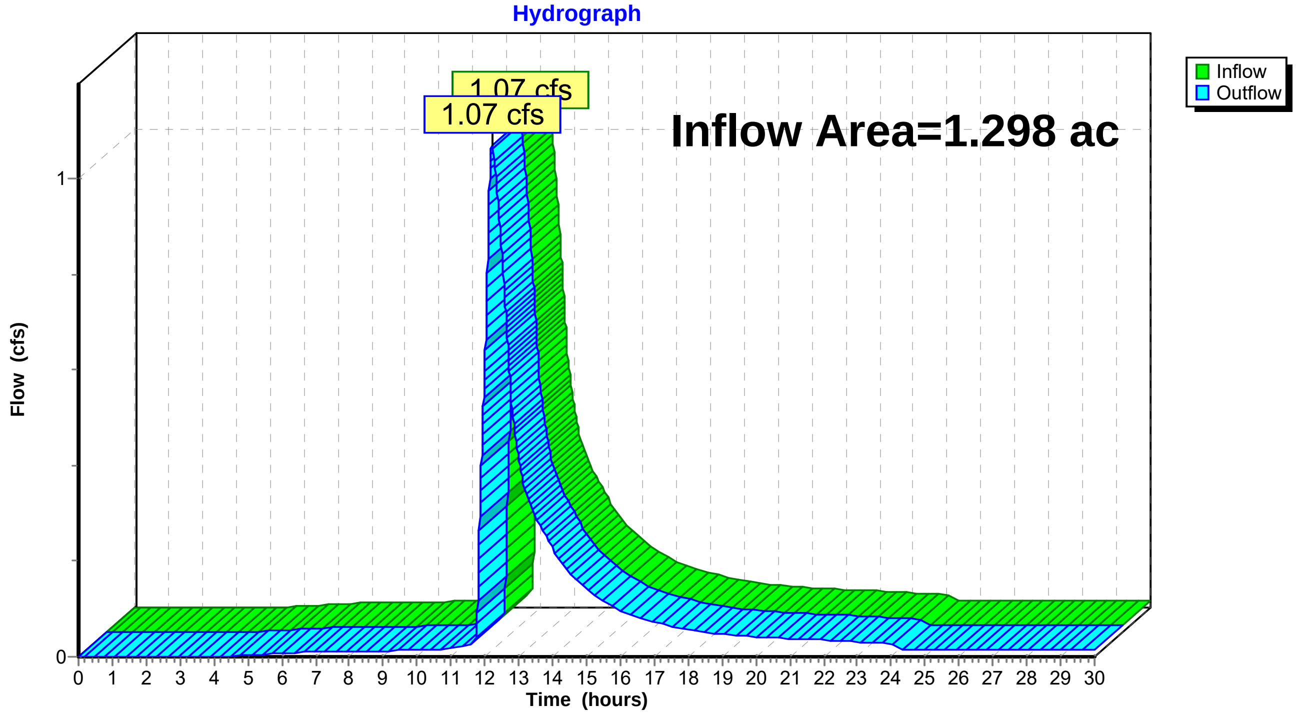
Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
26.00	0.00		0.00
26.50	0.00		0.00
27.00	0.00		0.00
27.50	0.00		0.00
28.00	0.00		0.00
28.50	0.00		0.00
29.00	0.00		0.00
29.50	0.00		0.00
30.00	0.00		0.00

Summary for Reach DP2: Discharge Point #2 (Existing Culvert)

Inflow Area =	1.298 ac, 58.87% Impervious, Inflow Depth > 1.53"			for 1 Year event
Inflow =	1.07 cfs @	12.21 hrs, Volume=	0.165 af	
Outflow =	1.07 cfs @	12.21 hrs, Volume=	0.165 af, Atten= 0%, Lag= 0.0 min	

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach DP2: Discharge Point #2 (Existing Culvert)



Hydrograph for Reach DP2: Discharge Point #2 (Existing Culvert)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.01		0.01
6.50	0.01		0.01
7.00	0.01		0.01
7.50	0.01		0.01
8.00	0.01		0.01
8.50	0.01		0.01
9.00	0.01		0.01
9.50	0.01		0.01
10.00	0.01		0.01
10.50	0.02		0.02
11.00	0.02		0.02
11.50	0.02		0.02
12.00	**0.62**		**0.62**
12.50	**0.84**		**0.84**
13.00	0.41		0.41
13.50	0.29		0.29
14.00	0.23		0.23
14.50	0.18		0.18
15.00	0.14		0.14
15.50	0.12		0.12
16.00	0.10		0.10
16.50	0.08		0.08
17.00	0.07		0.07
17.50	0.06		0.06
18.00	0.06		0.06
18.50	0.05		0.05
19.00	0.05		0.05
19.50	0.04		0.04
20.00	0.04		0.04
20.50	0.04		0.04
21.00	0.04		0.04
21.50	0.04		0.04
22.00	0.03		0.03
22.50	0.03		0.03
23.00	0.03		0.03
23.50	0.03		0.03
24.00	0.03		0.03
24.50	0.01		0.01
25.00	0.01		0.01
25.50	0.01		0.01
26.00	0.01		0.01
26.50	0.01		0.01
27.00	0.01		0.01
27.50	0.01		0.01
28.00	0.01		0.01
28.50	0.01		0.01
29.00	0.01		0.01
29.50	0.01		0.01
30.00	0.01		0.01

Summary for Pond CB3: Catch Basin #3

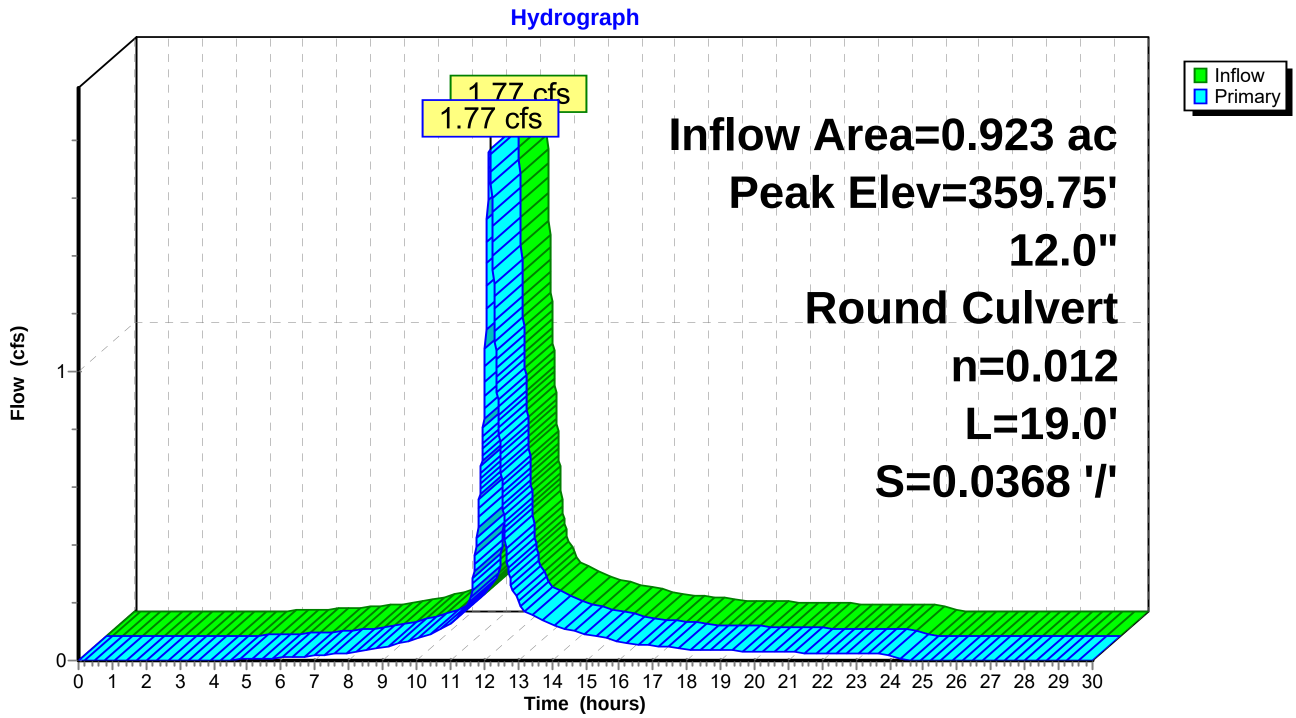
Inflow Area =	0.923 ac, 81.61% Impervious,	Inflow Depth = 2.08"	for 1 Year event	
Inflow =	1.77 cfs @	12.16 hrs, Volume=	0.160 af	
Outflow =	1.77 cfs @	12.16 hrs, Volume=	0.160 af,	Atten= 0%, Lag= 0.0 min
Primary =	1.77 cfs @	12.16 hrs, Volume=	0.160 af	

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 359.75' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	358.90'	**12.0" Round Culvert** L= 19.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 358.90' / 358.20' S= 0.0368 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.77 cfs @ 12.16 hrs HW=359.75' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.77 cfs @ 2.48 fps)

Pond CB3: Catch Basin #3



Hydrograph for Pond CB3: Catch Basin #3

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	358.90	0.00
0.50	0.00	358.90	0.00
1.00	0.00	358.90	0.00
1.50	0.00	358.90	0.00
2.00	0.00	358.90	0.00
2.50	0.00	358.90	0.00
3.00	0.00	358.90	0.00
3.50	0.00	358.90	0.00
4.00	0.00	358.91	0.00
4.50	0.00	358.92	0.00
5.00	0.00	358.93	0.00
5.50	0.01	358.94	0.01
6.00	0.01	358.95	0.01
6.50	0.01	358.96	0.01
7.00	0.02	358.97	0.02
7.50	0.02	358.98	0.02
8.00	0.03	358.99	0.03
8.50	0.04	359.00	0.04
9.00	0.05	359.02	0.05
9.50	0.06	359.03	0.06
10.00	0.07	359.05	0.07
10.50	0.10	359.07	0.10
11.00	0.12	359.09	0.12
11.50	0.20	359.14	0.20
12.00	**0.87**	**359.45**	**0.87**
12.50	**0.67**	**359.37**	**0.67**
13.00	0.21	359.15	0.21
13.50	0.15	359.11	0.15
14.00	0.12	359.09	0.12
14.50	0.11	359.08	0.11
15.00	0.09	359.07	0.09
15.50	0.08	359.05	0.08
16.00	0.07	359.04	0.07
16.50	0.06	359.03	0.06
17.00	0.05	359.02	0.05
17.50	0.05	359.01	0.05
18.00	0.04	359.01	0.04
18.50	0.04	359.00	0.04
19.00	0.03	359.00	0.03
19.50	0.03	359.00	0.03
20.00	0.03	358.99	0.03
20.50	0.03	358.99	0.03
21.00	0.03	358.99	0.03
21.50	0.03	358.99	0.03
22.00	0.03	358.99	0.03
22.50	0.02	358.98	0.02
23.00	0.02	358.98	0.02
23.50	0.02	358.98	0.02
24.00	0.02	358.98	0.02
24.50	0.00	358.90	0.00
25.00	0.00	358.90	0.00
25.50	0.00	358.90	0.00
26.00	0.00	358.90	0.00
26.50	0.00	358.90	0.00
27.00	0.00	358.90	0.00
27.50	0.00	358.90	0.00
28.00	0.00	358.90	0.00
28.50	0.00	358.90	0.00
29.00	0.00	358.90	0.00
29.50	0.00	358.90	0.00
30.00	0.00	358.90	0.00

Summary for Pond HDS: Hydrodynamic Separator

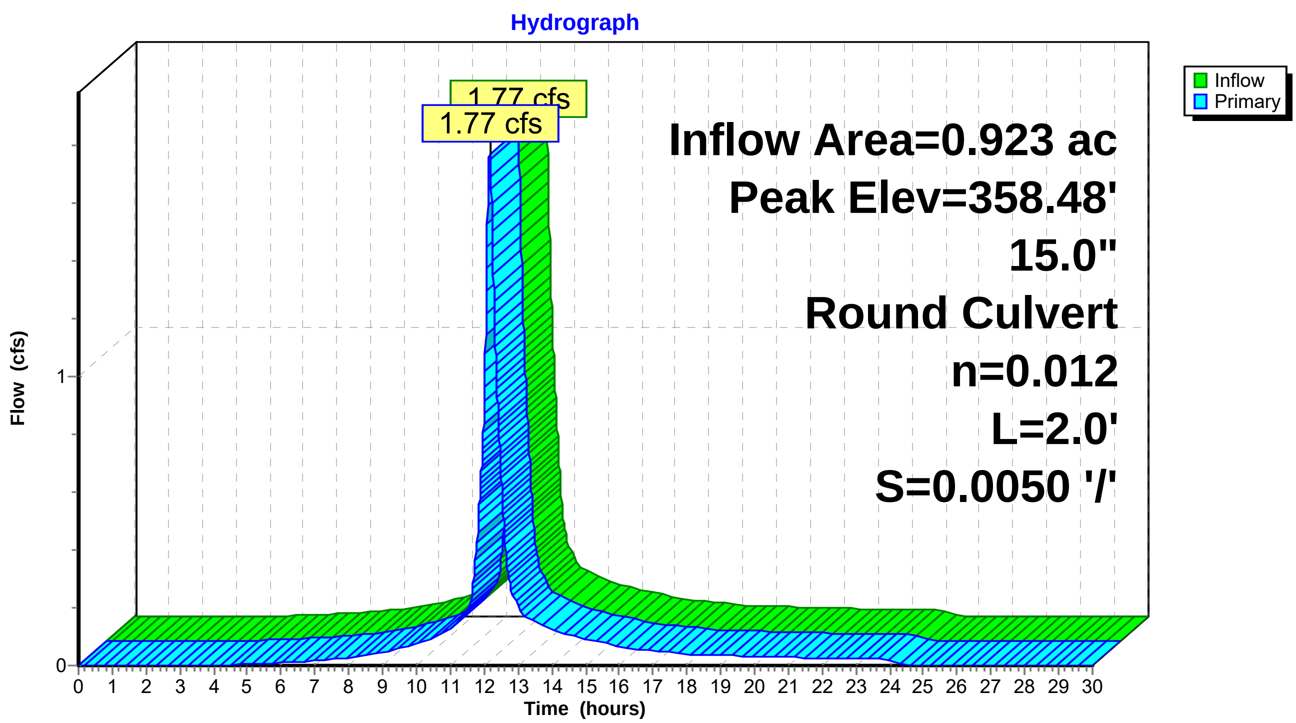
Inflow Area =	0.923 ac,	81.61% Impervious,	Inflow Depth = 2.08"	for 1 Year event
Inflow =	1.77 cfs @	12.16 hrs, Volume=	0.160 af	
Outflow =	1.77 cfs @	12.16 hrs, Volume=	0.160 af,	Atten= 0%, Lag= 0.0 min
Primary =	1.77 cfs @	12.16 hrs, Volume=	0.160 af	

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 358.48' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	357.61'	**15.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 357.61' / 357.60' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.77 cfs @ 12.16 hrs HW=358.48' (Free Discharge)
↑**1=Culvert** (Barrel Controls 1.77 cfs @ 2.74 fps)

Pond HDS: Hydrodynamic Separator



Hydrograph for Pond HDS: Hydrodynamic Separator

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	357.61	0.00
0.50	0.00	357.61	0.00
1.00	0.00	357.61	0.00
1.50	0.00	357.61	0.00
2.00	0.00	357.61	0.00
2.50	0.00	357.61	0.00
3.00	0.00	357.61	0.00
3.50	0.00	357.61	0.00
4.00	0.00	357.62	0.00
4.50	0.00	357.64	0.00
5.00	0.00	357.65	0.00
5.50	0.01	357.66	0.01
6.00	0.01	357.66	0.01
6.50	0.01	357.67	0.01
7.00	0.02	357.69	0.02
7.50	0.02	357.70	0.02
8.00	0.03	357.71	0.03
8.50	0.04	357.72	0.04
9.00	0.05	357.74	0.05
9.50	0.06	357.75	0.06
10.00	0.07	357.77	0.07
10.50	0.10	357.79	0.10
11.00	0.12	357.82	0.12
11.50	0.20	357.88	0.20
12.00	**0.87**	**358.20**	**0.87**
12.50	**0.67**	**358.12**	**0.67**
13.00	0.21	357.89	0.21
13.50	0.15	357.84	0.15
14.00	0.12	357.82	0.12
14.50	0.11	357.80	0.11
15.00	0.09	357.79	0.09
15.50	0.08	357.78	0.08
16.00	0.07	357.76	0.07
16.50	0.06	357.75	0.06
17.00	0.05	357.74	0.05
17.50	0.05	357.74	0.05
18.00	0.04	357.73	0.04
18.50	0.04	357.72	0.04
19.00	0.03	357.72	0.03
19.50	0.03	357.72	0.03
20.00	0.03	357.71	0.03
20.50	0.03	357.71	0.03
21.00	0.03	357.71	0.03
21.50	0.03	357.71	0.03
22.00	0.03	357.70	0.03
22.50	0.02	357.70	0.02
23.00	0.02	357.70	0.02
23.50	0.02	357.70	0.02
24.00	0.02	357.69	0.02
24.50	0.00	357.62	0.00
25.00	0.00	357.61	0.00
25.50	0.00	357.61	0.00
26.00	0.00	357.61	0.00
26.50	0.00	357.61	0.00
27.00	0.00	357.61	0.00
27.50	0.00	357.61	0.00
28.00	0.00	357.61	0.00
28.50	0.00	357.61	0.00
29.00	0.00	357.61	0.00
29.50	0.00	357.61	0.00
30.00	0.00	357.61	0.00

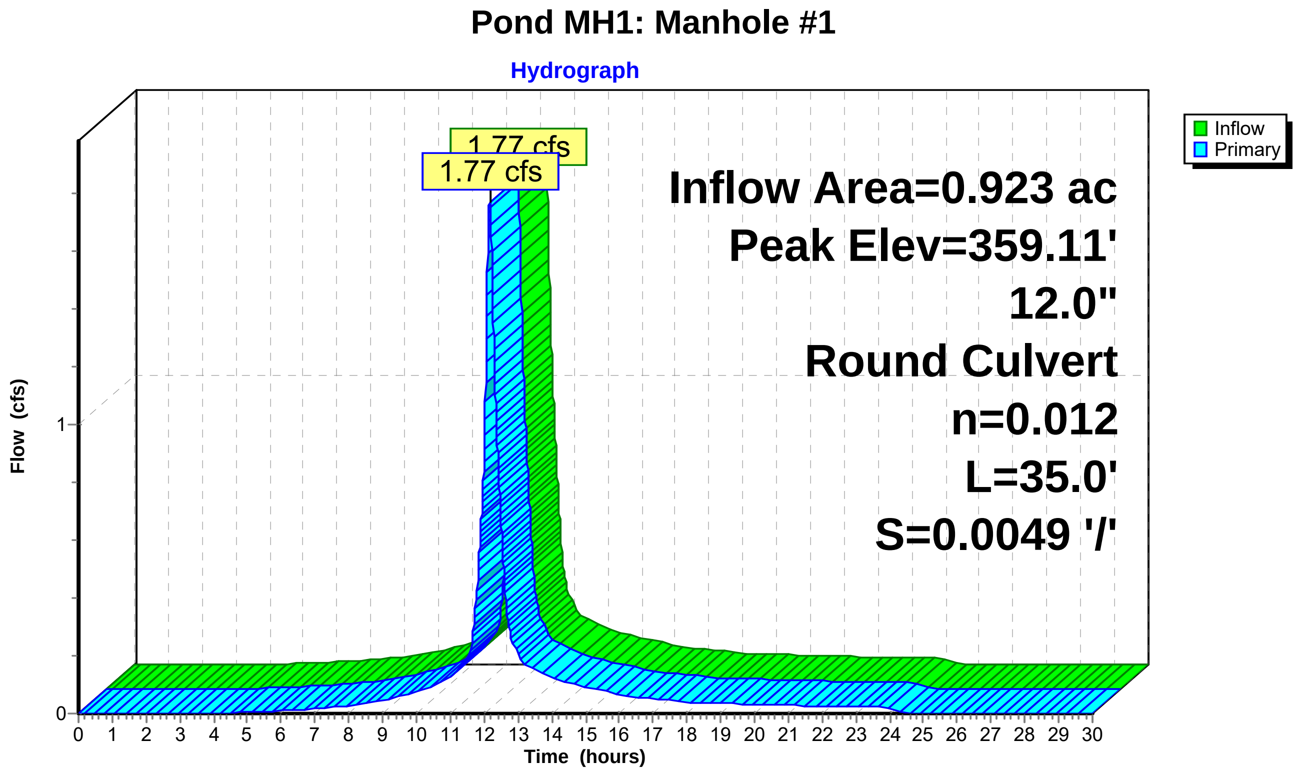
Summary for Pond MH1: Manhole #1

Inflow Area =	0.923 ac,	81.61% Impervious,	Inflow Depth = 2.08"	for 1 Year event
Inflow =	1.77 cfs @	12.16 hrs, Volume=	0.160 af	
Outflow =	1.77 cfs @	12.16 hrs, Volume=	0.160 af,	Atten= 0%, Lag= 0.0 min
Primary =	1.77 cfs @	12.16 hrs, Volume=	0.160 af	

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 359.11' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	358.20'	**12.0" Round Culvert** L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 358.20' / 358.03' S= 0.0049 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.77 cfs @ 12.16 hrs HW=359.11' (Free Discharge)
1=Culvert (Barrel Controls 1.77 cfs @ 3.10 fps)



Hydrograph for Pond MH1: Manhole #1

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	358.20	0.00
0.50	0.00	358.20	0.00
1.00	0.00	358.20	0.00
1.50	0.00	358.20	0.00
2.00	0.00	358.20	0.00
2.50	0.00	358.20	0.00
3.00	0.00	358.20	0.00
3.50	0.00	358.20	0.00
4.00	0.00	358.21	0.00
4.50	0.00	358.23	0.00
5.00	0.00	358.24	0.00
5.50	0.01	358.25	0.01
6.00	0.01	358.26	0.01
6.50	0.01	358.27	0.01
7.00	0.02	358.28	0.02
7.50	0.02	358.29	0.02
8.00	0.03	358.30	0.03
8.50	0.04	358.31	0.04
9.00	0.05	358.33	0.05
9.50	0.06	358.34	0.06
10.00	0.07	358.36	0.07
10.50	0.10	358.38	0.10
11.00	0.12	358.40	0.12
11.50	0.20	358.46	0.20
12.00	**0.87**	**358.79**	**0.87**
12.50	**0.67**	**358.70**	**0.67**
13.00	0.21	358.47	0.21
13.50	0.15	358.43	0.15
14.00	0.12	358.40	0.12
14.50	0.11	358.39	0.11
15.00	0.09	358.38	0.09
15.50	0.08	358.36	0.08
16.00	0.07	358.35	0.07
16.50	0.06	358.34	0.06
17.00	0.05	358.33	0.05
17.50	0.05	358.32	0.05
18.00	0.04	358.32	0.04
18.50	0.04	358.31	0.04
19.00	0.03	358.31	0.03
19.50	0.03	358.31	0.03
20.00	0.03	358.30	0.03
20.50	0.03	358.30	0.03
21.00	0.03	358.30	0.03
21.50	0.03	358.30	0.03
22.00	0.03	358.29	0.03
22.50	0.02	358.29	0.02
23.00	0.02	358.29	0.02
23.50	0.02	358.29	0.02
24.00	0.02	358.28	0.02
24.50	0.00	358.21	0.00
25.00	0.00	358.20	0.00
25.50	0.00	358.20	0.00

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
26.00	0.00	358.20	0.00
26.50	0.00	358.20	0.00
27.00	0.00	358.20	0.00
27.50	0.00	358.20	0.00
28.00	0.00	358.20	0.00
28.50	0.00	358.20	0.00
29.00	0.00	358.20	0.00
29.50	0.00	358.20	0.00
30.00	0.00	358.20	0.00

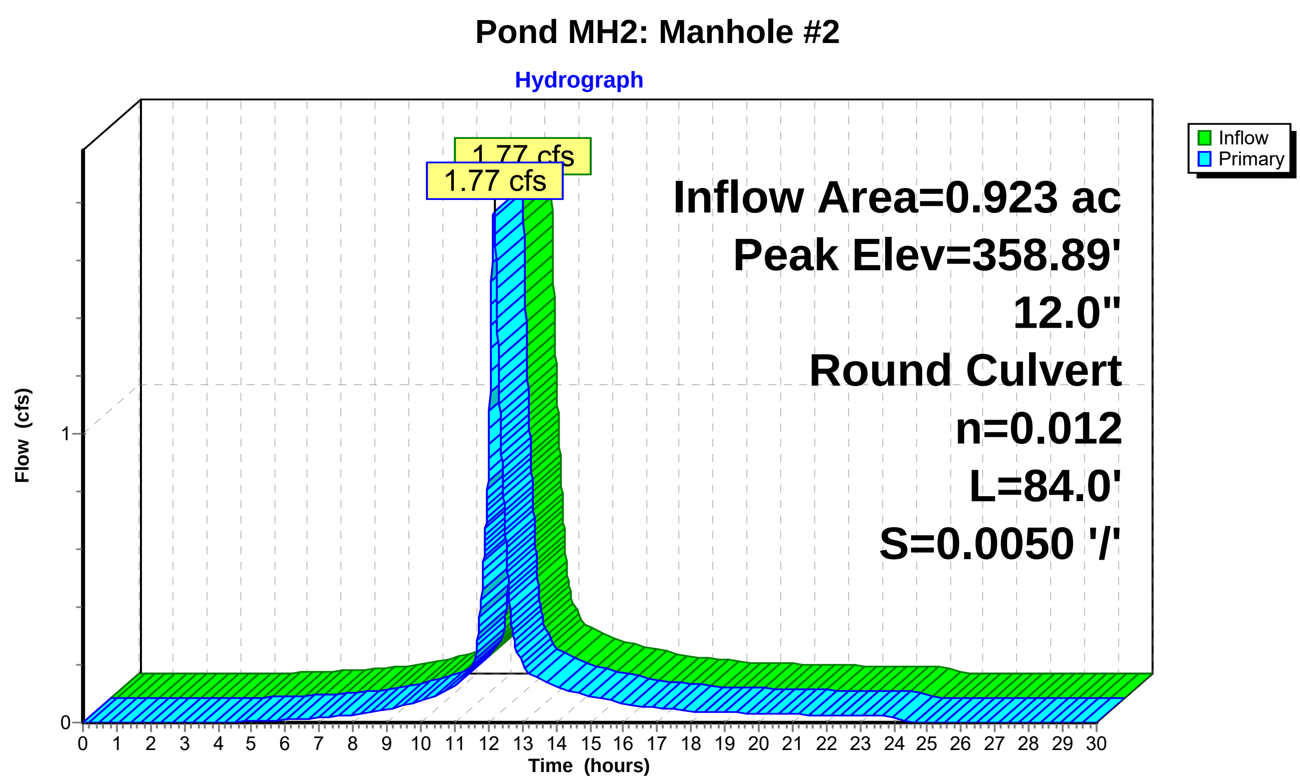
Summary for Pond MH2: Manhole #2

Inflow Area =	0.923 ac, 81.61% Impervious, Inflow Depth = 2.08" for 1 Year event		
Inflow =	1.77 cfs @ 12.16 hrs, Volume=	0.160 af	
Outflow =	1.77 cfs @ 12.16 hrs, Volume=	0.160 af,	Atten= 0%, Lag= 0.0 min
Primary =	1.77 cfs @ 12.16 hrs, Volume=	0.160 af	

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 358.89' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	358.03'	**12.0" Round Culvert** L= 84.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 358.03' / 357.61' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.77 cfs @ 12.16 hrs HW=358.89' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.77 cfs @ 3.30 fps)



Hydrograph for Pond MH2: Manhole #2

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	358.03	0.00
0.50	0.00	358.03	0.00
1.00	0.00	358.03	0.00
1.50	0.00	358.03	0.00
2.00	0.00	358.03	0.00
2.50	0.00	358.03	0.00
3.00	0.00	358.03	0.00
3.50	0.00	358.03	0.00
4.00	0.00	358.04	0.00
4.50	0.00	358.06	0.00
5.00	0.00	358.07	0.00
5.50	0.01	358.08	0.01
6.00	0.01	358.09	0.01
6.50	0.01	358.09	0.01
7.00	0.02	358.10	0.02
7.50	0.02	358.11	0.02
8.00	0.03	358.12	0.03
8.50	0.04	358.14	0.04
9.00	0.05	358.15	0.05
9.50	0.06	358.17	0.06
10.00	0.07	358.18	0.07
10.50	0.10	358.20	0.10
11.00	0.12	358.23	0.12
11.50	0.20	358.28	0.20
12.00	**0.87**	**358.59**	**0.87**
12.50	**0.67**	**358.51**	**0.67**
13.00	0.21	358.29	0.21
13.50	0.15	358.25	0.15
14.00	0.12	358.23	0.12
14.50	0.11	358.21	0.11
15.00	0.09	358.20	0.09
15.50	0.08	358.19	0.08
16.00	0.07	358.18	0.07
16.50	0.06	358.17	0.06
17.00	0.05	358.16	0.05
17.50	0.05	358.15	0.05
18.00	0.04	358.14	0.04
18.50	0.04	358.14	0.04
19.00	0.03	358.14	0.03
19.50	0.03	358.13	0.03
20.00	0.03	358.13	0.03
20.50	0.03	358.13	0.03
21.00	0.03	358.13	0.03
21.50	0.03	358.12	0.03
22.00	0.03	358.12	0.03
22.50	0.02	358.12	0.02
23.00	0.02	358.12	0.02
23.50	0.02	358.12	0.02
24.00	0.02	358.11	0.02
24.50	0.00	358.04	0.00
25.00	0.00	358.03	0.00
25.50	0.00	358.03	0.00
26.00	0.00	358.03	0.00
26.50	0.00	358.03	0.00
27.00	0.00	358.03	0.00
27.50	0.00	358.03	0.00
28.00	0.00	358.03	0.00
28.50	0.00	358.03	0.00
29.00	0.00	358.03	0.00
29.50	0.00	358.03	0.00
30.00	0.00	358.03	0.00

Summary for Pond MH3: Manhole #3 (Diversion Manhole)

Inflow Area = 0.923 ac, 81.61% Impervious, Inflow Depth = 2.08" for 1 Year event
Inflow = 1.77 cfs @ 12.16 hrs, Volume= 0.160 af
Outflow = 1.77 cfs @ 12.16 hrs, Volume= 0.160 af, Atten= 0%, Lag= 0.0 min
Primary = 0.68 cfs @ 12.16 hrs, Volume= 0.131 af
Secondary = 1.09 cfs @ 12.16 hrs, Volume= 0.029 af

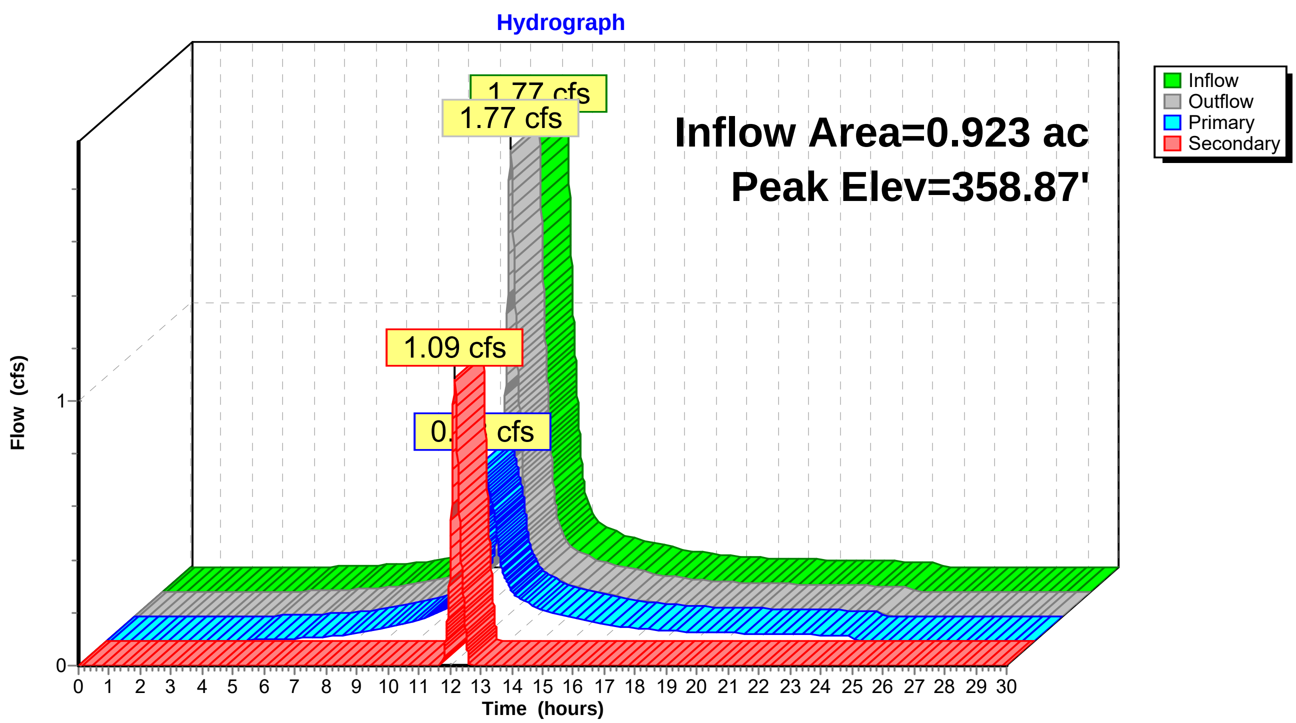
Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 358.87' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	357.60'	**6.0" Round Culvert** L= 41.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 357.60' / 357.50' S= 0.0024 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	358.27'	**15.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 358.27' / 358.19' S= 0.0400 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.68 cfs @ 12.16 hrs HW=358.87' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.68 cfs @ 3.46 fps)

Secondary OutFlow Max=1.09 cfs @ 12.16 hrs HW=358.87' (Free Discharge)
└─**2=Culvert** (Barrel Controls 1.09 cfs @ 2.75 fps)

Pond MH3: Manhole #3 (Diversion Manhole)



Hydrograph for Pond MH3: Manhole #3 (Diversion Manhole)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	357.60	0.00	0.00	0.00
1.00	0.00	357.60	0.00	0.00	0.00
2.00	0.00	357.60	0.00	0.00	0.00
3.00	0.00	357.60	0.00	0.00	0.00
4.00	0.00	357.61	0.00	0.00	0.00
5.00	0.00	357.65	0.00	0.00	0.00
6.00	0.01	357.68	0.01	0.01	0.00
7.00	0.02	357.70	0.02	0.02	0.00
8.00	0.03	357.73	0.03	0.03	0.00
9.00	0.05	357.78	0.05	0.05	0.00
10.00	0.07	357.82	0.07	0.07	0.00
11.00	0.12	357.89	0.12	0.12	0.00
12.00	**0.87**	**358.57**	**0.87**	**0.55**	**0.32**
13.00	**0.21**	**358.00**	**0.21**	**0.21**	**0.00**
14.00	0.12	357.89	0.12	0.12	0.00
15.00	0.09	357.85	0.09	0.09	0.00
16.00	0.07	357.81	0.07	0.07	0.00
17.00	0.05	357.78	0.05	0.05	0.00
18.00	0.04	357.76	0.04	0.04	0.00
19.00	0.03	357.75	0.03	0.03	0.00
20.00	0.03	357.74	0.03	0.03	0.00
21.00	0.03	357.74	0.03	0.03	0.00
22.00	0.03	357.73	0.03	0.03	0.00
23.00	0.02	357.72	0.02	0.02	0.00
24.00	0.02	357.72	0.02	0.02	0.00
25.00	0.00	357.60	0.00	0.00	0.00
26.00	0.00	357.60	0.00	0.00	0.00
27.00	0.00	357.60	0.00	0.00	0.00
28.00	0.00	357.60	0.00	0.00	0.00
29.00	0.00	357.60	0.00	0.00	0.00
30.00	0.00	357.60	0.00	0.00	0.00

Summary for Pond MH4: Manhole #4

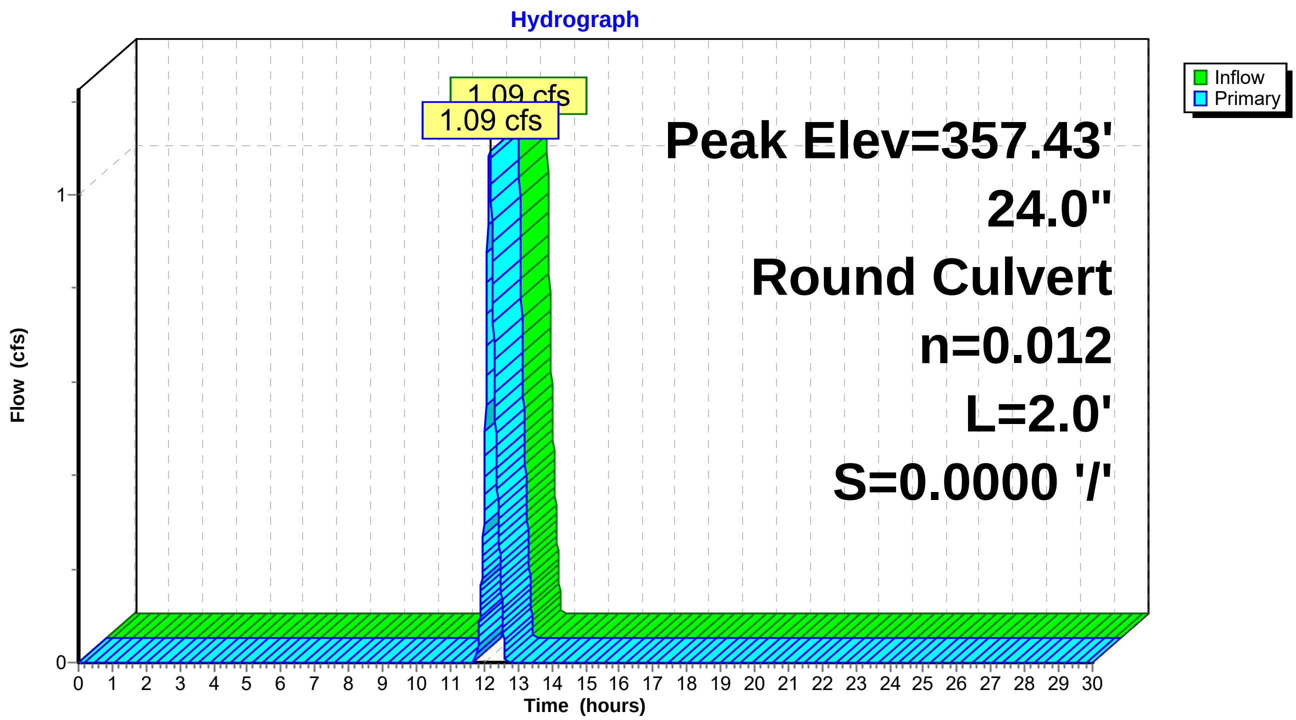
Inflow	=	1.09 cfs @	12.16 hrs,	Volume=	0.029 af
Outflow	=	1.09 cfs @	12.16 hrs,	Volume=	0.029 af, Atten= 0%, Lag= 0.0 min
Primary	=	1.09 cfs @	12.16 hrs,	Volume=	0.029 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 357.43' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	356.85'	**24.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 356.85' / 356.85' S= 0.0000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=1.09 cfs @ 12.16 hrs HW=357.43' (Free Discharge)
↑**1=Culvert** (Barrel Controls 1.09 cfs @ 2.18 fps)

Pond MH4: Manhole #4



Hydrograph for Pond MH4: Manhole #4

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	356.85	0.00
0.50	0.00	356.85	0.00
1.00	0.00	356.85	0.00
1.50	0.00	356.85	0.00
2.00	0.00	356.85	0.00
2.50	0.00	356.85	0.00
3.00	0.00	356.85	0.00
3.50	0.00	356.85	0.00
4.00	0.00	356.85	0.00
4.50	0.00	356.85	0.00
5.00	0.00	356.85	0.00
5.50	0.00	356.85	0.00
6.00	0.00	356.85	0.00
6.50	0.00	356.85	0.00
7.00	0.00	356.85	0.00
7.50	0.00	356.85	0.00
8.00	0.00	356.85	0.00
8.50	0.00	356.85	0.00
9.00	0.00	356.85	0.00
9.50	0.00	356.85	0.00
10.00	0.00	356.85	0.00
10.50	0.00	356.85	0.00
11.00	0.00	356.85	0.00
11.50	0.00	356.85	0.00
12.00	**0.32**	**357.16**	**0.32**
12.50	**0.16**	**357.07**	**0.16**
13.00	0.00	356.85	0.00
13.50	0.00	356.85	0.00
14.00	0.00	356.85	0.00
14.50	0.00	356.85	0.00
15.00	0.00	356.85	0.00
15.50	0.00	356.85	0.00
16.00	0.00	356.85	0.00
16.50	0.00	356.85	0.00
17.00	0.00	356.85	0.00
17.50	0.00	356.85	0.00
18.00	0.00	356.85	0.00
18.50	0.00	356.85	0.00
19.00	0.00	356.85	0.00
19.50	0.00	356.85	0.00
20.00	0.00	356.85	0.00
20.50	0.00	356.85	0.00
21.00	0.00	356.85	0.00
21.50	0.00	356.85	0.00
22.00	0.00	356.85	0.00
22.50	0.00	356.85	0.00
23.00	0.00	356.85	0.00
23.50	0.00	356.85	0.00
24.00	0.00	356.85	0.00
24.50	0.00	356.85	0.00
25.00	0.00	356.85	0.00
25.50	0.00	356.85	0.00
26.00	0.00	356.85	0.00
26.50	0.00	356.85	0.00
27.00	0.00	356.85	0.00
27.50	0.00	356.85	0.00
28.00	0.00	356.85	0.00
28.50	0.00	356.85	0.00
29.00	0.00	356.85	0.00
29.50	0.00	356.85	0.00
30.00	0.00	356.85	0.00

Summary for Pond P1: Bioretention

Inflow Area = 1.127 ac, 66.81% Impervious, Inflow Depth = 1.57" for 1 Year event
Inflow = 0.88 cfs @ 12.14 hrs, Volume= 0.147 af
Outflow = 0.83 cfs @ 12.21 hrs, Volume= 0.129 af, Atten= 6%, Lag= 3.9 min
Primary = 0.83 cfs @ 12.21 hrs, Volume= 0.129 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 358.11' @ 12.21 hrs Surf.Area= 2,452 sf Storage= 1,390 cf

Plug-Flow detention time= 147.6 min calculated for 0.129 af (87% of inflow)
Center-of-Mass det. time= 87.4 min (899.7 - 812.3)

Volume	Invert	Avail.Storage	Storage Description
#1	357.50'	2,398 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

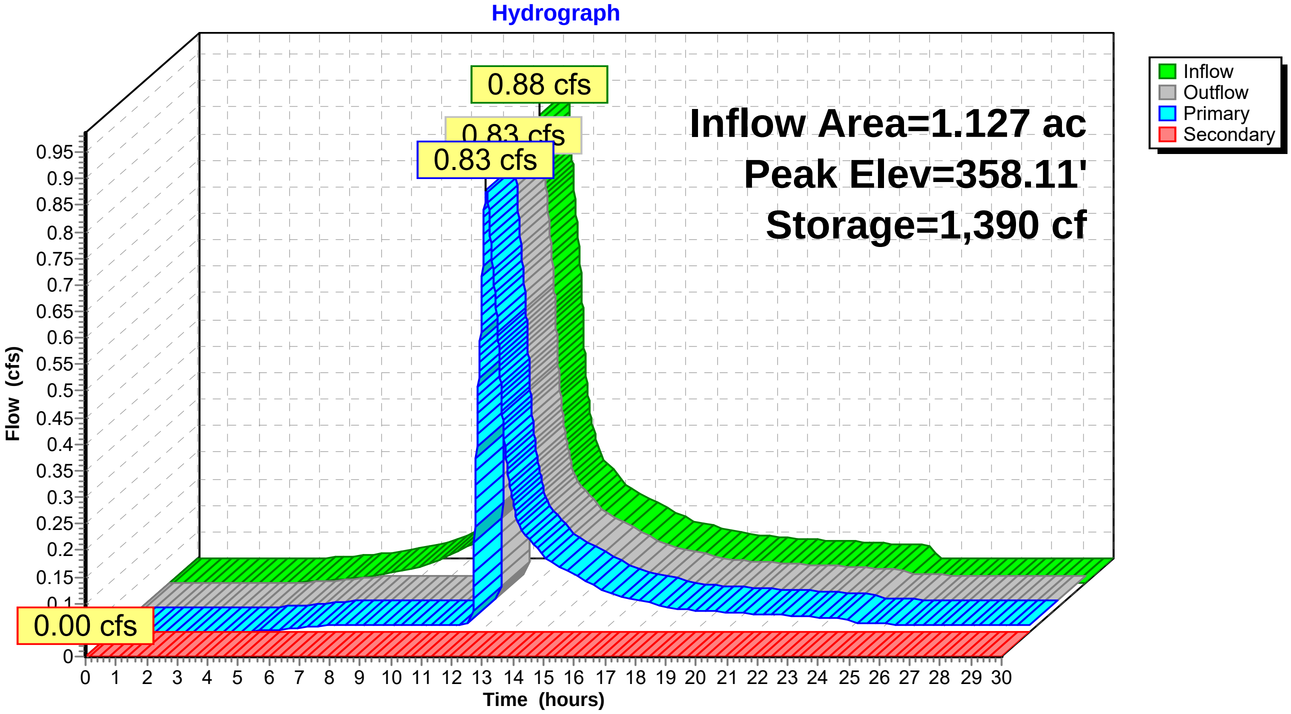
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
357.50	2,136	236.5	0	0	2,136
358.50	2,669	250.1	2,398	2,398	2,716

Device	Routing	Invert	Outlet Devices
#1	Primary	354.33'	**12.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 354.33' / 354.25' S= 0.0053 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	354.33'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	357.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 351.00'
#4	Device 1	357.99'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	358.30'	**10.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.83 cfs @ 12.21 hrs HW=358.11' (Free Discharge)
1=Culvert (Passes 0.83 cfs of 5.40 cfs potential flow)
2=Orifice/Grate (Passes 0.02 cfs of 1.78 cfs potential flow)
3=Exfiltration (Controls 0.02 cfs)
4=Orifice/Grate (Weir Controls 0.82 cfs @ 1.12 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=357.50' (Free Discharge)
5=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond P1: Bioretention



Hydrograph for Pond P1: Bioretention

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	357.50	0.00	0.00	**0.00**
1.00	0.00	0	357.50	0.00	0.00	0.00
2.00	0.00	0	357.50	0.00	0.00	0.00
3.00	0.00	0	357.50	0.00	0.00	0.00
4.00	0.00	0	357.50	0.00	0.00	0.00
5.00	0.00	4	357.50	0.00	0.00	0.00
6.00	0.01	12	357.51	0.01	0.01	0.00
7.00	0.02	22	357.51	0.01	0.01	0.00
8.00	0.03	56	357.53	0.01	0.01	0.00
9.00	0.05	141	357.57	0.01	0.01	0.00
10.00	0.07	313	357.64	0.01	0.01	0.00
11.00	0.13	619	357.78	0.01	0.01	0.00
12.00	**0.64**	**1,316**	**358.08**	**0.54**	**0.54**	0.00
13.00	**0.24**	**1,236**	**358.04**	**0.27**	**0.27**	0.00
14.00	0.14	1,192	358.02	0.15	0.15	0.00
15.00	0.11	1,175	358.02	0.11	0.11	0.00
16.00	0.08	1,160	358.01	0.08	0.08	0.00
17.00	0.06	1,149	358.01	0.06	0.06	0.00
18.00	0.05	1,140	358.00	0.05	0.05	0.00
19.00	0.04	1,136	358.00	0.04	0.04	0.00
20.00	0.04	1,133	358.00	0.04	0.04	0.00
21.00	0.03	1,130	358.00	0.03	0.03	0.00
22.00	0.03	1,127	358.00	0.03	0.03	0.00
23.00	0.03	1,123	358.00	0.03	0.03	0.00
24.00	0.02	1,120	357.99	0.02	0.02	0.00
25.00	0.00	1,073	357.98	0.01	0.01	0.00
26.00	0.00	1,020	357.95	0.01	0.01	0.00
27.00	0.00	967	357.93	0.01	0.01	0.00
28.00	0.00	914	357.91	0.01	0.01	0.00
29.00	0.00	862	357.89	0.01	0.01	0.00
30.00	0.00	811	357.86	0.01	0.01	0.00

Summary for Pond P2: StormTech SC-740

Inflow	=	1.09 cfs @	12.16 hrs, Volume=	0.029 af
Outflow	=	0.15 cfs @	12.51 hrs, Volume=	0.022 af, Atten= 87%, Lag= 21.0 min
Primary	=	0.15 cfs @	12.51 hrs, Volume=	0.022 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 357.04' @ 12.51 hrs Surf.Area= 0.048 ac Storage= 0.025 af

Plug-Flow detention time= 81.9 min calculated for 0.022 af (75% of inflow)
Center-of-Mass det. time= 78.0 min (809.8 - 731.8)

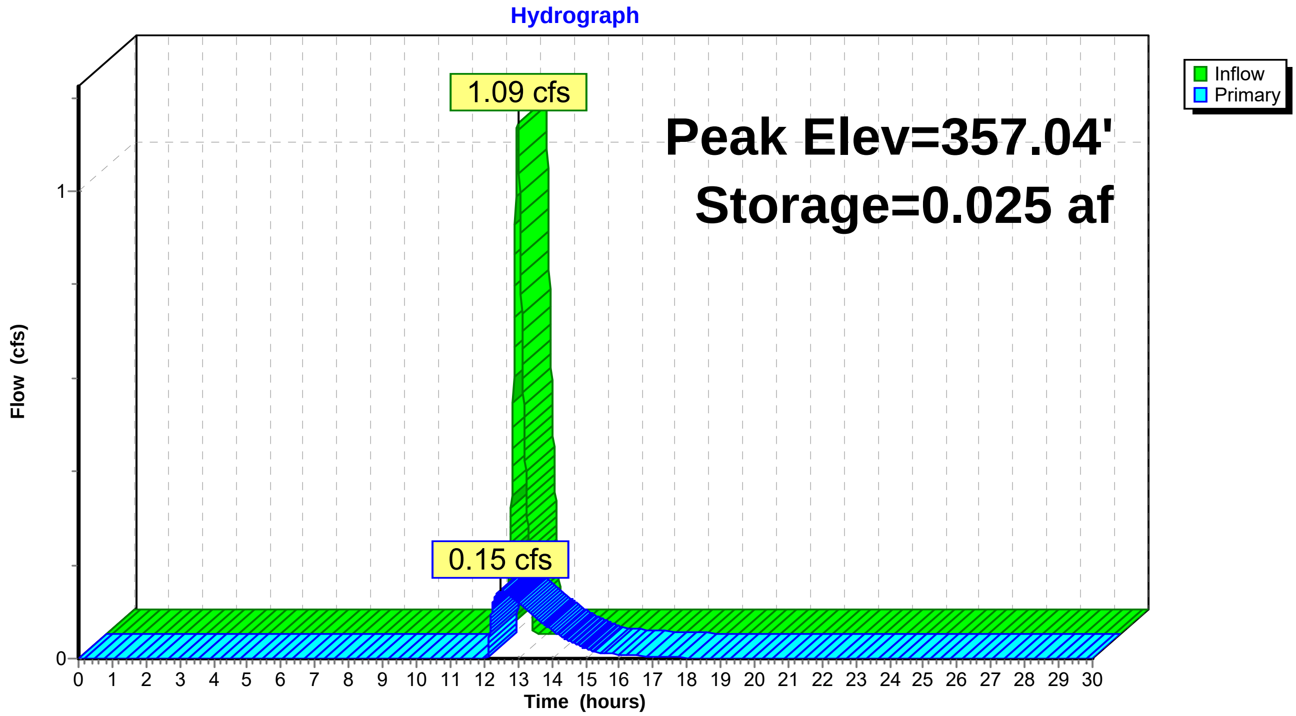
Volume	Invert	Avail.Storage	Storage Description
#1A	356.16'	0.044 af	**39.50'W x 53.46'L x 3.50'H Field A** 0.170 af Overall - 0.059 af Embedded = 0.111 af x 40.0% Voids
#2A	356.66'	0.059 af	**ADS_StormTech SC-740 +Cap** x 56 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 8 Rows of 7 Chambers
#3	365.85'	0.005 af	**24.0" Round Pipe Storage** L= 66.0'
		0.108 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	356.34'	**12.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 356.34' / 356.14' S= 0.1000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	356.54'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	357.05'	**6.0" W x 6.3" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	359.60'	**36.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.15 cfs @ 12.51 hrs HW=357.04' (Free Discharge)
└**1=Culvert** (Passes 0.15 cfs of 1.33 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 2.96 fps)
  ├**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P2: StormTech SC-740



Hydrograph for Pond P2: StormTech SC-740

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	356.16	0.00
1.00	0.00	0.000	356.16	0.00
2.00	0.00	0.000	356.16	0.00
3.00	0.00	0.000	356.16	0.00
4.00	0.00	0.000	356.16	0.00
5.00	0.00	0.000	356.16	0.00
6.00	0.00	0.000	356.16	0.00
7.00	0.00	0.000	356.16	0.00
8.00	0.00	0.000	356.16	0.00
9.00	0.00	0.000	356.16	0.00
10.00	0.00	0.000	356.16	0.00
11.00	0.00	0.000	356.16	0.00
12.00	**0.32**	**0.002**	**356.29**	**0.00**
13.00	**0.00**	**0.020**	**356.92**	**0.12**
14.00	0.00	0.013	356.73	0.06
15.00	0.00	0.009	356.64	0.02
16.00	0.00	0.008	356.59	0.01
17.00	0.00	0.008	356.56	0.00
18.00	0.00	0.008	356.55	0.00
19.00	0.00	0.007	356.55	0.00
20.00	0.00	0.007	356.54	0.00
21.00	0.00	0.007	356.54	0.00
22.00	0.00	0.007	356.54	0.00
23.00	0.00	0.007	356.54	0.00
24.00	0.00	0.007	356.54	0.00
25.00	0.00	0.007	356.54	0.00
26.00	0.00	0.007	356.54	0.00
27.00	0.00	0.007	356.54	0.00
28.00	0.00	0.007	356.54	0.00
29.00	0.00	0.007	356.54	0.00
30.00	0.00	0.007	356.54	0.00

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: Subcatchment #1 Runoff Area=1,903 sf 0.00% Impervious Runoff Depth=2.62"
Tc=6.0 min CN=80 Runoff=0.13 cfs 0.010 af

Subcatchment DA2: Subcatchment #2 Runoff Area=40,196 sf 81.61% Impervious Runoff Depth=4.11"
Flow Length=128' Tc=12.2 min CN=95 Runoff=3.38 cfs 0.316 af

Subcatchment DA3: Subcatchment #3 Runoff Area=8,907 sf 0.00% Impervious Runoff Depth=2.62"
Flow Length=72' Tc=8.7 min CN=80 Runoff=0.57 cfs 0.045 af

Subcatchment DA4: Subcatchment #2 Runoff Area=7,458 sf 6.64% Impervious Runoff Depth=2.71"
Flow Length=334' Tc=8.6 min CN=81 Runoff=0.50 cfs 0.039 af

Reach DP1: Discharge Point #1 (US 9W) Inflow=0.13 cfs 0.010 af
Outflow=0.13 cfs 0.010 af

Reach DP2: Discharge Point #2 (Existing Culvert) Inflow=2.49 cfs 0.374 af
Outflow=2.49 cfs 0.374 af

Pond CB3: Catch Basin #3 Peak Elev=360.68' Inflow=3.38 cfs 0.316 af
12.0" Round Culvert n=0.012 L=19.0' S=0.0368 '/' Outflow=3.38 cfs 0.316 af

Pond HDS: Hydrodynamic Separator Peak Elev=358.90' Inflow=3.38 cfs 0.316 af
15.0" Round Culvert n=0.012 L=2.0' S=0.0050 '/' Outflow=3.38 cfs 0.316 af

Pond MH1: Manhole #1 Peak Elev=359.98' Inflow=3.38 cfs 0.316 af
12.0" Round Culvert n=0.012 L=35.0' S=0.0049 '/' Outflow=3.38 cfs 0.316 af

Pond MH2: Manhole #2 Peak Elev=359.81' Inflow=3.38 cfs 0.316 af
12.0" Round Culvert n=0.012 L=84.0' S=0.0050 '/' Outflow=3.38 cfs 0.316 af

Pond MH3: Manhole #3 (Diversion Manhole) Peak Elev=359.27' Inflow=3.38 cfs 0.316 af
Primary=0.82 cfs 0.230 af Secondary=2.55 cfs 0.086 af Outflow=3.38 cfs 0.316 af

Pond MH4: Manhole #4 Peak Elev=357.75' Inflow=2.55 cfs 0.086 af
24.0" Round Culvert n=0.012 L=2.0' S=0.0000 '/' Outflow=2.55 cfs 0.086 af

Pond P1: Bioretention Peak Elev=358.15' Storage=1,492 cf Inflow=1.39 cfs 0.275 af
Primary=1.31 cfs 0.256 af Secondary=0.00 cfs 0.000 af Outflow=1.31 cfs 0.256 af

Pond P2: StormTech SC-740 Peak Elev=357.77' Storage=0.052 af Inflow=2.55 cfs 0.086 af
Outflow=1.09 cfs 0.079 af

Total Runoff Area = 1.342 ac Runoff Volume = 0.409 af Average Runoff Depth = 3.66"
43.04% Pervious = 0.578 ac 56.96% Impervious = 0.764 ac

Summary for Subcatchment DA1: Subcatchment #1

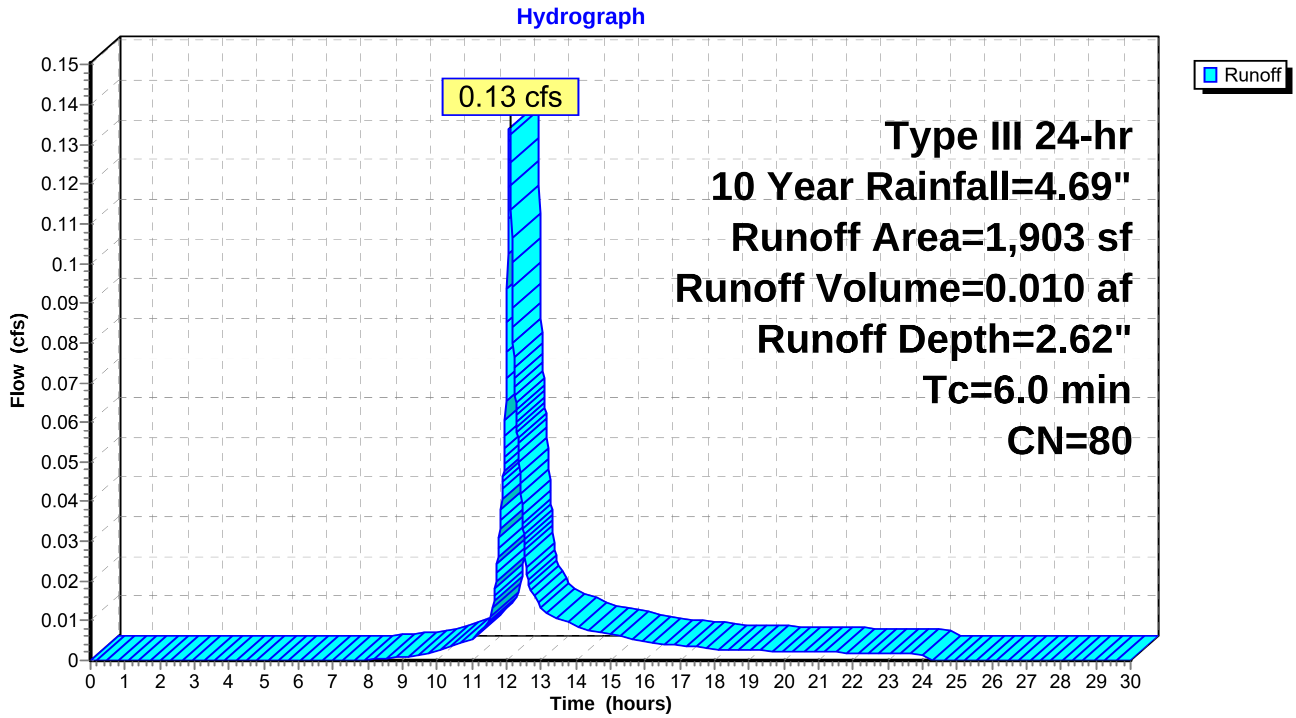
Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.010 af, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.69"

Area (sf)	CN	Description
1,903	80	>75% Grass cover, Good, HSG D
1,903		100.00% Pervious Area

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

Subcatchment DA1: Subcatchment #1



Hydrograph for Subcatchment DA1: Subcatchment #1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.09	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.14	0.00	0.00
3.50	0.17	0.00	0.00
4.00	0.20	0.00	0.00
4.50	0.23	0.00	0.00
5.00	0.27	0.00	0.00
5.50	0.30	0.00	0.00
6.00	0.34	0.00	0.00
6.50	0.38	0.00	0.00
7.00	0.42	0.00	0.00
7.50	0.48	0.00	0.00
8.00	0.53	0.00	0.00
8.50	0.60	0.00	0.00
9.00	0.68	0.01	0.00
9.50	0.78	0.03	0.00
10.00	0.89	0.05	0.00
10.50	1.02	0.09	0.00
11.00	1.17	0.14	0.01
11.50	1.40	0.24	0.01
12.00	2.34	0.78	**0.08**
12.50	3.29	1.47	**0.03**
13.00	3.52	1.65	0.01
13.50	3.67	1.78	0.01
14.00	3.80	1.88	0.01
14.50	3.91	1.97	0.01
15.00	4.01	2.05	0.01
15.50	4.09	2.11	0.01
16.00	4.16	2.17	0.00
16.50	4.21	2.22	0.00
17.00	4.27	2.26	0.00
17.50	4.31	2.30	0.00
18.00	4.35	2.34	0.00
18.50	4.39	2.37	0.00
19.00	4.42	2.40	0.00
19.50	4.46	2.42	0.00
20.00	4.49	2.45	0.00
20.50	4.52	2.48	0.00
21.00	4.55	2.50	0.00
21.50	4.57	2.52	0.00
22.00	4.60	2.55	0.00
22.50	4.62	2.57	0.00
23.00	4.65	2.59	0.00
23.50	4.67	2.61	0.00
24.00	**4.69**	**2.62**	0.00
24.50	4.69	2.62	0.00
25.00	4.69	2.62	0.00
25.50	4.69	2.62	0.00
26.00	4.69	2.62	0.00
26.50	4.69	2.62	0.00
27.00	4.69	2.62	0.00
27.50	4.69	2.62	0.00
28.00	4.69	2.62	0.00
28.50	4.69	2.62	0.00
29.00	4.69	2.62	0.00
29.50	4.69	2.62	0.00
30.00	4.69	2.62	0.00

Summary for Subcatchment DA2: Subcatchment #2

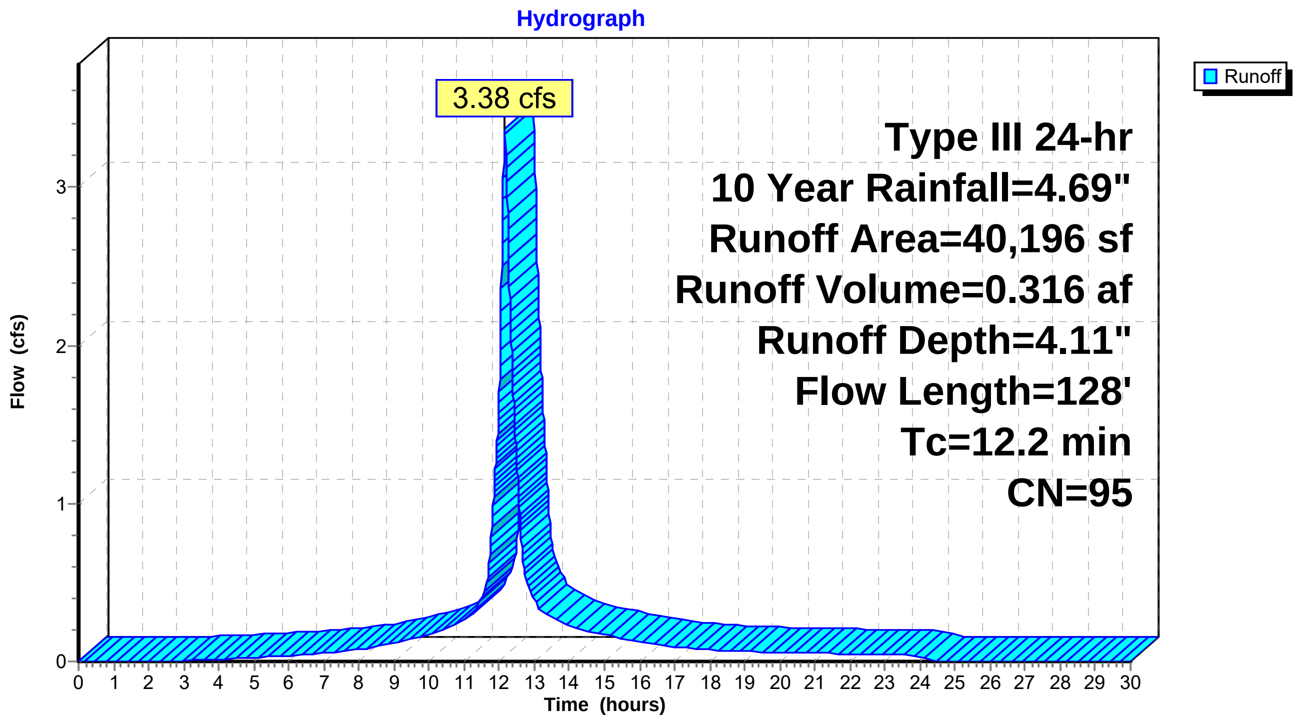
Runoff = 3.38 cfs @ 12.16 hrs, Volume= 0.316 af, Depth= 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.69"

Area (sf)	CN	Description
32,805	98	Paved parking, HSG D
7,391	80	>75% Grass cover, Good, HSG D
40,196	95	Weighted Average
7,391		18.39% Pervious Area
32,805		81.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	72	0.0250	0.11		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
0.5	28	0.0200	0.94		**Sheet Flow, Sheet Flow 2** Smooth surfaces n= 0.011 P2= 2.48"
0.3	28	0.0050	1.44		**Shallow Concentrated Flow, Shallow Concnetrated Flow 1** Paved Kv= 20.3 fps
12.2	128	Total			

Subcatchment DA2: Subcatchment #2



Hydrograph for Subcatchment DA2: Subcatchment #2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.09	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.14	0.00	0.00
3.50	0.17	0.01	0.01
4.00	0.20	0.01	0.01
4.50	0.23	0.02	0.02
5.00	0.27	0.04	0.02
5.50	0.30	0.05	0.03
6.00	0.34	0.07	0.03
6.50	0.38	0.09	0.04
7.00	0.42	0.12	0.05
7.50	0.48	0.15	0.06
8.00	0.53	0.19	0.07
8.50	0.60	0.24	0.09
9.00	0.68	0.30	0.12
9.50	0.78	0.38	0.14
10.00	0.89	0.47	0.17
10.50	1.02	0.58	0.21
11.00	1.17	0.71	0.26
11.50	1.40	0.92	0.40
12.00	2.34	1.81	**1.71**
12.50	3.29	2.74	**1.25**
13.00	3.52	2.96	0.39
13.50	3.67	3.11	0.28
14.00	3.80	3.24	0.23
14.50	3.91	3.34	0.20
15.00	4.01	3.44	0.17
15.50	4.09	3.52	0.15
16.00	4.16	3.58	0.12
16.50	4.21	3.64	0.11
17.00	4.27	3.69	0.09
17.50	4.31	3.74	0.08
18.00	4.35	3.78	0.07
18.50	4.39	3.81	0.07
19.00	4.42	3.85	0.06
19.50	4.46	3.88	0.06
20.00	4.49	3.91	0.06
20.50	4.52	3.94	0.05
21.00	4.55	3.97	0.05
21.50	4.57	4.00	0.05
22.00	4.60	4.02	0.05
22.50	4.62	4.05	0.04
23.00	4.65	4.07	0.04
23.50	4.67	4.09	0.04
24.00	**4.69**	**4.11**	0.04
24.50	4.69	4.11	0.00
25.00	4.69	4.11	0.00
25.50	4.69	4.11	0.00
26.00	4.69	4.11	0.00
26.50	4.69	4.11	0.00
27.00	4.69	4.11	0.00
27.50	4.69	4.11	0.00
28.00	4.69	4.11	0.00
28.50	4.69	4.11	0.00
29.00	4.69	4.11	0.00
29.50	4.69	4.11	0.00
30.00	4.69	4.11	0.00

Summary for Subcatchment DA3: Subcatchment #3

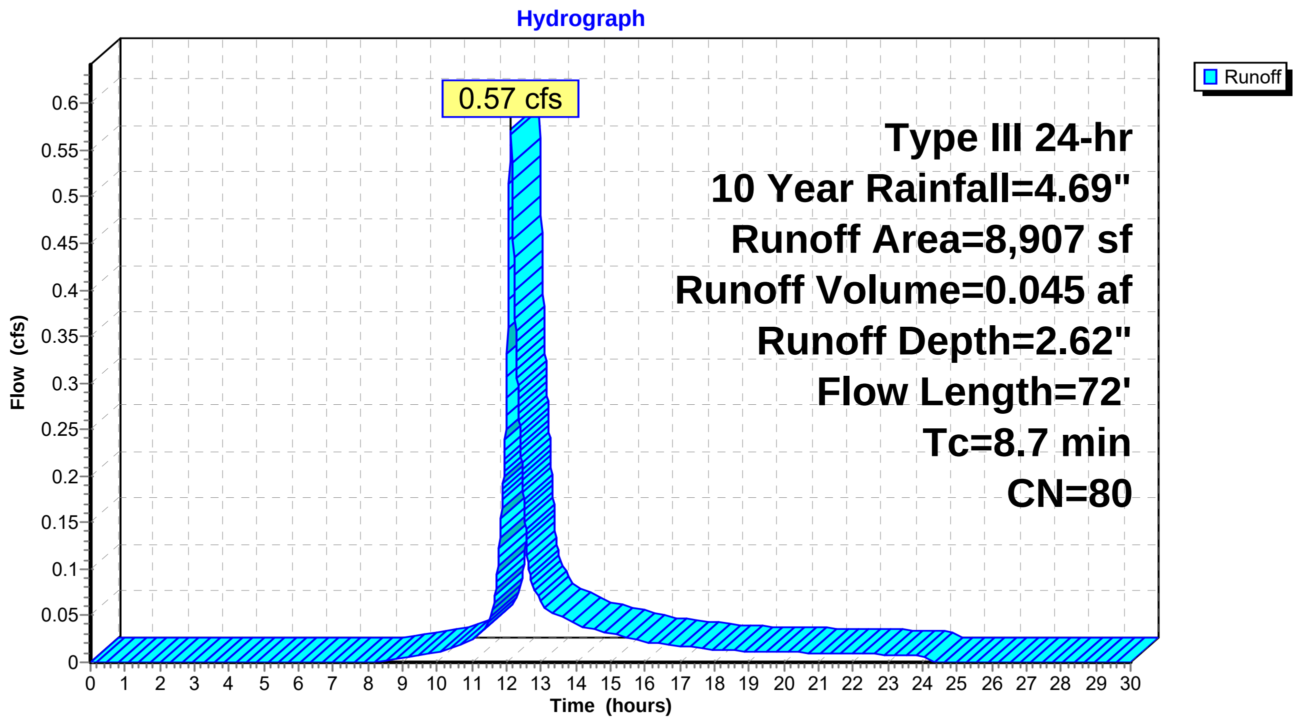
Runoff = 0.57 cfs @ 12.12 hrs, Volume= 0.045 af, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.69"

Area (sf)	CN	Description
8,907	80	>75% Grass cover, Good, HSG D
8,907		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	44	0.0550	0.13		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
3.1	28	0.1000	0.15		**Sheet Flow, Sheet Flow 2** Grass: Dense n= 0.240 P2= 2.48"
8.7	72	Total			

Subcatchment DA3: Subcatchment #3



Hydrograph for Subcatchment DA3: Subcatchment #3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.09	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.14	0.00	0.00
3.50	0.17	0.00	0.00
4.00	0.20	0.00	0.00
4.50	0.23	0.00	0.00
5.00	0.27	0.00	0.00
5.50	0.30	0.00	0.00
6.00	0.34	0.00	0.00
6.50	0.38	0.00	0.00
7.00	0.42	0.00	0.00
7.50	0.48	0.00	0.00
8.00	0.53	0.00	0.00
8.50	0.60	0.00	0.00
9.00	0.68	0.01	0.00
9.50	0.78	0.03	0.01
10.00	0.89	0.05	0.01
10.50	1.02	0.09	0.02
11.00	1.17	0.14	0.02
11.50	1.40	0.24	0.04
12.00	2.34	0.78	**0.28**
12.50	3.29	1.47	**0.18**
13.00	3.52	1.65	0.07
13.50	3.67	1.78	0.05
14.00	3.80	1.88	0.04
14.50	3.91	1.97	0.04
15.00	4.01	2.05	0.03
15.50	4.09	2.11	0.03
16.00	4.16	2.17	0.02
16.50	4.21	2.22	0.02
17.00	4.27	2.26	0.02
17.50	4.31	2.30	0.02
18.00	4.35	2.34	0.01
18.50	4.39	2.37	0.01
19.00	4.42	2.40	0.01
19.50	4.46	2.42	0.01
20.00	4.49	2.45	0.01
20.50	4.52	2.48	0.01
21.00	4.55	2.50	0.01
21.50	4.57	2.52	0.01
22.00	4.60	2.55	0.01
22.50	4.62	2.57	0.01
23.00	4.65	2.59	0.01
23.50	4.67	2.61	0.01
24.00	**4.69**	**2.62**	0.01
24.50	4.69	2.62	0.00
25.00	4.69	2.62	0.00
25.50	4.69	2.62	0.00
26.00	4.69	2.62	0.00
26.50	4.69	2.62	0.00
27.00	4.69	2.62	0.00
27.50	4.69	2.62	0.00
28.00	4.69	2.62	0.00
28.50	4.69	2.62	0.00
29.00	4.69	2.62	0.00
29.50	4.69	2.62	0.00
30.00	4.69	2.62	0.00

Summary for Subcatchment DA4: Subcatchment #2

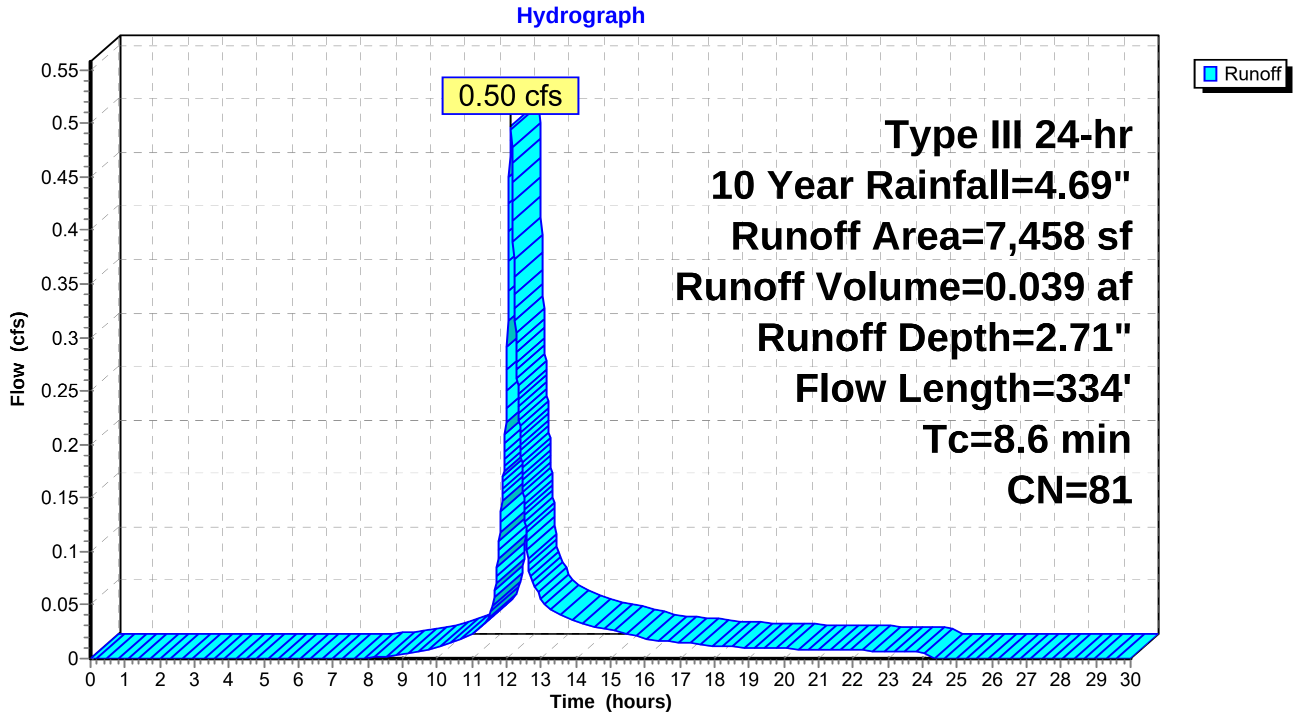
Runoff = 0.50 cfs @ 12.12 hrs, Volume= 0.039 af, Depth= 2.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.69"

Area (sf)	CN	Description
495	98	Paved parking, HSG D
6,963	80	>75% Grass cover, Good, HSG D
7,458	81	Weighted Average
6,963		93.36% Pervious Area
495		6.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	56	0.0480	0.13		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
0.7	158	0.0300	3.52		**Shallow Concentrated Flow, Shallow Concnetrated Flow 1** Paved Kv= 20.3 fps
0.0	7	0.3700	4.26		**Shallow Concentrated Flow, Shallow Concentrated Flow 2** Short Grass Pasture Kv= 7.0 fps
0.7	113	0.0060	2.63	11.85	**Channel Flow, Channel 1** Area= 4.5 sf Perim= 12.6' r= 0.36' n= 0.022 Earth, clean & straight
8.6	334	Total			

Subcatchment DA4: Subcatchment #2



Hydrograph for Subcatchment DA4: Subcatchment #2

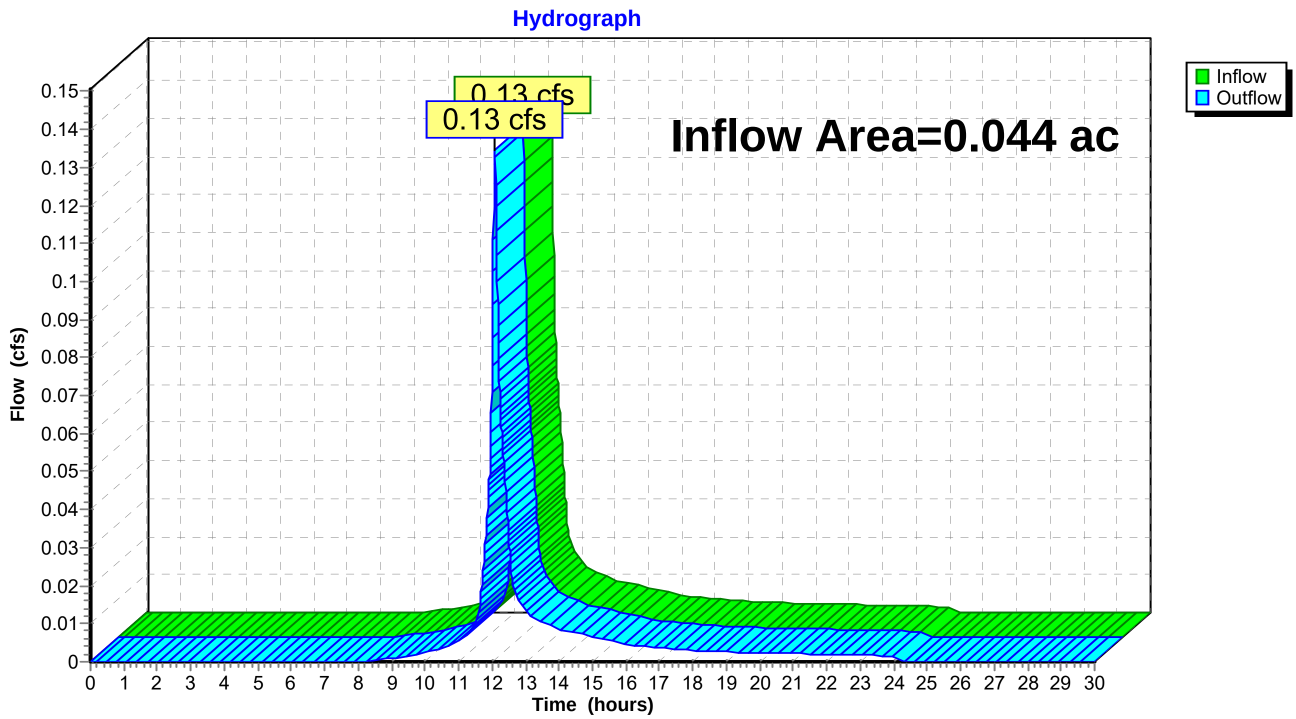
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.09	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.14	0.00	0.00
3.50	0.17	0.00	0.00
4.00	0.20	0.00	0.00
4.50	0.23	0.00	0.00
5.00	0.27	0.00	0.00
5.50	0.30	0.00	0.00
6.00	0.34	0.00	0.00
6.50	0.38	0.00	0.00
7.00	0.42	0.00	0.00
7.50	0.48	0.00	0.00
8.00	0.53	0.00	0.00
8.50	0.60	0.01	0.00
9.00	0.68	0.02	0.00
9.50	0.78	0.04	0.01
10.00	0.89	0.06	0.01
10.50	1.02	0.10	0.02
11.00	1.17	0.16	0.02
11.50	1.40	0.26	0.04
12.00	2.34	0.83	**0.25**
12.50	3.29	1.54	**0.15**
13.00	3.52	1.72	0.06
13.50	3.67	1.85	0.04
14.00	3.80	1.96	0.03
14.50	3.91	2.05	0.03
15.00	4.01	2.13	0.03
15.50	4.09	2.20	0.02
16.00	4.16	2.25	0.02
16.50	4.21	2.30	0.02
17.00	4.27	2.35	0.01
17.50	4.31	2.39	0.01
18.00	4.35	2.42	0.01
18.50	4.39	2.45	0.01
19.00	4.42	2.48	0.01
19.50	4.46	2.51	0.01
20.00	4.49	2.54	0.01
20.50	4.52	2.56	0.01
21.00	4.55	2.59	0.01
21.50	4.57	2.61	0.01
22.00	4.60	2.63	0.01
22.50	4.62	2.66	0.01
23.00	4.65	2.68	0.01
23.50	4.67	2.70	0.01
24.00	**4.69**	**2.71**	0.01
24.50	4.69	2.71	0.00
25.00	4.69	2.71	0.00
25.50	4.69	2.71	0.00
26.00	4.69	2.71	0.00
26.50	4.69	2.71	0.00
27.00	4.69	2.71	0.00
27.50	4.69	2.71	0.00
28.00	4.69	2.71	0.00
28.50	4.69	2.71	0.00
29.00	4.69	2.71	0.00
29.50	4.69	2.71	0.00
30.00	4.69	2.71	0.00

Summary for Reach DP1: Discharge Point #1 (US 9W)

Inflow Area =	0.044 ac,	0.00% Impervious, Inflow Depth = 2.62"	for 10 Year event
Inflow =	0.13 cfs @	12.09 hrs, Volume=	0.010 af
Outflow =	0.13 cfs @	12.09 hrs, Volume=	0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach DP1: Discharge Point #1 (US 9W)



Hydrograph for Reach DP1: Discharge Point #1 (US 9W)

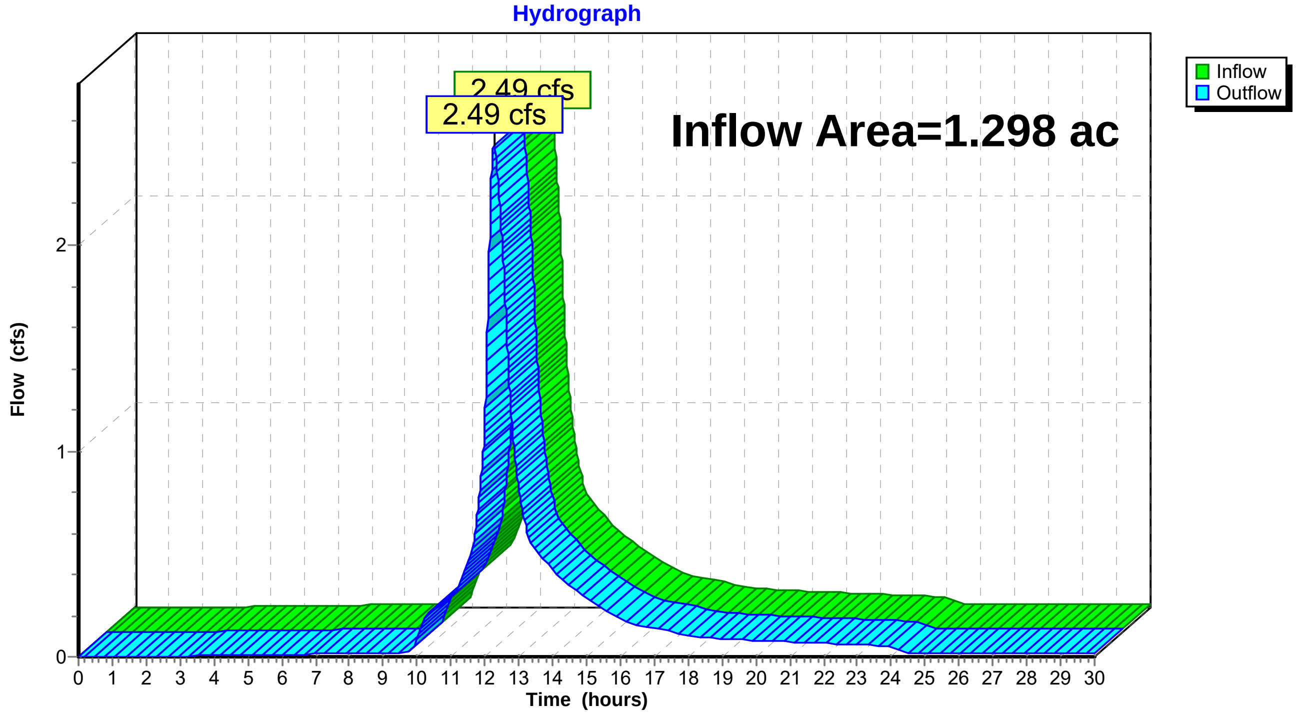
Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.00		0.00
7.00	0.00		0.00
7.50	0.00		0.00
8.00	0.00		0.00
8.50	0.00		0.00
9.00	0.00		0.00
9.50	0.00		0.00
10.00	0.00		0.00
10.50	0.00		0.00
11.00	0.01		0.01
11.50	0.01		0.01
12.00	**0.08**		**0.08**
12.50	**0.03**		**0.03**
13.00	0.01		0.01
13.50	0.01		0.01
14.00	0.01		0.01
14.50	0.01		0.01
15.00	0.01		0.01
15.50	0.01		0.01
16.00	0.00		0.00
16.50	0.00		0.00
17.00	0.00		0.00
17.50	0.00		0.00
18.00	0.00		0.00
18.50	0.00		0.00
19.00	0.00		0.00
19.50	0.00		0.00
20.00	0.00		0.00
20.50	0.00		0.00
21.00	0.00		0.00
21.50	0.00		0.00
22.00	0.00		0.00
22.50	0.00		0.00
23.00	0.00		0.00
23.50	0.00		0.00
24.00	0.00		0.00
24.50	0.00		0.00
25.00	0.00		0.00
25.50	0.00		0.00
26.00	0.00		0.00
26.50	0.00		0.00
27.00	0.00		0.00
27.50	0.00		0.00
28.00	0.00		0.00
28.50	0.00		0.00
29.00	0.00		0.00
29.50	0.00		0.00
30.00	0.00		0.00

Summary for Reach DP2: Discharge Point #2 (Existing Culvert)

Inflow Area =	1.298 ac, 58.87% Impervious,	Inflow Depth > 3.45"	for 10 Year event	
Inflow =	2.49 cfs @ 12.26 hrs,	Volume=	0.374 af	
Outflow =	2.49 cfs @ 12.26 hrs,	Volume=	0.374 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach DP2: Discharge Point #2 (Existing Culvert)



Hydrograph for Reach DP2: Discharge Point #2 (Existing Culvert)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.01		0.01
4.00	0.01		0.01
4.50	0.01		0.01
5.00	0.01		0.01
5.50	0.01		0.01
6.00	0.01		0.01
6.50	0.01		0.01
7.00	0.01		0.01
7.50	0.01		0.01
8.00	0.01		0.01
8.50	0.02		0.02
9.00	0.02		0.02
9.50	0.02		0.02
10.00	0.09		0.09
10.50	0.23		0.23
11.00	0.30		0.30
11.50	0.45		0.45
12.00	**1.16**		**1.16**
12.50	**2.04**		**2.04**
13.00	0.82		0.82
13.50	0.53		0.53
14.00	0.43		0.43
14.50	0.35		0.35
15.00	0.29		0.29
15.50	0.23		0.23
16.00	0.19		0.19
16.50	0.16		0.16
17.00	0.14		0.14
17.50	0.12		0.12
18.00	0.11		0.11
18.50	0.09		0.09
19.00	0.09		0.09
19.50	0.08		0.08
20.00	0.08		0.08
20.50	0.08		0.08
21.00	0.07		0.07
21.50	0.07		0.07
22.00	0.07		0.07
22.50	0.06		0.06
23.00	0.06		0.06
23.50	0.06		0.06
24.00	0.05		0.05
24.50	0.02		0.02
25.00	0.01		0.01
25.50	0.01		0.01
26.00	0.01		0.01
26.50	0.01		0.01
27.00	0.01		0.01
27.50	0.01		0.01
28.00	0.01		0.01
28.50	0.01		0.01
29.00	0.01		0.01
29.50	0.01		0.01
30.00	0.01		0.01

Summary for Pond CB3: Catch Basin #3

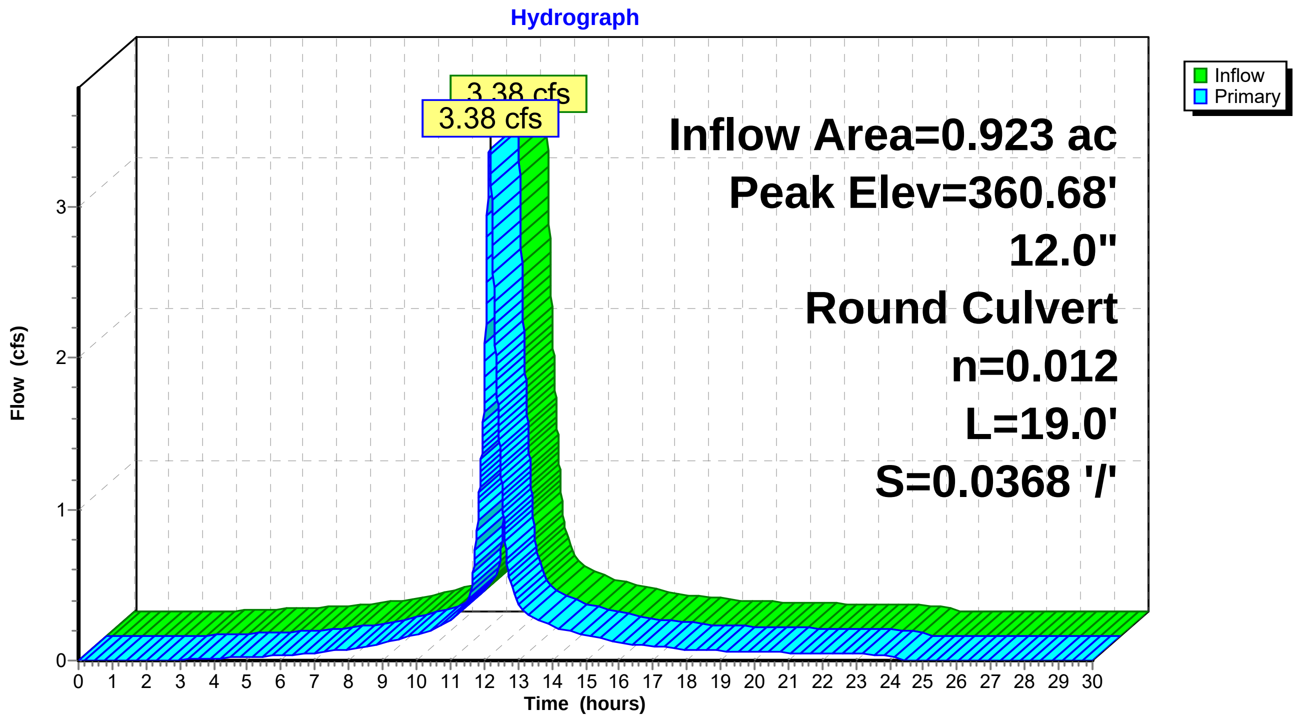
Inflow Area = 0.923 ac, 81.61% Impervious, Inflow Depth = 4.11" for 10 Year event
Inflow = 3.38 cfs @ 12.16 hrs, Volume= 0.316 af
Outflow = 3.38 cfs @ 12.16 hrs, Volume= 0.316 af, Atten= 0%, Lag= 0.0 min
Primary = 3.38 cfs @ 12.16 hrs, Volume= 0.316 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 360.68' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	358.90'	**12.0" Round Culvert** L= 19.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 358.90' / 358.20' S= 0.0368 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.38 cfs @ 12.16 hrs HW=360.68' (Free Discharge)
└─**1=Culvert** (Inlet Controls 3.38 cfs @ 4.30 fps)

Pond CB3: Catch Basin #3



Hydrograph for Pond CB3: Catch Basin #3

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	358.90	0.00
0.50	0.00	358.90	0.00
1.00	0.00	358.90	0.00
1.50	0.00	358.90	0.00
2.00	0.00	358.90	0.00
2.50	0.00	358.91	0.00
3.00	0.00	358.94	0.00
3.50	0.01	358.95	0.01
4.00	0.01	358.96	0.01
4.50	0.02	358.97	0.02
5.00	0.02	358.98	0.02
5.50	0.03	358.99	0.03
6.00	0.03	359.00	0.03
6.50	0.04	359.01	0.04
7.00	0.05	359.02	0.05
7.50	0.06	359.04	0.06
8.00	0.07	359.05	0.07
8.50	0.09	359.07	0.09
9.00	0.12	359.09	0.12
9.50	0.14	359.11	0.14
10.00	0.17	359.13	0.17
10.50	0.21	359.15	0.21
11.00	0.26	359.18	0.26
11.50	0.40	359.26	0.40
12.00	**1.71**	**359.73**	**1.71**
12.50	**1.25**	**359.58**	**1.25**
13.00	0.39	359.25	0.39
13.50	0.28	359.19	0.28
14.00	0.23	359.16	0.23
14.50	0.20	359.14	0.20
15.00	0.17	359.13	0.17
15.50	0.15	359.11	0.15
16.00	0.12	359.09	0.12
16.50	0.11	359.08	0.11
17.00	0.09	359.07	0.09
17.50	0.08	359.06	0.08
18.00	0.07	359.05	0.07
18.50	0.07	359.04	0.07
19.00	0.06	359.04	0.06
19.50	0.06	359.03	0.06
20.00	0.06	359.03	0.06
20.50	0.05	359.03	0.05
21.00	0.05	359.02	0.05
21.50	0.05	359.02	0.05
22.00	0.05	359.02	0.05
22.50	0.04	359.01	0.04
23.00	0.04	359.01	0.04
23.50	0.04	359.01	0.04
24.00	0.04	359.00	0.04
24.50	0.00	358.91	0.00
25.00	0.00	358.90	0.00
25.50	0.00	358.90	0.00
26.00	0.00	358.90	0.00
26.50	0.00	358.90	0.00
27.00	0.00	358.90	0.00
27.50	0.00	358.90	0.00
28.00	0.00	358.90	0.00
28.50	0.00	358.90	0.00
29.00	0.00	358.90	0.00
29.50	0.00	358.90	0.00
30.00	0.00	358.90	0.00

Summary for Pond HDS: Hydrodynamic Separator

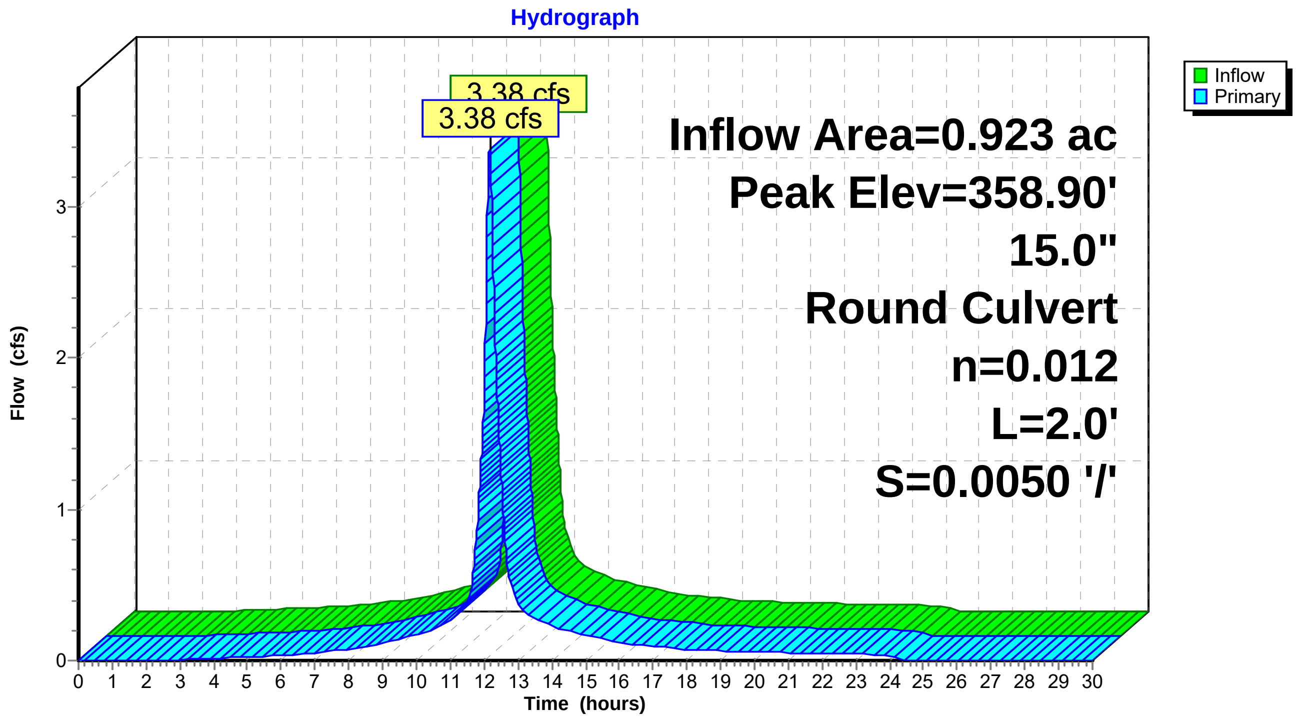
Inflow Area =	0.923 ac,	81.61% Impervious,	Inflow Depth = 4.11"	for 10 Year event	
Inflow =	3.38 cfs @	12.16 hrs,	Volume=	0.316 af	
Outflow =	3.38 cfs @	12.16 hrs,	Volume=	0.316 af,	Atten= 0%, Lag= 0.0 min
Primary =	3.38 cfs @	12.16 hrs,	Volume=	0.316 af	

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 358.90' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	357.61'	**15.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 357.61' / 357.60' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.38 cfs @ 12.16 hrs HW=358.90' (Free Discharge)
1=Culvert (Barrel Controls 3.38 cfs @ 3.32 fps)

Pond HDS: Hydrodynamic Separator



Hydrograph for Pond HDS: Hydrodynamic Separator

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	357.61	0.00	26.00	0.00	357.61	0.00
0.50	0.00	357.61	0.00	26.50	0.00	357.61	0.00
1.00	0.00	357.61	0.00	27.00	0.00	357.61	0.00
1.50	0.00	357.61	0.00	27.50	0.00	357.61	0.00
2.00	0.00	357.61	0.00	28.00	0.00	357.61	0.00
2.50	0.00	357.63	0.00	28.50	0.00	357.61	0.00
3.00	0.00	357.65	0.00	29.00	0.00	357.61	0.00
3.50	0.01	357.67	0.01	29.50	0.00	357.61	0.00
4.00	0.01	357.68	0.01	30.00	0.00	357.61	0.00
4.50	0.02	357.69	0.02				
5.00	0.02	357.70	0.02				
5.50	0.03	357.71	0.03				
6.00	0.03	357.72	0.03				
6.50	0.04	357.73	0.04				
7.00	0.05	357.74	0.05				
7.50	0.06	357.76	0.06				
8.00	0.07	357.77	0.07				
8.50	0.09	357.79	0.09				
9.00	0.12	357.81	0.12				
9.50	0.14	357.84	0.14				
10.00	0.17	357.86	0.17				
10.50	0.21	357.89	0.21				
11.00	0.26	357.92	0.26				
11.50	0.40	358.00	0.40				
12.00	**1.71**	**358.46**	**1.71**				
12.50	**1.25**	**358.32**	**1.25**				
13.00	0.39	357.99	0.39				
13.50	0.28	357.93	0.28				
14.00	0.23	357.90	0.23				
14.50	0.20	357.88	0.20				
15.00	0.17	357.86	0.17				
15.50	0.15	357.84	0.15				
16.00	0.12	357.82	0.12				
16.50	0.11	357.80	0.11				
17.00	0.09	357.79	0.09				
17.50	0.08	357.78	0.08				
18.00	0.07	357.77	0.07				
18.50	0.07	357.76	0.07				
19.00	0.06	357.76	0.06				
19.50	0.06	357.75	0.06				
20.00	0.06	357.75	0.06				
20.50	0.05	357.75	0.05				
21.00	0.05	357.74	0.05				
21.50	0.05	357.74	0.05				
22.00	0.05	357.74	0.05				
22.50	0.04	357.73	0.04				
23.00	0.04	357.73	0.04				
23.50	0.04	357.73	0.04				
24.00	0.04	357.72	0.04				
24.50	0.00	357.62	0.00				
25.00	0.00	357.61	0.00				
25.50	0.00	357.61	0.00				

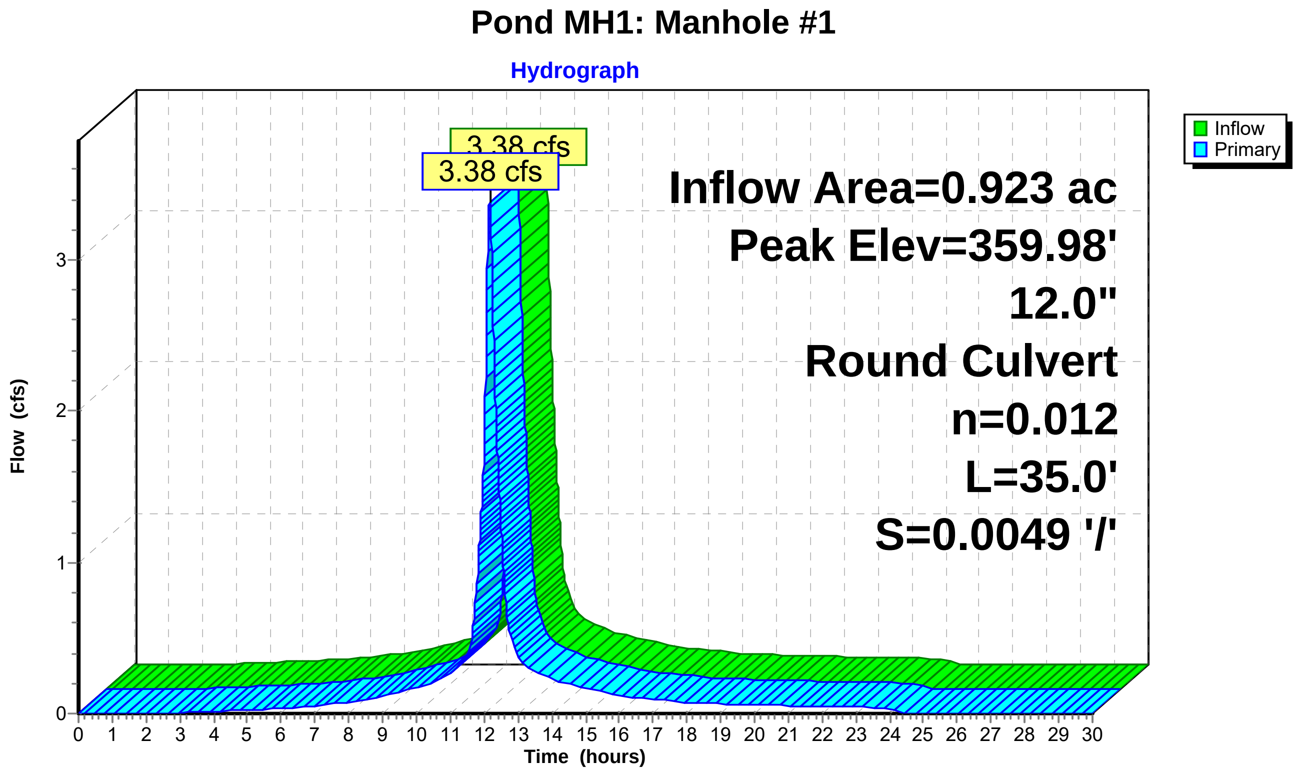
Summary for Pond MH1: Manhole #1

Inflow Area = 0.923 ac, 81.61% Impervious, Inflow Depth = 4.11" for 10 Year event
Inflow = 3.38 cfs @ 12.16 hrs, Volume= 0.316 af
Outflow = 3.38 cfs @ 12.16 hrs, Volume= 0.316 af, Atten= 0%, Lag= 0.0 min
Primary = 3.38 cfs @ 12.16 hrs, Volume= 0.316 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 359.98' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	358.20'	**12.0" Round Culvert** L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 358.20' / 358.03' S= 0.0049 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.38 cfs @ 12.16 hrs HW=359.98' (Free Discharge)
└─**1=Culvert** (Inlet Controls 3.38 cfs @ 4.30 fps)



Hydrograph for Pond MH1: Manhole #1

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	358.20	0.00
0.50	0.00	358.20	0.00
1.00	0.00	358.20	0.00
1.50	0.00	358.20	0.00
2.00	0.00	358.20	0.00
2.50	0.00	358.22	0.00
3.00	0.00	358.24	0.00
3.50	0.01	358.26	0.01
4.00	0.01	358.27	0.01
4.50	0.02	358.28	0.02
5.00	0.02	358.29	0.02
5.50	0.03	358.30	0.03
6.00	0.03	358.31	0.03
6.50	0.04	358.32	0.04
7.00	0.05	358.33	0.05
7.50	0.06	358.34	0.06
8.00	0.07	358.36	0.07
8.50	0.09	358.38	0.09
9.00	0.12	358.40	0.12
9.50	0.14	358.42	0.14
10.00	0.17	358.44	0.17
10.50	0.21	358.47	0.21
11.00	0.26	358.50	0.26
11.50	0.40	358.58	0.40
12.00	**1.71**	**359.09**	**1.71**
12.50	**1.25**	**358.93**	**1.25**
13.00	0.39	358.57	0.39
13.50	0.28	358.51	0.28
14.00	0.23	358.48	0.23
14.50	0.20	358.46	0.20
15.00	0.17	358.44	0.17
15.50	0.15	358.42	0.15
16.00	0.12	358.40	0.12
16.50	0.11	358.39	0.11
17.00	0.09	358.38	0.09
17.50	0.08	358.37	0.08
18.00	0.07	358.36	0.07
18.50	0.07	358.35	0.07
19.00	0.06	358.35	0.06
19.50	0.06	358.34	0.06
20.00	0.06	358.34	0.06
20.50	0.05	358.33	0.05
21.00	0.05	358.33	0.05
21.50	0.05	358.33	0.05
22.00	0.05	358.33	0.05
22.50	0.04	358.32	0.04
23.00	0.04	358.32	0.04
23.50	0.04	358.32	0.04
24.00	0.04	358.31	0.04
24.50	0.00	358.21	0.00
25.00	0.00	358.20	0.00
25.50	0.00	358.20	0.00
26.00	0.00	358.20	0.00
26.50	0.00	358.20	0.00
27.00	0.00	358.20	0.00
27.50	0.00	358.20	0.00
28.00	0.00	358.20	0.00
28.50	0.00	358.20	0.00
29.00	0.00	358.20	0.00
29.50	0.00	358.20	0.00
30.00	0.00	358.20	0.00

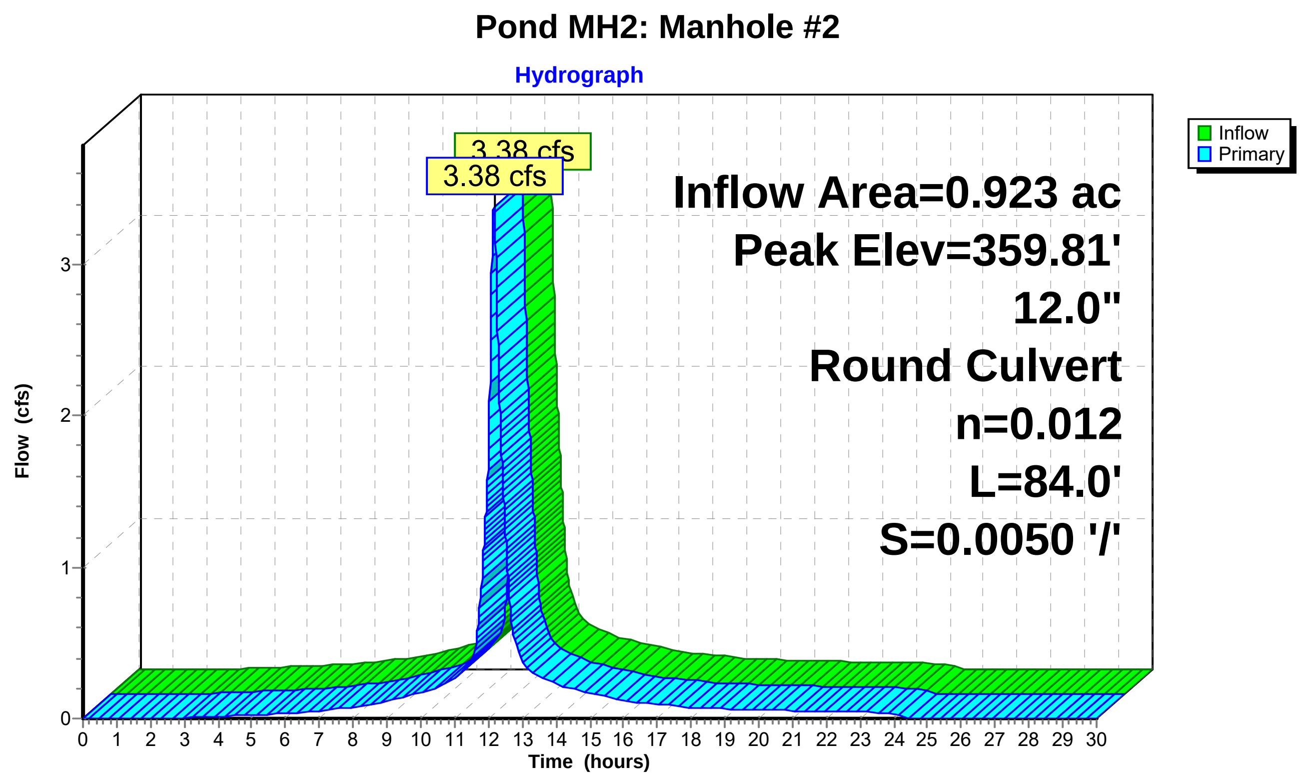
Summary for Pond MH2: Manhole #2

Inflow Area = 0.923 ac, 81.61% Impervious, Inflow Depth = 4.11" for 10 Year event
Inflow = 3.38 cfs @ 12.16 hrs, Volume= 0.316 af
Outflow = 3.38 cfs @ 12.16 hrs, Volume= 0.316 af, Atten= 0%, Lag= 0.0 min
Primary = 3.38 cfs @ 12.16 hrs, Volume= 0.316 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 359.81' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	358.03'	**12.0" Round Culvert** L= 84.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 358.03' / 357.61' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.38 cfs @ 12.16 hrs HW=359.81' (Free Discharge)
└─**1=Culvert** (Inlet Controls 3.38 cfs @ 4.30 fps)



Hydrograph for Pond MH2: Manhole #2

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	358.03	0.00
0.50	0.00	358.03	0.00
1.00	0.00	358.03	0.00
1.50	0.00	358.03	0.00
2.00	0.00	358.03	0.00
2.50	0.00	358.05	0.00
3.00	0.00	358.07	0.00
3.50	0.01	358.09	0.01
4.00	0.01	358.10	0.01
4.50	0.02	358.11	0.02
5.00	0.02	358.12	0.02
5.50	0.03	358.13	0.03
6.00	0.03	358.14	0.03
6.50	0.04	358.15	0.04
7.00	0.05	358.16	0.05
7.50	0.06	358.17	0.06
8.00	0.07	358.18	0.07
8.50	0.09	358.20	0.09
9.00	0.12	358.22	0.12
9.50	0.14	358.24	0.14
10.00	0.17	358.26	0.17
10.50	0.21	358.29	0.21
11.00	0.26	358.32	0.26
11.50	0.40	358.39	0.40
12.00	**1.71**	**358.87**	**1.71**
12.50	**1.25**	**358.72**	**1.25**
13.00	0.39	358.39	0.39
13.50	0.28	358.33	0.28
14.00	0.23	358.30	0.23
14.50	0.20	358.28	0.20
15.00	0.17	358.26	0.17
15.50	0.15	358.24	0.15
16.00	0.12	358.23	0.12
16.50	0.11	358.21	0.11
17.00	0.09	358.20	0.09
17.50	0.08	358.19	0.08
18.00	0.07	358.18	0.07
18.50	0.07	358.18	0.07
19.00	0.06	358.17	0.06
19.50	0.06	358.17	0.06
20.00	0.06	358.17	0.06
20.50	0.05	358.16	0.05
21.00	0.05	358.16	0.05
21.50	0.05	358.16	0.05
22.00	0.05	358.15	0.05
22.50	0.04	358.15	0.04
23.00	0.04	358.15	0.04
23.50	0.04	358.14	0.04
24.00	0.04	358.14	0.04
24.50	0.00	358.04	0.00
25.00	0.00	358.03	0.00
25.50	0.00	358.03	0.00

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
26.00	0.00	358.03	0.00
26.50	0.00	358.03	0.00
27.00	0.00	358.03	0.00
27.50	0.00	358.03	0.00
28.00	0.00	358.03	0.00
28.50	0.00	358.03	0.00
29.00	0.00	358.03	0.00
29.50	0.00	358.03	0.00
30.00	0.00	358.03	0.00

Summary for Pond MH3: Manhole #3 (Diversion Manhole)

Inflow Area =	0.923 ac, 81.61% Impervious, Inflow Depth = 4.11" for 10 Year event				
Inflow =	3.38 cfs @	12.16 hrs,	Volume=	0.316 af	
Outflow =	3.38 cfs @	12.16 hrs,	Volume=	0.316 af,	Atten= 0%, Lag= 0.0 min
Primary =	0.82 cfs @	12.16 hrs,	Volume=	0.230 af	
Secondary =	2.55 cfs @	12.16 hrs,	Volume=	0.086 af	

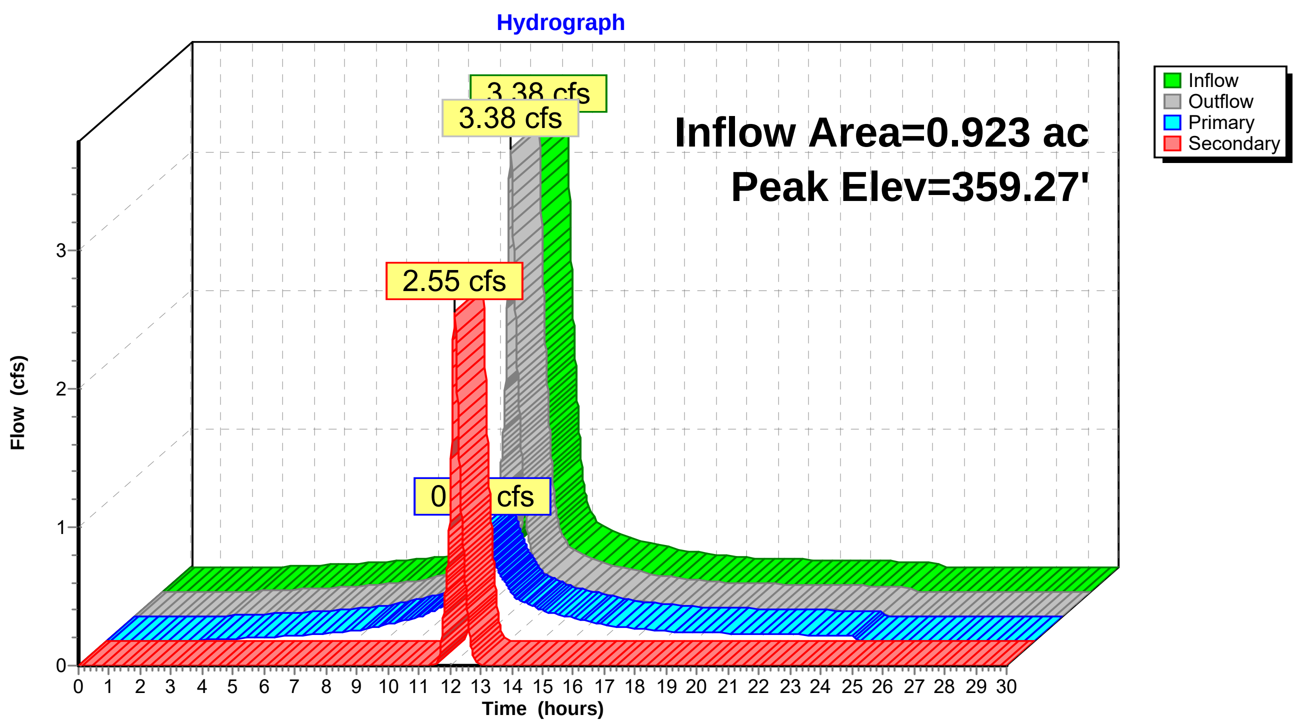
Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 359.27' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	357.60'	**6.0" Round Culvert** L= 41.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 357.60' / 357.50' S= 0.0024 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	358.27'	**15.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 358.27' / 358.19' S= 0.0400 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.82 cfs @ 12.16 hrs HW=359.27' (Free Discharge)
└─**1=Culvert** (Barrel Controls 0.82 cfs @ 4.19 fps)

Secondary OutFlow Max=2.55 cfs @ 12.16 hrs HW=359.27' (Free Discharge)
└─**2=Culvert** (Barrel Controls 2.55 cfs @ 3.32 fps)

Pond MH3: Manhole #3 (Diversion Manhole)



Hydrograph for Pond MH3: Manhole #3 (Diversion Manhole)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	357.60	0.00	0.00	0.00
1.00	0.00	357.60	0.00	0.00	0.00
2.00	0.00	357.60	0.00	0.00	0.00
3.00	0.00	357.66	0.00	0.00	0.00
4.00	0.01	357.70	0.01	0.01	0.00
5.00	0.02	357.73	0.02	0.02	0.00
6.00	0.03	357.75	0.03	0.03	0.00
7.00	0.05	357.79	0.05	0.05	0.00
8.00	0.07	357.82	0.07	0.07	0.00
9.00	0.12	357.88	0.12	0.12	0.00
10.00	0.17	357.95	0.17	0.17	0.00
11.00	0.26	358.06	0.26	0.26	0.00
12.00	**1.71**	**358.85**	**1.71**	**0.67**	**1.03**
13.00	**0.39**	**358.28**	**0.39**	**0.39**	**0.00**
14.00	0.23	358.02	0.23	0.23	0.00
15.00	0.17	357.95	0.17	0.17	0.00
16.00	0.12	357.89	0.12	0.12	0.00
17.00	0.09	357.85	0.09	0.09	0.00
18.00	0.07	357.82	0.07	0.07	0.00
19.00	0.06	357.81	0.06	0.06	0.00
20.00	0.06	357.79	0.06	0.06	0.00
21.00	0.05	357.79	0.05	0.05	0.00
22.00	0.05	357.78	0.05	0.05	0.00
23.00	0.04	357.77	0.04	0.04	0.00
24.00	0.04	357.76	0.04	0.04	0.00
25.00	0.00	357.60	0.00	0.00	0.00
26.00	0.00	357.60	0.00	0.00	0.00
27.00	0.00	357.60	0.00	0.00	0.00
28.00	0.00	357.60	0.00	0.00	0.00
29.00	0.00	357.60	0.00	0.00	0.00
30.00	0.00	357.60	0.00	0.00	0.00

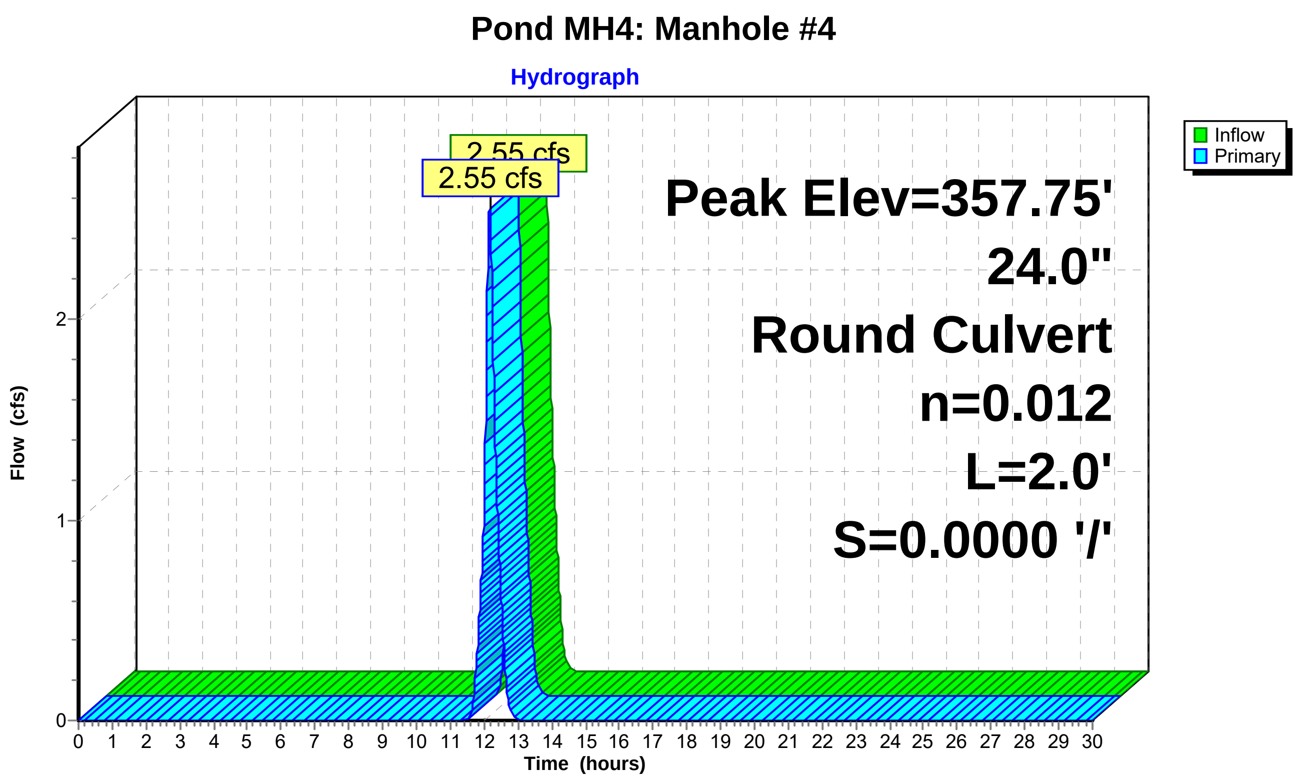
Summary for Pond MH4: Manhole #4

Inflow	=	2.55 cfs @	12.16 hrs,	Volume=	0.086 af
Outflow	=	2.55 cfs @	12.16 hrs,	Volume=	0.086 af, Atten= 0%, Lag= 0.0 min
Primary	=	2.55 cfs @	12.16 hrs,	Volume=	0.086 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 357.75' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	356.85'	**24.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 356.85' / 356.85' S= 0.0000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=2.55 cfs @ 12.16 hrs HW=357.75' (Free Discharge)
1=Culvert (Barrel Controls 2.55 cfs @ 2.74 fps)



Hydrograph for Pond MH4: Manhole #4

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	356.85	0.00
0.50	0.00	356.85	0.00
1.00	0.00	356.85	0.00
1.50	0.00	356.85	0.00
2.00	0.00	356.85	0.00
2.50	0.00	356.85	0.00
3.00	0.00	356.85	0.00
3.50	0.00	356.85	0.00
4.00	0.00	356.85	0.00
4.50	0.00	356.85	0.00
5.00	0.00	356.85	0.00
5.50	0.00	356.85	0.00
6.00	0.00	356.85	0.00
6.50	0.00	356.85	0.00
7.00	0.00	356.85	0.00
7.50	0.00	356.85	0.00
8.00	0.00	356.85	0.00
8.50	0.00	356.85	0.00
9.00	0.00	356.85	0.00
9.50	0.00	356.85	0.00
10.00	0.00	356.85	0.00
10.50	0.00	356.85	0.00
11.00	0.00	356.85	0.00
11.50	0.00	356.89	0.00
12.00	**1.03**	**357.41**	**1.03**
12.50	**0.63**	**357.29**	**0.63**
13.00	0.00	356.87	0.00
13.50	0.00	356.85	0.00
14.00	0.00	356.85	0.00
14.50	0.00	356.85	0.00
15.00	0.00	356.85	0.00
15.50	0.00	356.85	0.00
16.00	0.00	356.85	0.00
16.50	0.00	356.85	0.00
17.00	0.00	356.85	0.00
17.50	0.00	356.85	0.00
18.00	0.00	356.85	0.00
18.50	0.00	356.85	0.00
19.00	0.00	356.85	0.00
19.50	0.00	356.85	0.00
20.00	0.00	356.85	0.00
20.50	0.00	356.85	0.00
21.00	0.00	356.85	0.00
21.50	0.00	356.85	0.00
22.00	0.00	356.85	0.00
22.50	0.00	356.85	0.00
23.00	0.00	356.85	0.00
23.50	0.00	356.85	0.00
24.00	0.00	356.85	0.00
24.50	0.00	356.85	0.00
25.00	0.00	356.85	0.00
25.50	0.00	356.85	0.00

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
26.00	0.00	356.85	0.00
26.50	0.00	356.85	0.00
27.00	0.00	356.85	0.00
27.50	0.00	356.85	0.00
28.00	0.00	356.85	0.00
28.50	0.00	356.85	0.00
29.00	0.00	356.85	0.00
29.50	0.00	356.85	0.00
30.00	0.00	356.85	0.00

Summary for Pond P1: Bioretention

Inflow Area = 1.127 ac, 66.81% Impervious, Inflow Depth = 2.93" for 10 Year event
Inflow = 1.39 cfs @ 12.13 hrs, Volume= 0.275 af
Outflow = 1.31 cfs @ 12.18 hrs, Volume= 0.256 af, Atten= 6%, Lag= 3.1 min
Primary = 1.31 cfs @ 12.18 hrs, Volume= 0.256 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 358.15' @ 12.18 hrs Surf.Area= 2,475 sf Storage= 1,492 cf

Plug-Flow detention time= 97.6 min calculated for 0.256 af (93% of inflow)
Center-of-Mass det. time= 59.3 min (857.1 - 797.8)

Volume	Invert	Avail.Storage	Storage Description
#1	357.50'	2,398 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

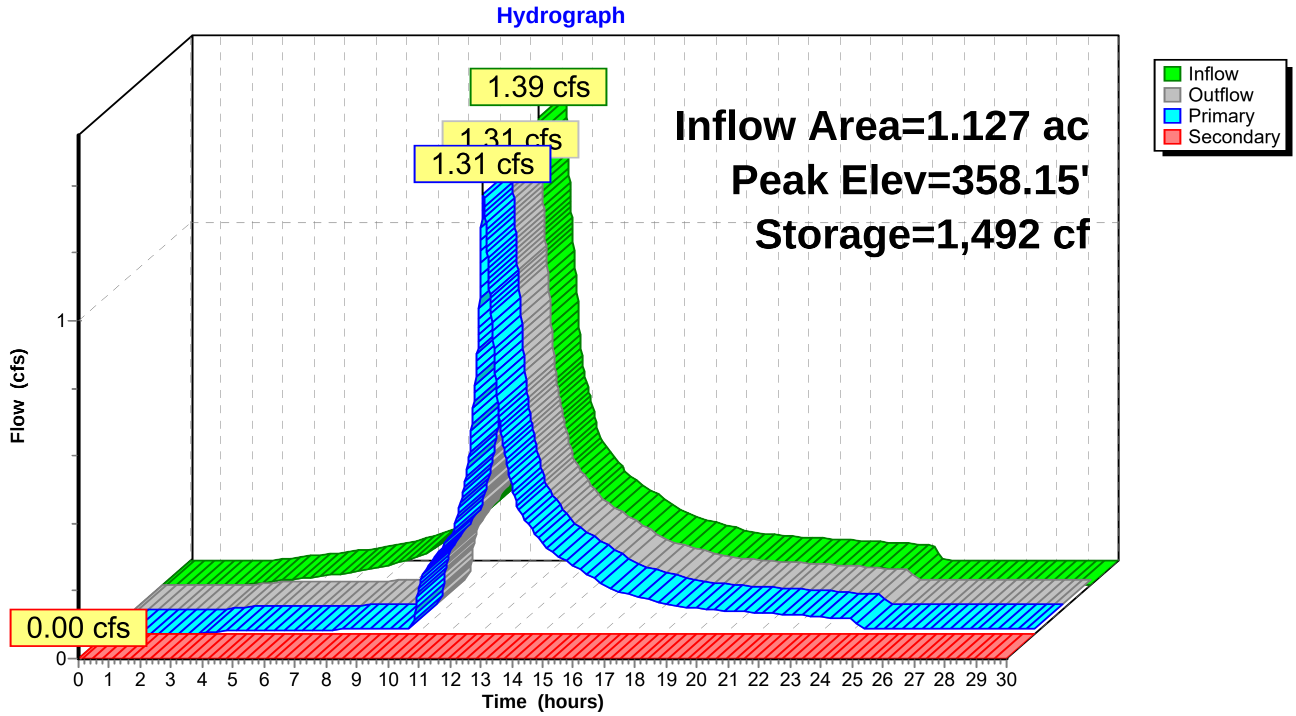
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
357.50	2,136	236.5	0	0	2,136
358.50	2,669	250.1	2,398	2,398	2,716

Device	Routing	Invert	Outlet Devices
#1	Primary	354.33'	**12.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 354.33' / 354.25' S= 0.0053 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	354.33'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	357.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 351.00'
#4	Device 1	357.99'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	358.30'	**10.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=1.30 cfs @ 12.18 hrs HW=358.15' (Free Discharge)
└─**1=Culvert** (Passes 1.30 cfs of 5.44 cfs potential flow)
  ├─**2=Orifice/Grate** (Passes 0.02 cfs of 1.79 cfs potential flow)
  │ └─**3=Exfiltration** (Controls 0.02 cfs)
  └─**4=Orifice/Grate** (Weir Controls 1.29 cfs @ 1.30 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=357.50' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P1: Bioretention



Hydrograph for Pond P1: Bioretention

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	357.50	0.00	0.00	**0.00**
1.00	0.00	0	357.50	0.00	0.00	0.00
2.00	0.00	0	357.50	0.00	0.00	0.00
3.00	0.00	4	357.50	0.00	0.00	0.00
4.00	0.01	17	357.51	0.01	0.01	0.00
5.00	0.02	43	357.52	0.01	0.01	0.00
6.00	0.03	103	357.55	0.01	0.01	0.00
7.00	0.05	210	357.60	0.01	0.01	0.00
8.00	0.07	390	357.68	0.01	0.01	0.00
9.00	0.12	686	357.81	0.01	0.01	0.00
10.00	0.18	1,161	358.01	0.08	0.08	0.00
11.00	0.29	1,239	358.04	0.28	0.28	0.00
12.00	**0.96**	**1,394**	**358.11**	**0.85**	**0.85**	0.00
13.00	**0.45**	**1,302**	**358.07**	**0.48**	**0.48**	0.00
14.00	0.27	1,241	358.05	0.28	0.28	0.00
15.00	0.20	1,215	358.03	0.21	0.21	0.00
16.00	0.14	1,192	358.02	0.15	0.15	0.00
17.00	0.11	1,177	358.02	0.12	0.12	0.00
18.00	0.09	1,164	358.01	0.09	0.09	0.00
19.00	0.08	1,158	358.01	0.08	0.08	0.00
20.00	0.07	1,154	358.01	0.07	0.07	0.00
21.00	0.06	1,150	358.01	0.06	0.06	0.00
22.00	0.06	1,146	358.01	0.06	0.06	0.00
23.00	0.05	1,142	358.00	0.05	0.05	0.00
24.00	0.04	1,139	358.00	0.05	0.05	0.00
25.00	0.00	1,082	357.98	0.01	0.01	0.00
26.00	0.00	1,029	357.96	0.01	0.01	0.00
27.00	0.00	976	357.93	0.01	0.01	0.00
28.00	0.00	923	357.91	0.01	0.01	0.00
29.00	0.00	871	357.89	0.01	0.01	0.00
30.00	0.00	819	357.87	0.01	0.01	0.00

Summary for Pond P2: StormTech SC-740

Inflow	=	2.55 cfs @	12.16 hrs,	Volume=	0.086 af
Outflow	=	1.09 cfs @	12.38 hrs,	Volume=	0.079 af, Atten= 57%, Lag= 13.4 min
Primary	=	1.09 cfs @	12.38 hrs,	Volume=	0.079 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 357.77' @ 12.38 hrs Surf.Area= 0.048 ac Storage= 0.052 af

Plug-Flow detention time= 52.2 min calculated for 0.079 af (91% of inflow)
Center-of-Mass det. time= 49.9 min (781.6 - 731.7)

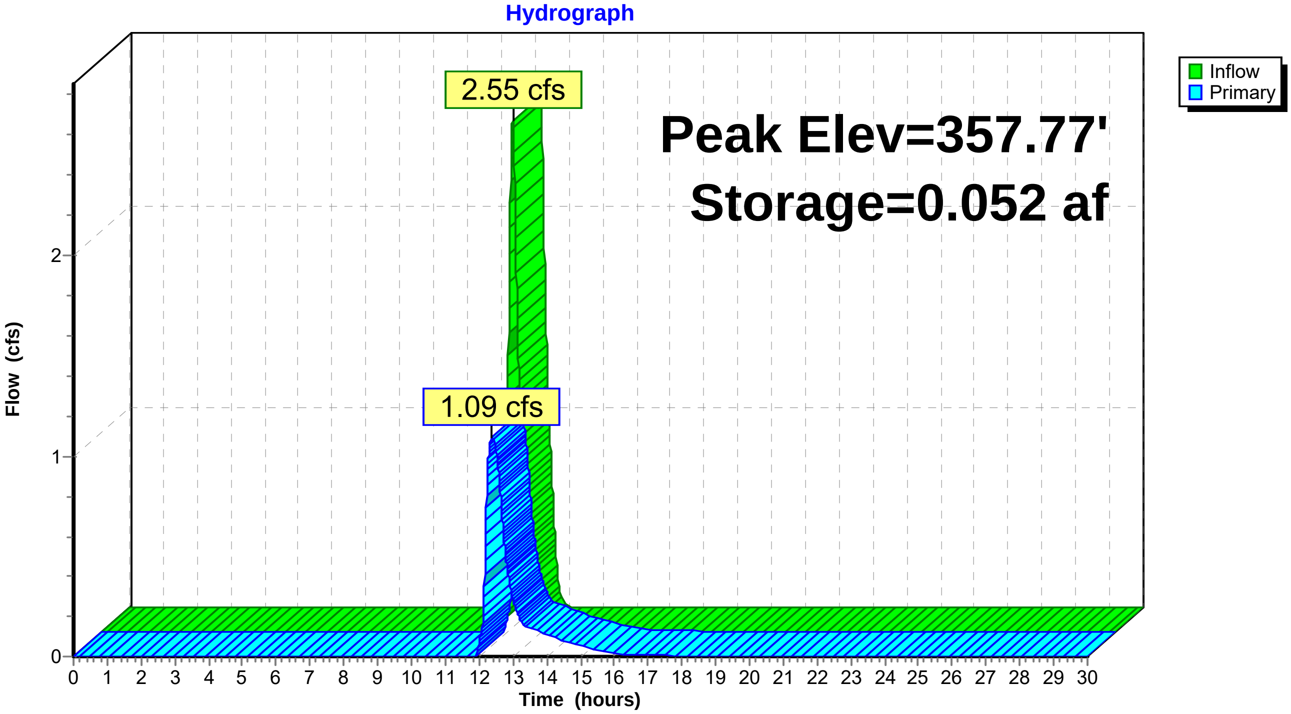
Volume	Invert	Avail.Storage	Storage Description
#1A	356.16'	0.044 af	**39.50'W x 53.46'L x 3.50'H Field A** 0.170 af Overall - 0.059 af Embedded = 0.111 af x 40.0% Voids
#2A	356.66'	0.059 af	**ADS_StormTech SC-740 +Cap** x 56 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 8 Rows of 7 Chambers
#3	365.85'	0.005 af	**24.0" Round Pipe Storage** L= 66.0'
		0.108 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	356.34'	**12.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 356.34' / 356.14' S= 0.1000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	356.54'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	357.05'	**6.0" W x 6.3" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	359.60'	**36.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=1.09 cfs @ 12.38 hrs HW=357.77' (Free Discharge)
└─**1=Culvert** (Passes 1.09 cfs of 2.88 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.06 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.84 cfs @ 3.21 fps)
  └─**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P2: StormTech SC-740



Hydrograph for Pond P2: StormTech SC-740

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	356.16	0.00
1.00	0.00	0.000	356.16	0.00
2.00	0.00	0.000	356.16	0.00
3.00	0.00	0.000	356.16	0.00
4.00	0.00	0.000	356.16	0.00
5.00	0.00	0.000	356.16	0.00
6.00	0.00	0.000	356.16	0.00
7.00	0.00	0.000	356.16	0.00
8.00	0.00	0.000	356.16	0.00
9.00	0.00	0.000	356.16	0.00
10.00	0.00	0.000	356.16	0.00
11.00	0.00	0.000	356.16	0.00
12.00	**1.03**	**0.013**	**356.74**	**0.07**
13.00	**0.00**	**0.032**	**357.22**	**0.28**
14.00	0.00	0.019	356.89	0.11
15.00	0.00	0.012	356.72	0.05
16.00	0.00	0.009	356.63	0.02
17.00	0.00	0.008	356.58	0.01
18.00	0.00	0.008	356.56	0.00
19.00	0.00	0.008	356.55	0.00
20.00	0.00	0.007	356.54	0.00
21.00	0.00	0.007	356.54	0.00
22.00	0.00	0.007	356.54	0.00
23.00	0.00	0.007	356.54	0.00
24.00	0.00	0.007	356.54	0.00
25.00	0.00	0.007	356.54	0.00
26.00	0.00	0.007	356.54	0.00
27.00	0.00	0.007	356.54	0.00
28.00	0.00	0.007	356.54	0.00
29.00	0.00	0.007	356.54	0.00
30.00	0.00	0.007	356.54	0.00

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: Subcatchment #1 Runoff Area=1,903 sf 0.00% Impervious Runoff Depth=5.83"
Tc=6.0 min CN=80 Runoff=0.29 cfs 0.021 af

Subcatchment DA2: Subcatchment #2 Runoff Area=40,196 sf 81.61% Impervious Runoff Depth=7.62"
Flow Length=128' Tc=12.2 min CN=95 Runoff=6.06 cfs 0.586 af

Subcatchment DA3: Subcatchment #3 Runoff Area=8,907 sf 0.00% Impervious Runoff Depth=5.83"
Flow Length=72' Tc=8.7 min CN=80 Runoff=1.25 cfs 0.099 af

Subcatchment DA4: Subcatchment #2 Runoff Area=7,458 sf 6.64% Impervious Runoff Depth=5.95"
Flow Length=334' Tc=8.6 min CN=81 Runoff=1.07 cfs 0.085 af

Reach DP1: Discharge Point #1 (US 9W) Inflow=0.29 cfs 0.021 af
Outflow=0.29 cfs 0.021 af

Reach DP2: Discharge Point #2 (Existing Culvert) Inflow=4.80 cfs 0.744 af
Outflow=4.80 cfs 0.744 af

Pond CB3: Catch Basin #3 Peak Elev=363.53' Inflow=6.06 cfs 0.586 af
12.0" Round Culvert n=0.012 L=19.0' S=0.0368 '/' Outflow=6.06 cfs 0.586 af

Pond HDS: Hydrodynamic Separator Peak Elev=359.93' Inflow=6.06 cfs 0.586 af
15.0" Round Culvert n=0.012 L=2.0' S=0.0050 '/' Outflow=6.06 cfs 0.586 af

Pond MH1: Manhole #1 Peak Elev=362.83' Inflow=6.06 cfs 0.586 af
12.0" Round Culvert n=0.012 L=35.0' S=0.0049 '/' Outflow=6.06 cfs 0.586 af

Pond MH2: Manhole #2 Peak Elev=362.66' Inflow=6.06 cfs 0.586 af
12.0" Round Culvert n=0.012 L=84.0' S=0.0050 '/' Outflow=6.06 cfs 0.586 af

Pond MH3: Manhole #3 (Diversion Manhole) Peak Elev=360.05' Inflow=6.06 cfs 0.586 af
Primary=1.05 cfs 0.379 af Secondary=5.02 cfs 0.207 af Outflow=6.06 cfs 0.586 af

Pond MH4: Manhole #4 Peak Elev=358.15' Inflow=5.02 cfs 0.207 af
24.0" Round Culvert n=0.012 L=2.0' S=0.0000 '/' Outflow=5.02 cfs 0.207 af

Pond P1: Bioretention Peak Elev=358.21' Storage=1,647 cf Inflow=2.27 cfs 0.478 af
Primary=2.14 cfs 0.459 af Secondary=0.00 cfs 0.000 af Outflow=2.14 cfs 0.459 af

Pond P2: StormTech SC-740 Peak Elev=359.62' Storage=0.102 af Inflow=5.02 cfs 0.207 af
Outflow=2.71 cfs 0.200 af

Total Runoff Area = 1.342 ac Runoff Volume = 0.791 af Average Runoff Depth = 7.08"
43.04% Pervious = 0.578 ac 56.96% Impervious = 0.764 ac

Summary for Subcatchment DA1: Subcatchment #1

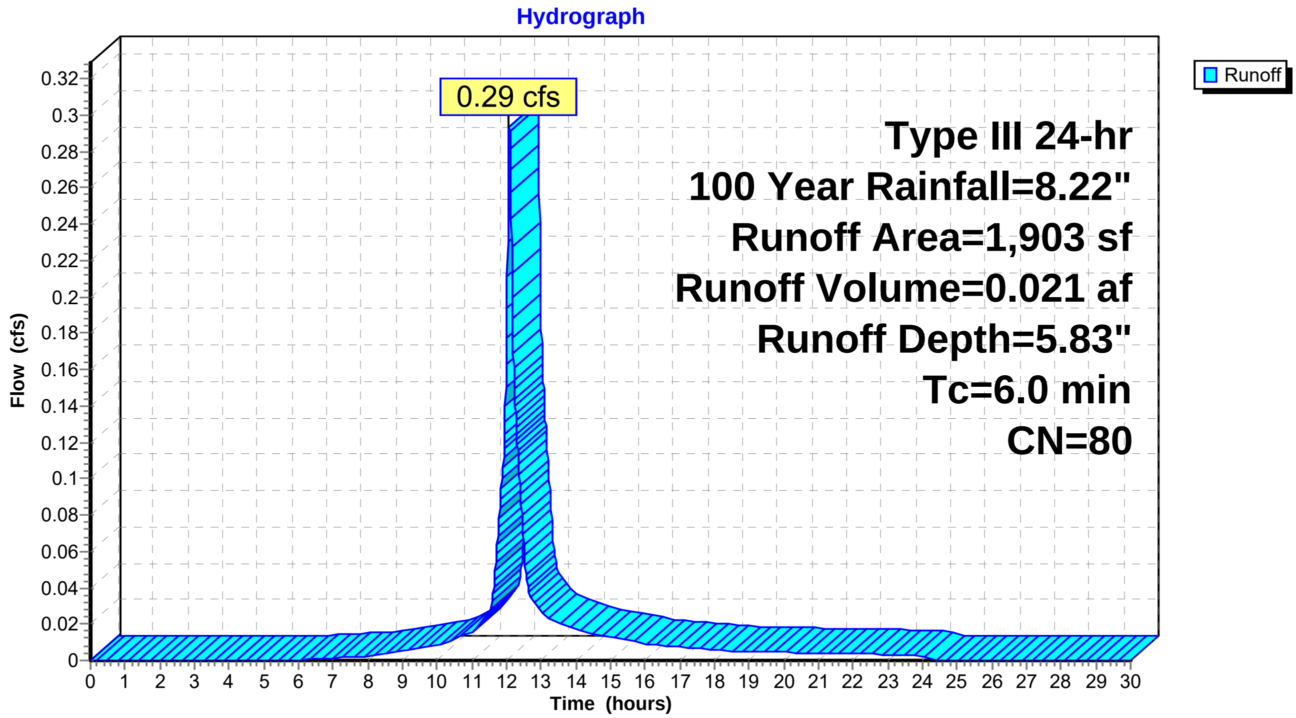
Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.22"

Area (sf)	CN	Description
1,903	80	>75% Grass cover, Good, HSG D
1,903		100.00% Pervious Area

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

Subcatchment DA1: Subcatchment #1



Hydrograph for Subcatchment DA1: Subcatchment #1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.08	0.00	0.00
1.50	0.12	0.00	0.00
2.00	0.16	0.00	0.00
2.50	0.21	0.00	0.00
3.00	0.25	0.00	0.00
3.50	0.30	0.00	0.00
4.00	0.35	0.00	0.00
4.50	0.41	0.00	0.00
5.00	0.47	0.00	0.00
5.50	0.53	0.00	0.00
6.00	0.59	0.00	0.00
6.50	0.66	0.01	0.00
7.00	0.74	0.02	0.00
7.50	0.84	0.04	0.00
8.00	0.94	0.07	0.00
8.50	1.06	0.10	0.00
9.00	1.20	0.15	0.00
9.50	1.36	0.22	0.01
10.00	1.55	0.31	0.01
10.50	1.78	0.43	0.01
11.00	2.06	0.60	0.02
11.50	2.45	0.85	0.03
12.00	4.11	2.13	**0.18**
12.50	5.77	3.57	**0.06**
13.00	6.16	3.93	0.03
13.50	6.44	4.18	0.02
14.00	6.67	4.39	0.02
14.50	6.86	4.56	0.01
15.00	7.02	4.71	0.01
15.50	7.16	4.85	0.01
16.00	7.28	4.96	0.01
16.50	7.38	5.05	0.01
17.00	7.48	5.14	0.01
17.50	7.56	5.21	0.01
18.00	7.63	5.28	0.01
18.50	7.69	5.34	0.01
19.00	7.75	5.39	0.00
19.50	7.81	5.45	0.00
20.00	7.87	5.50	0.00
20.50	7.92	5.55	0.00
21.00	7.97	5.60	0.00
21.50	8.02	5.64	0.00
22.00	8.06	5.68	0.00
22.50	8.10	5.72	0.00
23.00	8.15	5.76	0.00
23.50	8.18	5.80	0.00
24.00	**8.22**	**5.83**	0.00
24.50	8.22	5.83	0.00
25.00	8.22	5.83	0.00
25.50	8.22	5.83	0.00
26.00	8.22	5.83	0.00
26.50	8.22	5.83	0.00
27.00	8.22	5.83	0.00
27.50	8.22	5.83	0.00
28.00	8.22	5.83	0.00
28.50	8.22	5.83	0.00
29.00	8.22	5.83	0.00
29.50	8.22	5.83	0.00
30.00	8.22	5.83	0.00

Summary for Subcatchment DA2: Subcatchment #2

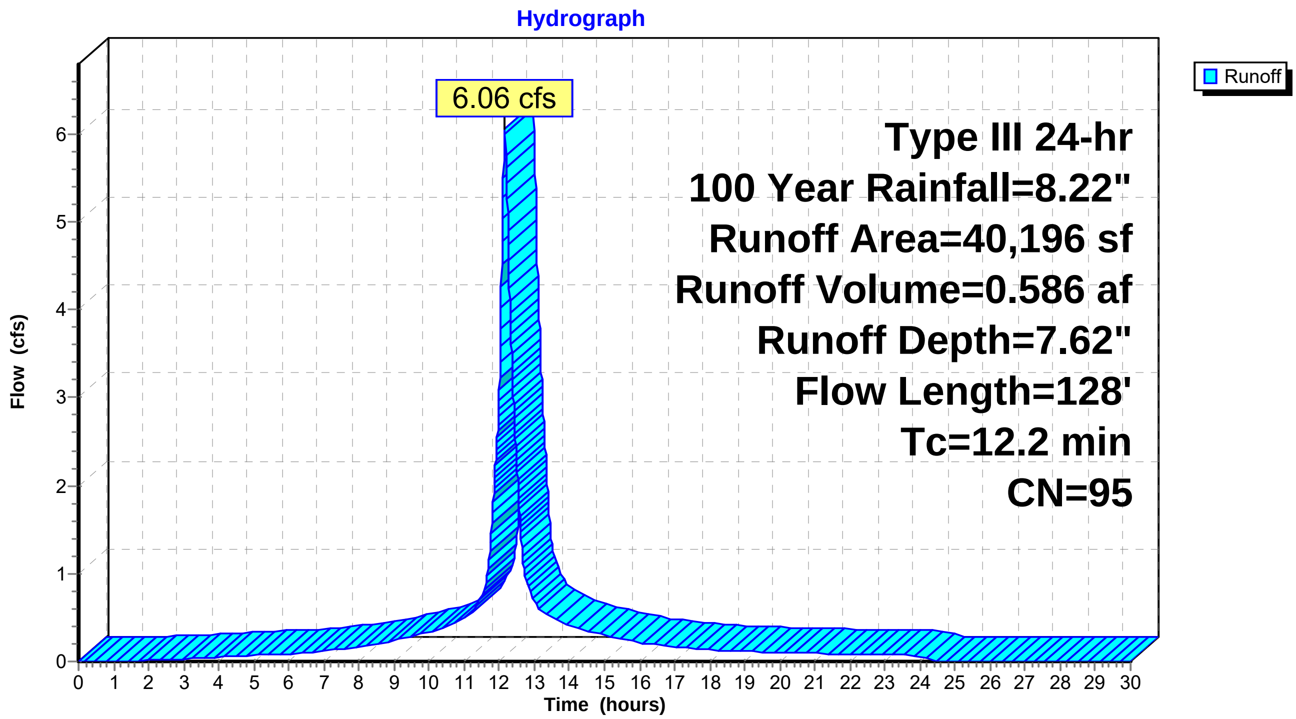
Runoff = 6.06 cfs @ 12.16 hrs, Volume= 0.586 af, Depth= 7.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.22"

Area (sf)	CN	Description
32,805	98	Paved parking, HSG D
7,391	80	>75% Grass cover, Good, HSG D
40,196	95	Weighted Average
7,391		18.39% Pervious Area
32,805		81.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	72	0.0250	0.11		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
0.5	28	0.0200	0.94		**Sheet Flow, Sheet Flow 2** Smooth surfaces n= 0.011 P2= 2.48"
0.3	28	0.0050	1.44		**Shallow Concentrated Flow, Shallow Concnetrated Flow 1** Paved Kv= 20.3 fps
12.2	128	Total			

Subcatchment DA2: Subcatchment #2



Hydrograph for Subcatchment DA2: Subcatchment #2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.08	0.00	0.00
1.50	0.12	0.00	0.00
2.00	0.16	0.01	0.01
2.50	0.21	0.02	0.02
3.00	0.25	0.03	0.03
3.50	0.30	0.05	0.04
4.00	0.35	0.08	0.05
4.50	0.41	0.11	0.06
5.00	0.47	0.15	0.07
5.50	0.53	0.19	0.08
6.00	0.59	0.23	0.09
6.50	0.66	0.29	0.10
7.00	0.74	0.35	0.12
7.50	0.84	0.42	0.14
8.00	0.94	0.51	0.16
8.50	1.06	0.61	0.20
9.00	1.20	0.74	0.24
9.50	1.36	0.89	0.28
10.00	1.55	1.06	0.33
10.50	1.78	1.27	0.41
11.00	2.06	1.54	0.50
11.50	2.45	1.91	0.75
12.00	4.11	3.54	**3.10**
12.50	5.77	5.18	**2.22**
13.00	6.16	5.58	0.69
13.50	6.44	5.85	0.50
14.00	6.67	6.07	0.41
14.50	6.86	6.26	0.35
15.00	7.02	6.43	0.30
15.50	7.16	6.57	0.26
16.00	7.28	6.69	0.21
16.50	7.38	6.79	0.19
17.00	7.48	6.88	0.17
17.50	7.56	6.96	0.15
18.00	7.63	7.03	0.13
18.50	7.69	7.09	0.12
19.00	7.75	7.16	0.11
19.50	7.81	7.21	0.11
20.00	7.87	7.27	0.10
20.50	7.92	7.32	0.10
21.00	7.97	7.37	0.09
21.50	8.02	7.42	0.09
22.00	8.06	7.46	0.08
22.50	8.10	7.51	0.08
23.00	8.15	7.55	0.07
23.50	8.18	7.58	0.07
24.00	**8.22**	**7.62**	0.07
24.50	8.22	7.62	0.00
25.00	8.22	7.62	0.00
25.50	8.22	7.62	0.00
26.00	8.22	7.62	0.00
26.50	8.22	7.62	0.00
27.00	8.22	7.62	0.00
27.50	8.22	7.62	0.00
28.00	8.22	7.62	0.00
28.50	8.22	7.62	0.00
29.00	8.22	7.62	0.00
29.50	8.22	7.62	0.00
30.00	8.22	7.62	0.00

Summary for Subcatchment DA3: Subcatchment #3

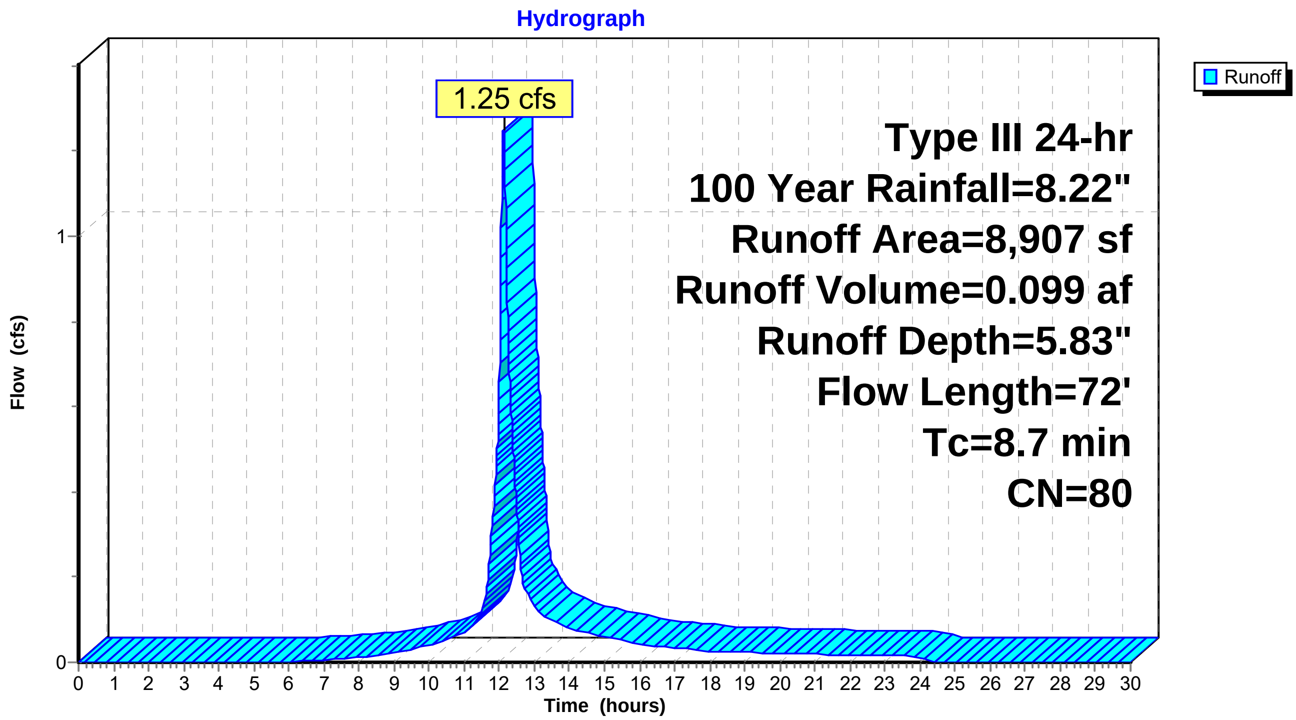
Runoff = 1.25 cfs @ 12.12 hrs, Volume= 0.099 af, Depth= 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.22"

Area (sf)	CN	Description
8,907	80	>75% Grass cover, Good, HSG D
8,907		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	44	0.0550	0.13		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
3.1	28	0.1000	0.15		**Sheet Flow, Sheet Flow 2** Grass: Dense n= 0.240 P2= 2.48"
8.7	72	Total			

Subcatchment DA3: Subcatchment #3



Hydrograph for Subcatchment DA3: Subcatchment #3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.08	0.00	0.00
1.50	0.12	0.00	0.00
2.00	0.16	0.00	0.00
2.50	0.21	0.00	0.00
3.00	0.25	0.00	0.00
3.50	0.30	0.00	0.00
4.00	0.35	0.00	0.00
4.50	0.41	0.00	0.00
5.00	0.47	0.00	0.00
5.50	0.53	0.00	0.00
6.00	0.59	0.00	0.00
6.50	0.66	0.01	0.00
7.00	0.74	0.02	0.01
7.50	0.84	0.04	0.01
8.00	0.94	0.07	0.01
8.50	1.06	0.10	0.02
9.00	1.20	0.15	0.02
9.50	1.36	0.22	0.03
10.00	1.55	0.31	0.04
10.50	1.78	0.43	0.05
11.00	2.06	0.60	0.07
11.50	2.45	0.85	0.12
12.00	4.11	2.13	**0.66**
12.50	5.77	3.57	**0.36**
13.00	6.16	3.93	0.13
13.50	6.44	4.18	0.10
14.00	6.67	4.39	0.08
14.50	6.86	4.56	0.07
15.00	7.02	4.71	0.06
15.50	7.16	4.85	0.05
16.00	7.28	4.96	0.04
16.50	7.38	5.05	0.04
17.00	7.48	5.14	0.03
17.50	7.56	5.21	0.03
18.00	7.63	5.28	0.03
18.50	7.69	5.34	0.02
19.00	7.75	5.39	0.02
19.50	7.81	5.45	0.02
20.00	7.87	5.50	0.02
20.50	7.92	5.55	0.02
21.00	7.97	5.60	0.02
21.50	8.02	5.64	0.02
22.00	8.06	5.68	0.02
22.50	8.10	5.72	0.02
23.00	8.15	5.76	0.02
23.50	8.18	5.80	0.01
24.00	**8.22**	**5.83**	0.01
24.50	8.22	5.83	0.00
25.00	8.22	5.83	0.00
25.50	8.22	5.83	0.00
26.00	8.22	5.83	0.00
26.50	8.22	5.83	0.00
27.00	8.22	5.83	0.00
27.50	8.22	5.83	0.00
28.00	8.22	5.83	0.00
28.50	8.22	5.83	0.00
29.00	8.22	5.83	0.00
29.50	8.22	5.83	0.00
30.00	8.22	5.83	0.00

Summary for Subcatchment DA4: Subcatchment #2

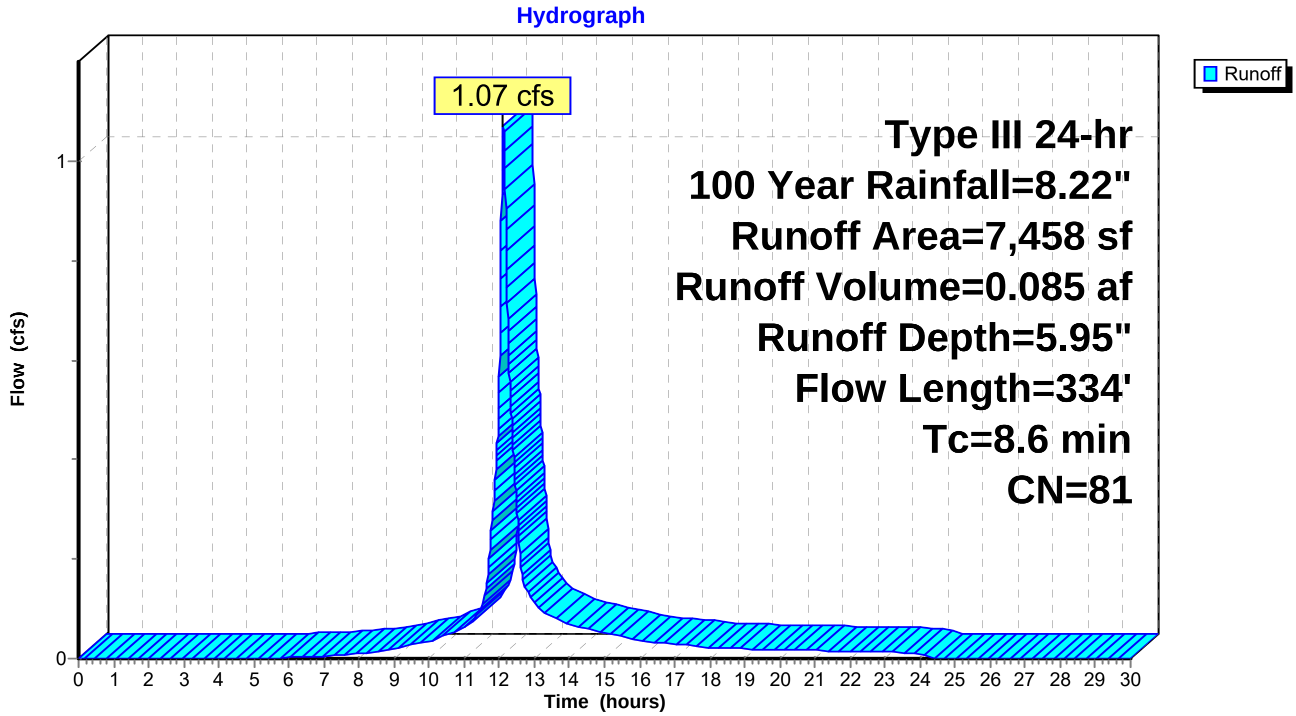
Runoff = 1.07 cfs @ 12.12 hrs, Volume= 0.085 af, Depth= 5.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.22"

Area (sf)	CN	Description
495	98	Paved parking, HSG D
6,963	80	>75% Grass cover, Good, HSG D
7,458	81	Weighted Average
6,963		93.36% Pervious Area
495		6.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	56	0.0480	0.13		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
0.7	158	0.0300	3.52		**Shallow Concentrated Flow, Shallow Concnetrated Flow 1** Paved Kv= 20.3 fps
0.0	7	0.3700	4.26		**Shallow Concentrated Flow, Shallow Concentrated Flow 2** Short Grass Pasture Kv= 7.0 fps
0.7	113	0.0060	2.63	11.85	**Channel Flow, Channel 1** Area= 4.5 sf Perim= 12.6' r= 0.36' n= 0.022 Earth, clean & straight
8.6	334	Total			

Subcatchment DA4: Subcatchment #2



Hydrograph for Subcatchment DA4: Subcatchment #2

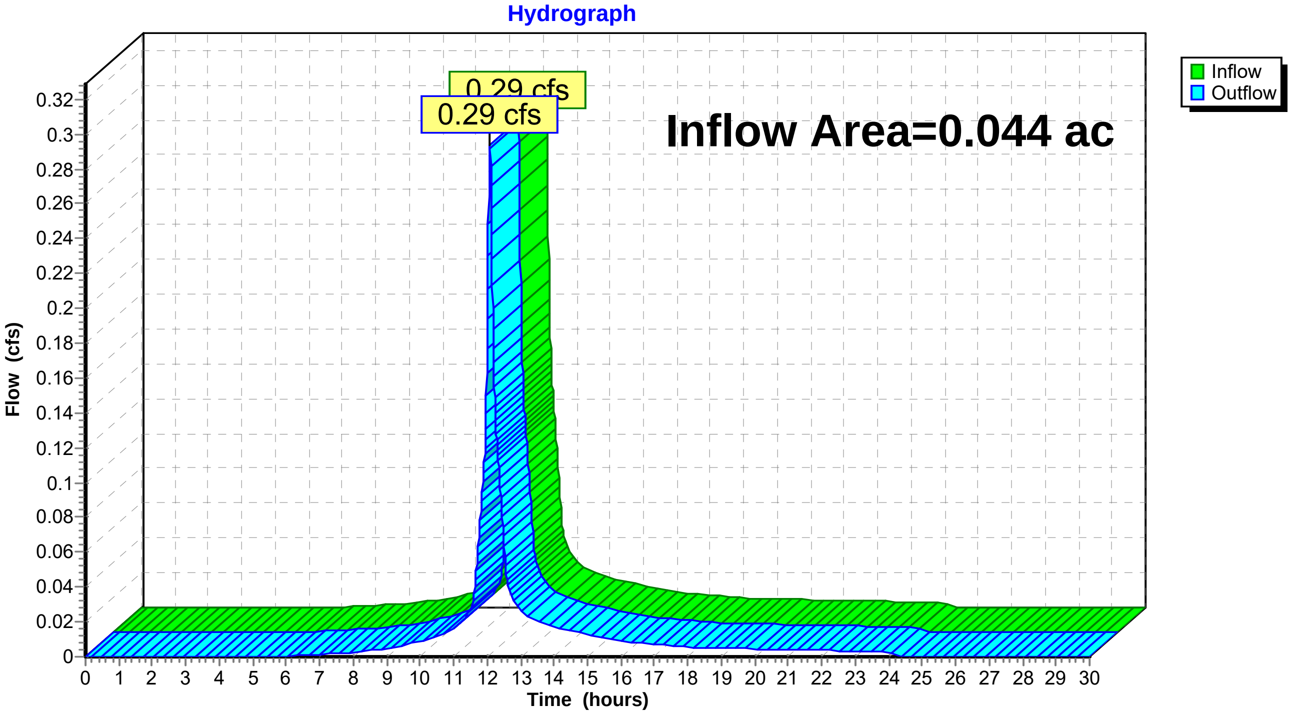
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.08	0.00	0.00
1.50	0.12	0.00	0.00
2.00	0.16	0.00	0.00
2.50	0.21	0.00	0.00
3.00	0.25	0.00	0.00
3.50	0.30	0.00	0.00
4.00	0.35	0.00	0.00
4.50	0.41	0.00	0.00
5.00	0.47	0.00	0.00
5.50	0.53	0.00	0.00
6.00	0.59	0.01	0.00
6.50	0.66	0.01	0.00
7.00	0.74	0.03	0.01
7.50	0.84	0.05	0.01
8.00	0.94	0.08	0.01
8.50	1.06	0.12	0.01
9.00	1.20	0.17	0.02
9.50	1.36	0.25	0.03
10.00	1.55	0.34	0.03
10.50	1.78	0.47	0.05
11.00	2.06	0.64	0.06
11.50	2.45	0.91	0.10
12.00	4.11	2.21	**0.57**
12.50	5.77	3.68	**0.30**
13.00	6.16	4.03	0.11
13.50	6.44	4.29	0.08
14.00	6.67	4.50	0.07
14.50	6.86	4.67	0.06
15.00	7.02	4.83	0.05
15.50	7.16	4.96	0.04
16.00	7.28	5.07	0.04
16.50	7.38	5.16	0.03
17.00	7.48	5.25	0.03
17.50	7.56	5.33	0.03
18.00	7.63	5.39	0.02
18.50	7.69	5.45	0.02
19.00	7.75	5.51	0.02
19.50	7.81	5.56	0.02
20.00	7.87	5.62	0.02
20.50	7.92	5.67	0.02
21.00	7.97	5.71	0.02
21.50	8.02	5.76	0.02
22.00	8.06	5.80	0.01
22.50	8.10	5.84	0.01
23.00	8.15	5.88	0.01
23.50	8.18	5.92	0.01
24.00	**8.22**	**5.95**	0.01
24.50	8.22	5.95	0.00
25.00	8.22	5.95	0.00
25.50	8.22	5.95	0.00
26.00	8.22	5.95	0.00
26.50	8.22	5.95	0.00
27.00	8.22	5.95	0.00
27.50	8.22	5.95	0.00
28.00	8.22	5.95	0.00
28.50	8.22	5.95	0.00
29.00	8.22	5.95	0.00
29.50	8.22	5.95	0.00
30.00	8.22	5.95	0.00

Summary for Reach DP1: Discharge Point #1 (US 9W)

Inflow Area =	0.044 ac,	0.00% Impervious, Inflow Depth = 5.83"	for 100 Year event
Inflow =	0.29 cfs @	12.09 hrs, Volume=	0.021 af
Outflow =	0.29 cfs @	12.09 hrs, Volume=	0.021 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach DP1: Discharge Point #1 (US 9W)



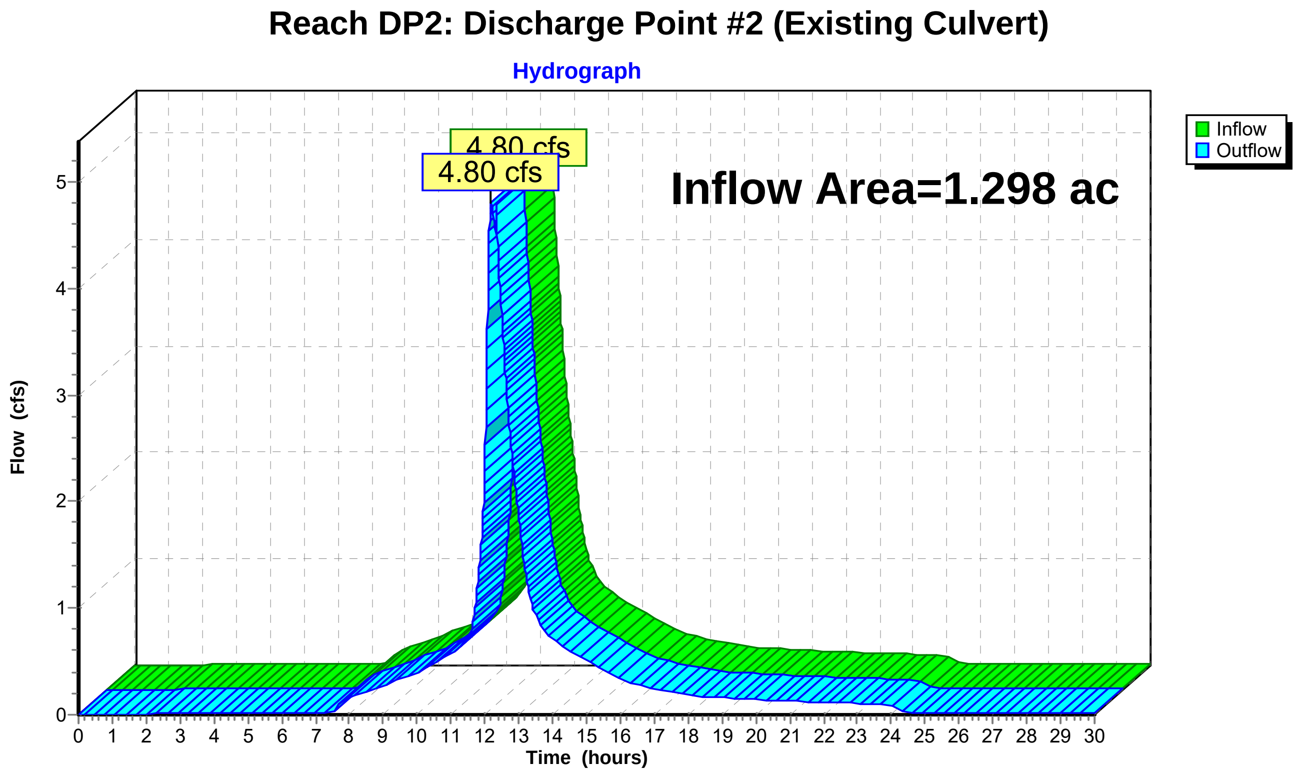
Hydrograph for Reach DP1: Discharge Point #1 (US 9W)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.00		0.00
7.00	0.00		0.00
7.50	0.00		0.00
8.00	0.00		0.00
8.50	0.00		0.00
9.00	0.00		0.00
9.50	0.01		0.01
10.00	0.01		0.01
10.50	0.01		0.01
11.00	0.02		0.02
11.50	0.03		0.03
12.00	**0.18**		**0.18**
12.50	**0.06**		**0.06**
13.00	0.03		0.03
13.50	0.02		0.02
14.00	0.02		0.02
14.50	0.01		0.01
15.00	0.01		0.01
15.50	0.01		0.01
16.00	0.01		0.01
16.50	0.01		0.01
17.00	0.01		0.01
17.50	0.01		0.01
18.00	0.01		0.01
18.50	0.01		0.01
19.00	0.00		0.00
19.50	0.00		0.00
20.00	0.00		0.00
20.50	0.00		0.00
21.00	0.00		0.00
21.50	0.00		0.00
22.00	0.00		0.00
22.50	0.00		0.00
23.00	0.00		0.00
23.50	0.00		0.00
24.00	0.00		0.00
24.50	0.00		0.00
25.00	0.00		0.00
25.50	0.00		0.00
26.00	0.00		0.00
26.50	0.00		0.00
27.00	0.00		0.00
27.50	0.00		0.00
28.00	0.00		0.00
28.50	0.00		0.00
29.00	0.00		0.00
29.50	0.00		0.00
30.00	0.00		0.00

Summary for Reach DP2: Discharge Point #2 (Existing Culvert)

Inflow Area = 1.298 ac, 58.87% Impervious, Inflow Depth > 6.88" for 100 Year event
Inflow = 4.80 cfs @ 12.19 hrs, Volume= 0.744 af
Outflow = 4.80 cfs @ 12.19 hrs, Volume= 0.744 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs



Hydrograph for Reach DP2: Discharge Point #2 (Existing Culvert)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.01		0.01
3.00	0.01		0.01
3.50	0.01		0.01
4.00	0.01		0.01
4.50	0.01		0.01
5.00	0.01		0.01
5.50	0.01		0.01
6.00	0.02		0.02
6.50	0.02		0.02
7.00	0.02		0.02
7.50	0.02		0.02
8.00	0.17		0.17
8.50	0.22		0.22
9.00	0.27		0.27
9.50	0.33		0.33
10.00	0.40		0.40
10.50	0.49		0.49
11.00	0.57		0.57
11.50	0.73		0.73
12.00	**2.40**		**2.40**
12.50	**3.73**		**3.73**
13.00	1.87		1.87
13.50	0.93		0.93
14.00	0.71		0.71
14.50	0.60		0.60
15.00	0.51		0.51
15.50	0.42		0.42
16.00	0.34		0.34
16.50	0.28		0.28
17.00	0.25		0.25
17.50	0.22		0.22
18.00	0.19		0.19
18.50	0.17		0.17
19.00	0.16		0.16
19.50	0.15		0.15
20.00	0.14		0.14
20.50	0.14		0.14
21.00	0.13		0.13
21.50	0.12		0.12
22.00	0.12		0.12
22.50	0.11		0.11
23.00	0.11		0.11
23.50	0.10		0.10
24.00	0.09		0.09
24.50	0.02		0.02
25.00	0.01		0.01
25.50	0.01		0.01
26.00	0.01		0.01
26.50	0.01		0.01
27.00	0.01		0.01
27.50	0.01		0.01
28.00	0.01		0.01
28.50	0.01		0.01
29.00	0.01		0.01
29.50	0.01		0.01
30.00	0.01		0.01

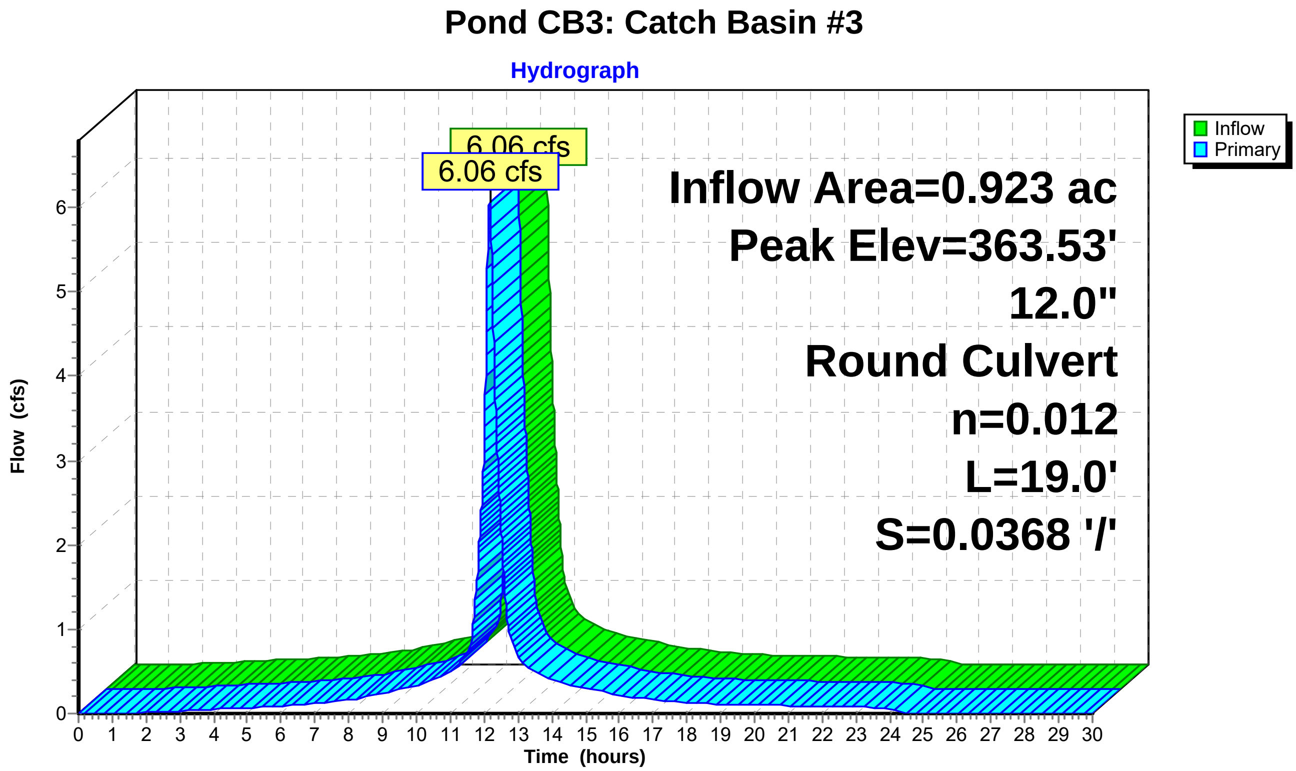
Summary for Pond CB3: Catch Basin #3

Inflow Area = 0.923 ac, 81.61% Impervious, Inflow Depth = 7.62" for 100 Year event
Inflow = 6.06 cfs @ 12.16 hrs, Volume= 0.586 af
Outflow = 6.06 cfs @ 12.16 hrs, Volume= 0.586 af, Atten= 0%, Lag= 0.0 min
Primary = 6.06 cfs @ 12.16 hrs, Volume= 0.586 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 363.53' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	358.90'	**12.0" Round Culvert** L= 19.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 358.90' / 358.20' S= 0.0368 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=6.06 cfs @ 12.16 hrs HW=363.52' (Free Discharge)
└**1=Culvert** (Inlet Controls 6.06 cfs @ 7.72 fps)



Hydrograph for Pond CB3: Catch Basin #3

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	358.90	0.00
0.50	0.00	358.90	0.00
1.00	0.00	358.90	0.00
1.50	0.00	358.91	0.00
2.00	0.01	358.95	0.01
2.50	0.02	358.98	0.02
3.00	0.03	358.99	0.03
3.50	0.04	359.01	0.04
4.00	0.05	359.02	0.05
4.50	0.06	359.03	0.06
5.00	0.07	359.04	0.07
5.50	0.08	359.05	0.08
6.00	0.09	359.06	0.09
6.50	0.10	359.07	0.10
7.00	0.12	359.09	0.12
7.50	0.14	359.10	0.14
8.00	0.16	359.12	0.16
8.50	0.20	359.14	0.20
9.00	0.24	359.17	0.24
9.50	0.28	359.20	0.28
10.00	0.33	359.22	0.33
10.50	0.41	359.26	0.41
11.00	0.50	359.30	0.50
11.50	0.75	359.40	0.75
12.00	**3.10**	**360.48**	**3.10**
12.50	**2.22**	**359.95**	**2.22**
13.00	0.69	359.38	0.69
13.50	0.50	359.30	0.50
14.00	0.41	359.26	0.41
14.50	0.35	359.23	0.35
15.00	0.30	359.20	0.30
15.50	0.26	359.18	0.26
16.00	0.21	359.15	0.21
16.50	0.19	359.14	0.19
17.00	0.17	359.12	0.17
17.50	0.15	359.11	0.15
18.00	0.13	359.10	0.13
18.50	0.12	359.09	0.12
19.00	0.11	359.08	0.11
19.50	0.11	359.08	0.11
20.00	0.10	359.07	0.10
20.50	0.10	359.07	0.10
21.00	0.09	359.06	0.09
21.50	0.09	359.06	0.09
22.00	0.08	359.06	0.08
22.50	0.08	359.05	0.08
23.00	0.07	359.05	0.07
23.50	0.07	359.04	0.07
24.00	0.07	359.04	0.07
24.50	0.00	358.90	0.00
25.00	0.00	358.90	0.00
25.50	0.00	358.90	0.00
26.00	0.00	358.90	0.00
26.50	0.00	358.90	0.00
27.00	0.00	358.90	0.00
27.50	0.00	358.90	0.00
28.00	0.00	358.90	0.00
28.50	0.00	358.90	0.00
29.00	0.00	358.90	0.00
29.50	0.00	358.90	0.00
30.00	0.00	358.90	0.00

Summary for Pond HDS: Hydrodynamic Separator

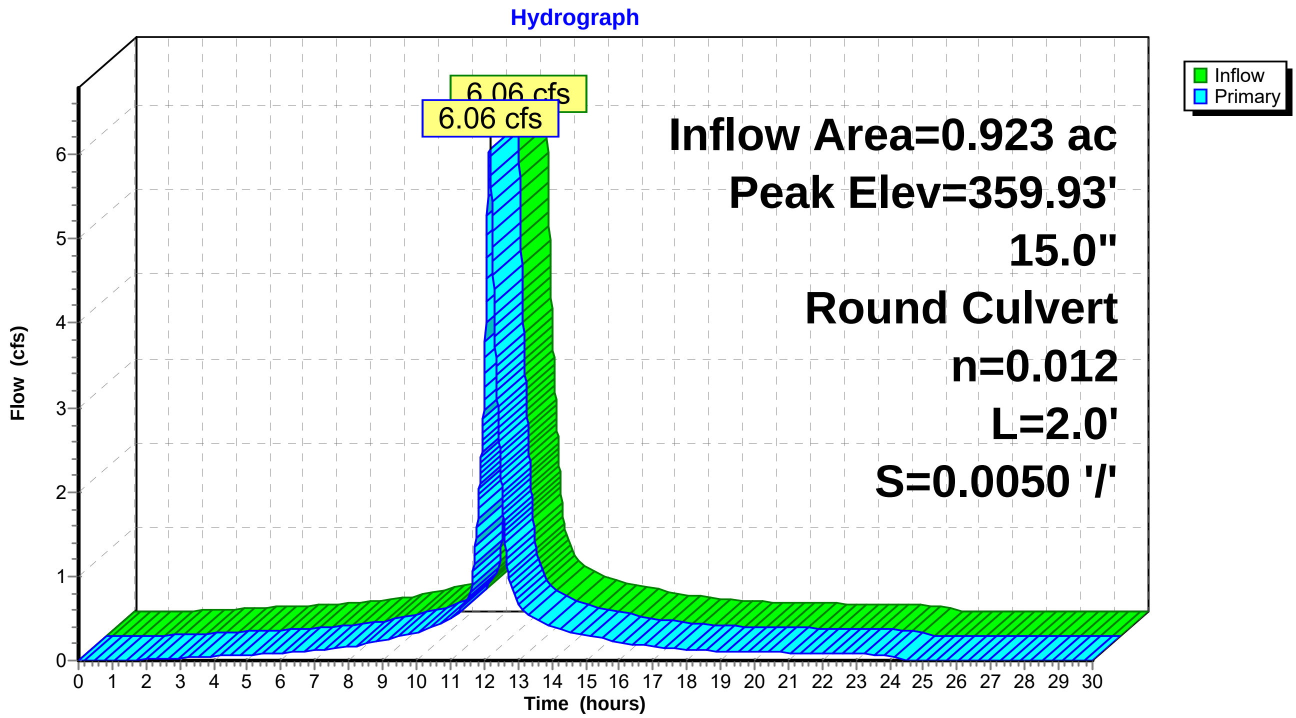
Inflow Area = 0.923 ac, 81.61% Impervious, Inflow Depth = 7.62" for 100 Year event
Inflow = 6.06 cfs @ 12.16 hrs, Volume= 0.586 af
Outflow = 6.06 cfs @ 12.16 hrs, Volume= 0.586 af, Atten= 0%, Lag= 0.0 min
Primary = 6.06 cfs @ 12.16 hrs, Volume= 0.586 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 359.93' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	357.61'	**15.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 357.61' / 357.60' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=6.06 cfs @ 12.16 hrs HW=359.92' (Free Discharge)
↑**1=Culvert** (Inlet Controls 6.06 cfs @ 4.94 fps)

Pond HDS: Hydrodynamic Separator



Hydrograph for Pond HDS: Hydrodynamic Separator

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	357.61	0.00
0.50	0.00	357.61	0.00
1.00	0.00	357.61	0.00
1.50	0.00	357.63	0.00
2.00	0.01	357.67	0.01
2.50	0.02	357.69	0.02
3.00	0.03	357.71	0.03
3.50	0.04	357.73	0.04
4.00	0.05	357.74	0.05
4.50	0.06	357.75	0.06
5.00	0.07	357.76	0.07
5.50	0.08	357.77	0.08
6.00	0.09	357.78	0.09
6.50	0.10	357.80	0.10
7.00	0.12	357.82	0.12
7.50	0.14	357.83	0.14
8.00	0.16	357.85	0.16
8.50	0.20	357.88	0.20
9.00	0.24	357.90	0.24
9.50	0.28	357.93	0.28
10.00	0.33	357.96	0.33
10.50	0.41	358.00	0.41
11.00	0.50	358.04	0.50
11.50	0.75	358.15	0.75
12.00	**3.10**	**358.82**	**3.10**
12.50	**2.22**	**358.60**	**2.22**
13.00	0.69	358.13	0.69
13.50	0.50	358.04	0.50
14.00	0.41	358.00	0.41
14.50	0.35	357.97	0.35
15.00	0.30	357.94	0.30
15.50	0.26	357.92	0.26
16.00	0.21	357.89	0.21
16.50	0.19	357.87	0.19
17.00	0.17	357.85	0.17
17.50	0.15	357.84	0.15
18.00	0.13	357.82	0.13
18.50	0.12	357.81	0.12
19.00	0.11	357.81	0.11
19.50	0.11	357.80	0.11
20.00	0.10	357.80	0.10
20.50	0.10	357.79	0.10
21.00	0.09	357.79	0.09
21.50	0.09	357.79	0.09
22.00	0.08	357.78	0.08
22.50	0.08	357.78	0.08
23.00	0.07	357.77	0.07
23.50	0.07	357.77	0.07
24.00	0.07	357.76	0.07
24.50	0.00	357.62	0.00
25.00	0.00	357.61	0.00
25.50	0.00	357.61	0.00
26.00	0.00	357.61	0.00
26.50	0.00	357.61	0.00
27.00	0.00	357.61	0.00
27.50	0.00	357.61	0.00
28.00	0.00	357.61	0.00
28.50	0.00	357.61	0.00
29.00	0.00	357.61	0.00
29.50	0.00	357.61	0.00
30.00	0.00	357.61	0.00

Summary for Pond MH1: Manhole #1

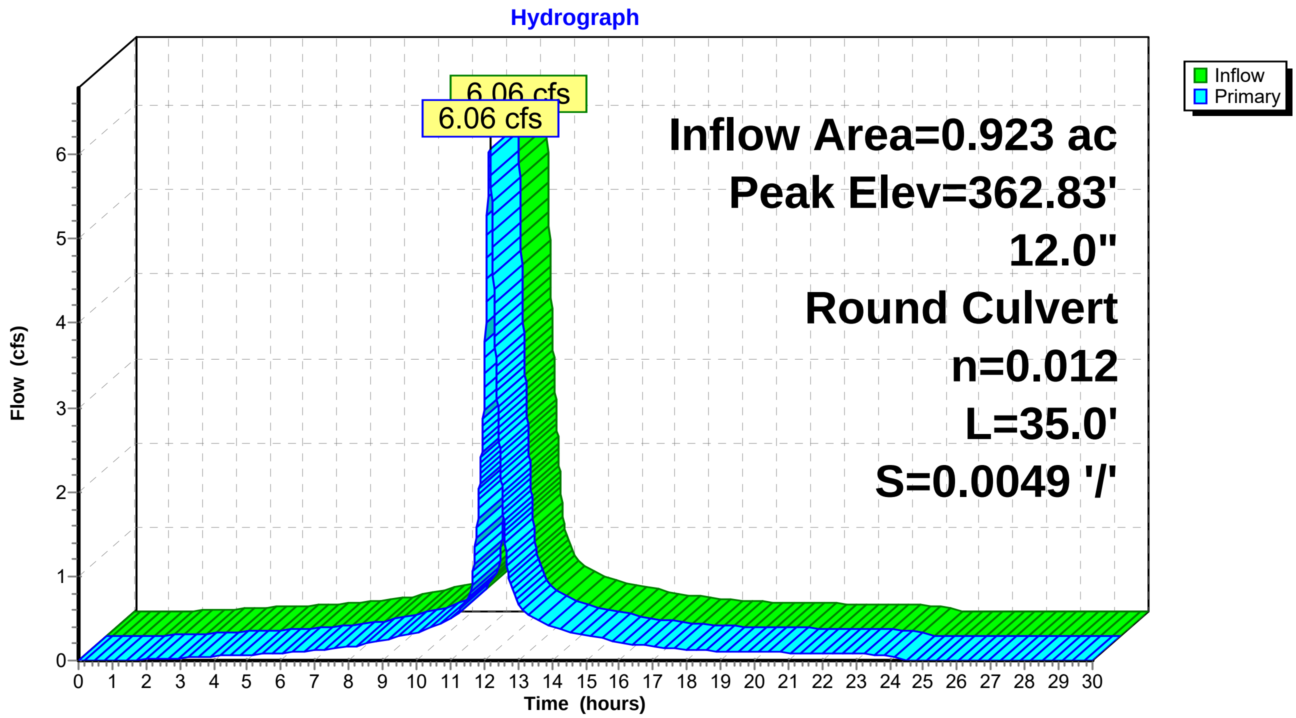
Inflow Area = 0.923 ac, 81.61% Impervious, Inflow Depth = 7.62" for 100 Year event
Inflow = 6.06 cfs @ 12.16 hrs, Volume= 0.586 af
Outflow = 6.06 cfs @ 12.16 hrs, Volume= 0.586 af, Atten= 0%, Lag= 0.0 min
Primary = 6.06 cfs @ 12.16 hrs, Volume= 0.586 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 362.83' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	358.20'	**12.0" Round Culvert** L= 35.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 358.20' / 358.03' S= 0.0049 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=6.06 cfs @ 12.16 hrs HW=362.82' (Free Discharge)
└─**1=Culvert** (Inlet Controls 6.06 cfs @ 7.72 fps)

Pond MH1: Manhole #1



Hydrograph for Pond MH1: Manhole #1

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	358.20	0.00
0.50	0.00	358.20	0.00
1.00	0.00	358.20	0.00
1.50	0.00	358.21	0.00
2.00	0.01	358.26	0.01
2.50	0.02	358.28	0.02
3.00	0.03	358.30	0.03
3.50	0.04	358.32	0.04
4.00	0.05	358.33	0.05
4.50	0.06	358.34	0.06
5.00	0.07	358.35	0.07
5.50	0.08	358.36	0.08
6.00	0.09	358.37	0.09
6.50	0.10	358.38	0.10
7.00	0.12	358.40	0.12
7.50	0.14	358.42	0.14
8.00	0.16	358.43	0.16
8.50	0.20	358.46	0.20
9.00	0.24	358.49	0.24
9.50	0.28	358.51	0.28
10.00	0.33	358.54	0.33
10.50	0.41	358.58	0.41
11.00	0.50	358.63	0.50
11.50	0.75	358.74	0.75
12.00	**3.10**	**359.78**	**3.10**
12.50	**2.22**	**359.27**	**2.22**
13.00	0.69	358.71	0.69
13.50	0.50	358.63	0.50
14.00	0.41	358.58	0.41
14.50	0.35	358.55	0.35
15.00	0.30	358.52	0.30
15.50	0.26	358.50	0.26
16.00	0.21	358.47	0.21
16.50	0.19	358.45	0.19
17.00	0.17	358.44	0.17
17.50	0.15	358.42	0.15
18.00	0.13	358.41	0.13
18.50	0.12	358.40	0.12
19.00	0.11	358.39	0.11
19.50	0.11	358.39	0.11
20.00	0.10	358.38	0.10
20.50	0.10	358.38	0.10
21.00	0.09	358.37	0.09
21.50	0.09	358.37	0.09
22.00	0.08	358.37	0.08
22.50	0.08	358.36	0.08
23.00	0.07	358.36	0.07
23.50	0.07	358.35	0.07
24.00	0.07	358.35	0.07
24.50	0.00	358.21	0.00
25.00	0.00	358.20	0.00
25.50	0.00	358.20	0.00

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
26.00	0.00	358.20	0.00
26.50	0.00	358.20	0.00
27.00	0.00	358.20	0.00
27.50	0.00	358.20	0.00
28.00	0.00	358.20	0.00
28.50	0.00	358.20	0.00
29.00	0.00	358.20	0.00
29.50	0.00	358.20	0.00
30.00	0.00	358.20	0.00

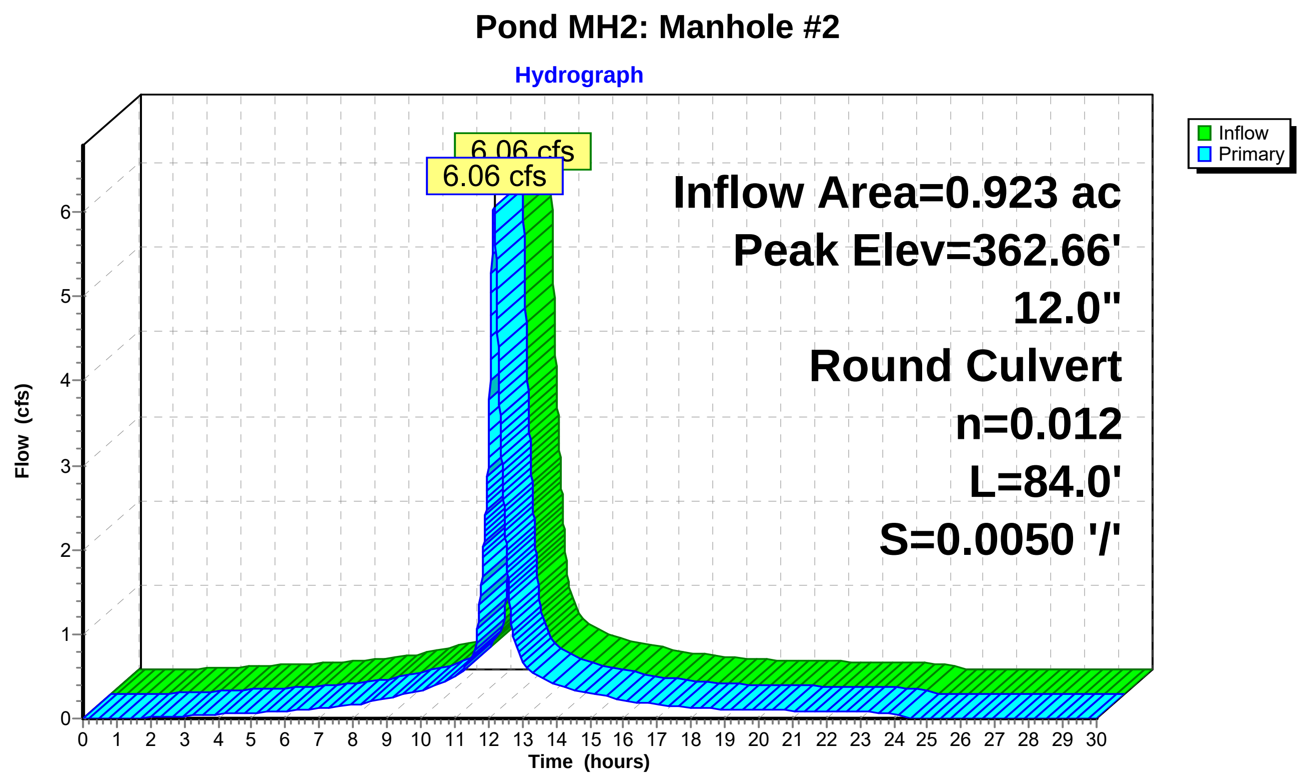
Summary for Pond MH2: Manhole #2

Inflow Area =	0.923 ac,	81.61% Impervious,	Inflow Depth = 7.62"	for 100 Year event
Inflow =	6.06 cfs @	12.16 hrs, Volume=	0.586 af	
Outflow =	6.06 cfs @	12.16 hrs, Volume=	0.586 af,	Atten= 0%, Lag= 0.0 min
Primary =	6.06 cfs @	12.16 hrs, Volume=	0.586 af	

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 362.66' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	358.03'	**12.0" Round Culvert** L= 84.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 358.03' / 357.61' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=6.06 cfs @ 12.16 hrs HW=362.65' (Free Discharge)
└─**1=Culvert** (Inlet Controls 6.06 cfs @ 7.72 fps)



Hydrograph for Pond MH2: Manhole #2

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	358.03	0.00
0.50	0.00	358.03	0.00
1.00	0.00	358.03	0.00
1.50	0.00	358.04	0.00
2.00	0.01	358.09	0.01
2.50	0.02	358.11	0.02
3.00	0.03	358.13	0.03
3.50	0.04	358.14	0.04
4.00	0.05	358.16	0.05
4.50	0.06	358.17	0.06
5.00	0.07	358.18	0.07
5.50	0.08	358.19	0.08
6.00	0.09	358.19	0.09
6.50	0.10	358.21	0.10
7.00	0.12	358.22	0.12
7.50	0.14	358.24	0.14
8.00	0.16	358.25	0.16
8.50	0.20	358.28	0.20
9.00	0.24	358.31	0.24
9.50	0.28	358.33	0.28
10.00	0.33	358.36	0.33
10.50	0.41	358.39	0.41
11.00	0.50	358.44	0.50
11.50	0.75	358.54	0.75
12.00	**3.10**	**359.61**	**3.10**
12.50	**2.22**	**359.08**	**2.22**
13.00	0.69	358.52	0.69
13.50	0.50	358.44	0.50
14.00	0.41	358.39	0.41
14.50	0.35	358.36	0.35
15.00	0.30	358.34	0.30
15.50	0.26	358.32	0.26
16.00	0.21	358.29	0.21
16.50	0.19	358.27	0.19
17.00	0.17	358.26	0.17
17.50	0.15	358.25	0.15
18.00	0.13	358.23	0.13
18.50	0.12	358.22	0.12
19.00	0.11	358.22	0.11
19.50	0.11	358.21	0.11
20.00	0.10	358.21	0.10
20.50	0.10	358.20	0.10
21.00	0.09	358.20	0.09
21.50	0.09	358.20	0.09
22.00	0.08	358.19	0.08
22.50	0.08	358.19	0.08
23.00	0.07	358.18	0.07
23.50	0.07	358.18	0.07
24.00	0.07	358.17	0.07
24.50	0.00	358.04	0.00
25.00	0.00	358.03	0.00
25.50	0.00	358.03	0.00
26.00	0.00	358.03	0.00
26.50	0.00	358.03	0.00
27.00	0.00	358.03	0.00
27.50	0.00	358.03	0.00
28.00	0.00	358.03	0.00
28.50	0.00	358.03	0.00
29.00	0.00	358.03	0.00
29.50	0.00	358.03	0.00
30.00	0.00	358.03	0.00

Summary for Pond MH3: Manhole #3 (Diversion Manhole)

Inflow Area = 0.923 ac, 81.61% Impervious, Inflow Depth = 7.62" for 100 Year event
Inflow = 6.06 cfs @ 12.16 hrs, Volume= 0.586 af
Outflow = 6.06 cfs @ 12.16 hrs, Volume= 0.586 af, Atten= 0%, Lag= 0.0 min
Primary = 1.05 cfs @ 12.16 hrs, Volume= 0.379 af
Secondary = 5.02 cfs @ 12.16 hrs, Volume= 0.207 af

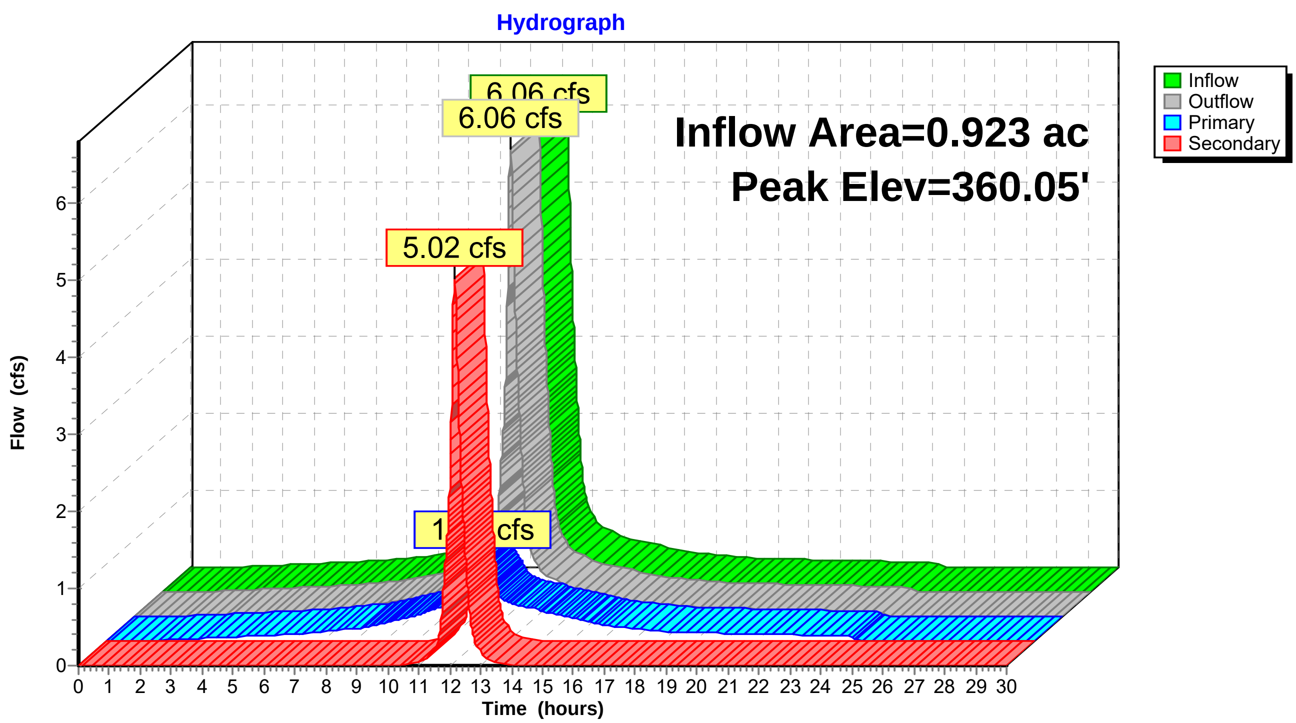
Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 360.05' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	357.60'	**6.0" Round Culvert** L= 41.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 357.60' / 357.50' S= 0.0024 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	358.27'	**15.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 358.27' / 358.19' S= 0.0400 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.05 cfs @ 12.16 hrs HW=360.05' (Free Discharge)
└─**1=Culvert** (Barrel Controls 1.05 cfs @ 5.32 fps)

Secondary OutFlow Max=5.02 cfs @ 12.16 hrs HW=360.05' (Free Discharge)
└─**2=Culvert** (Inlet Controls 5.02 cfs @ 4.09 fps)

Pond MH3: Manhole #3 (Diversion Manhole)



Hydrograph for Pond MH3: Manhole #3 (Diversion Manhole)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	357.60	0.00	0.00	0.00
1.00	0.00	357.60	0.00	0.00	0.00
2.00	0.01	357.69	0.01	0.01	0.00
3.00	0.03	357.74	0.03	0.03	0.00
4.00	0.05	357.78	0.05	0.05	0.00
5.00	0.07	357.81	0.07	0.07	0.00
6.00	0.09	357.84	0.09	0.09	0.00
7.00	0.12	357.89	0.12	0.12	0.00
8.00	0.16	357.94	0.16	0.16	0.00
9.00	0.24	358.03	0.24	0.24	0.00
10.00	0.33	358.14	0.33	0.33	0.00
11.00	0.50	358.38	0.50	0.45	0.05
12.00	**3.10**	**359.21**	**3.10**	**0.80**	**2.30**
13.00	**0.69**	**358.49**	**0.69**	**0.51**	**0.18**
14.00	0.41	358.30	0.41	0.40	0.00
15.00	0.30	358.10	0.30	0.30	0.00
16.00	0.21	358.00	0.21	0.21	0.00
17.00	0.17	357.95	0.17	0.17	0.00
18.00	0.13	357.90	0.13	0.13	0.00
19.00	0.11	357.88	0.11	0.11	0.00
20.00	0.10	357.86	0.10	0.10	0.00
21.00	0.09	357.85	0.09	0.09	0.00
22.00	0.08	357.84	0.08	0.08	0.00
23.00	0.07	357.82	0.07	0.07	0.00
24.00	0.07	357.81	0.07	0.07	0.00
25.00	0.00	357.60	0.00	0.00	0.00
26.00	0.00	357.60	0.00	0.00	0.00
27.00	0.00	357.60	0.00	0.00	0.00
28.00	0.00	357.60	0.00	0.00	0.00
29.00	0.00	357.60	0.00	0.00	0.00
30.00	0.00	357.60	0.00	0.00	0.00

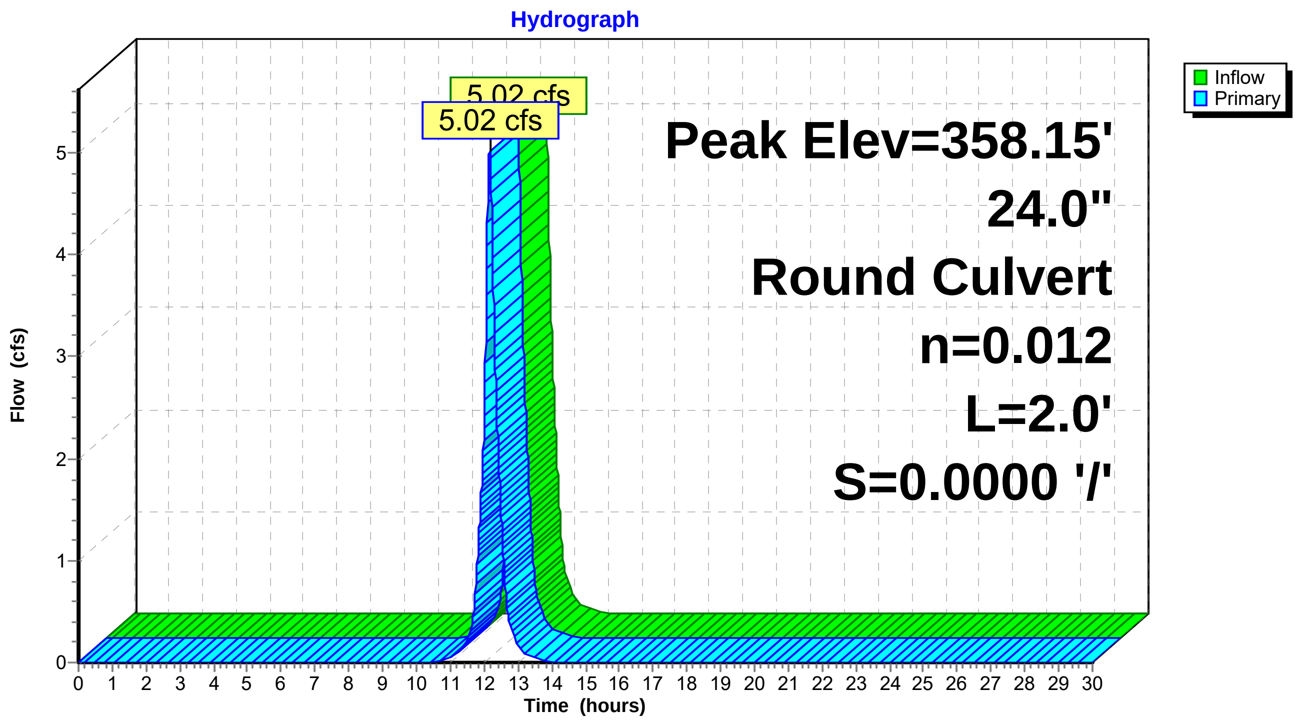
Summary for Pond MH4: Manhole #4

Inflow	=	5.02 cfs @	12.16 hrs, Volume=	0.207 af
Outflow	=	5.02 cfs @	12.16 hrs, Volume=	0.207 af, Atten= 0%, Lag= 0.0 min
Primary	=	5.02 cfs @	12.16 hrs, Volume=	0.207 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 358.15' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	356.85'	**24.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 356.85' / 356.85' S= 0.0000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=5.02 cfs @ 12.16 hrs HW=358.15' (Free Discharge)
└─**1=Culvert** (Barrel Controls 5.02 cfs @ 3.30 fps)



Hydrograph for Pond MH4: Manhole #4

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	356.85	0.00
0.50	0.00	356.85	0.00
1.00	0.00	356.85	0.00
1.50	0.00	356.85	0.00
2.00	0.00	356.85	0.00
2.50	0.00	356.85	0.00
3.00	0.00	356.85	0.00
3.50	0.00	356.85	0.00
4.00	0.00	356.85	0.00
4.50	0.00	356.85	0.00
5.00	0.00	356.85	0.00
5.50	0.00	356.85	0.00
6.00	0.00	356.85	0.00
6.50	0.00	356.85	0.00
7.00	0.00	356.85	0.00
7.50	0.00	356.85	0.00
8.00	0.00	356.85	0.00
8.50	0.00	356.85	0.00
9.00	0.00	356.85	0.00
9.50	0.00	356.85	0.00
10.00	0.00	356.85	0.00
10.50	0.00	356.89	0.00
11.00	0.05	356.97	0.05
11.50	0.22	357.11	0.22
12.00	**2.30**	**357.70**	**2.30**
12.50	**1.49**	**357.53**	**1.49**
13.00	0.18	357.08	0.18
13.50	0.05	356.97	0.05
14.00	0.00	356.89	0.00
14.50	0.00	356.85	0.00
15.00	0.00	356.85	0.00
15.50	0.00	356.85	0.00
16.00	0.00	356.85	0.00
16.50	0.00	356.85	0.00
17.00	0.00	356.85	0.00
17.50	0.00	356.85	0.00
18.00	0.00	356.85	0.00
18.50	0.00	356.85	0.00
19.00	0.00	356.85	0.00
19.50	0.00	356.85	0.00
20.00	0.00	356.85	0.00
20.50	0.00	356.85	0.00
21.00	0.00	356.85	0.00
21.50	0.00	356.85	0.00
22.00	0.00	356.85	0.00
22.50	0.00	356.85	0.00
23.00	0.00	356.85	0.00
23.50	0.00	356.85	0.00
24.00	0.00	356.85	0.00
24.50	0.00	356.85	0.00
25.00	0.00	356.85	0.00
25.50	0.00	356.85	0.00
26.00	0.00	356.85	0.00
26.50	0.00	356.85	0.00
27.00	0.00	356.85	0.00
27.50	0.00	356.85	0.00
28.00	0.00	356.85	0.00
28.50	0.00	356.85	0.00
29.00	0.00	356.85	0.00
29.50	0.00	356.85	0.00
30.00	0.00	356.85	0.00

Summary for Pond P1: Bioretention

Inflow Area = 1.127 ac, 66.81% Impervious, Inflow Depth = 5.09" for 100 Year event
Inflow = 2.27 cfs @ 12.13 hrs, Volume= 0.478 af
Outflow = 2.14 cfs @ 12.17 hrs, Volume= 0.459 af, Atten= 6%, Lag= 2.6 min
Primary = 2.14 cfs @ 12.17 hrs, Volume= 0.459 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 358.21' @ 12.17 hrs Surf.Area= 2,508 sf Storage= 1,647 cf

Plug-Flow detention time= 67.3 min calculated for 0.459 af (96% of inflow)
Center-of-Mass det. time= 43.2 min (827.4 - 784.2)

Volume	Invert	Avail.Storage	Storage Description
#1	357.50'	2,398 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

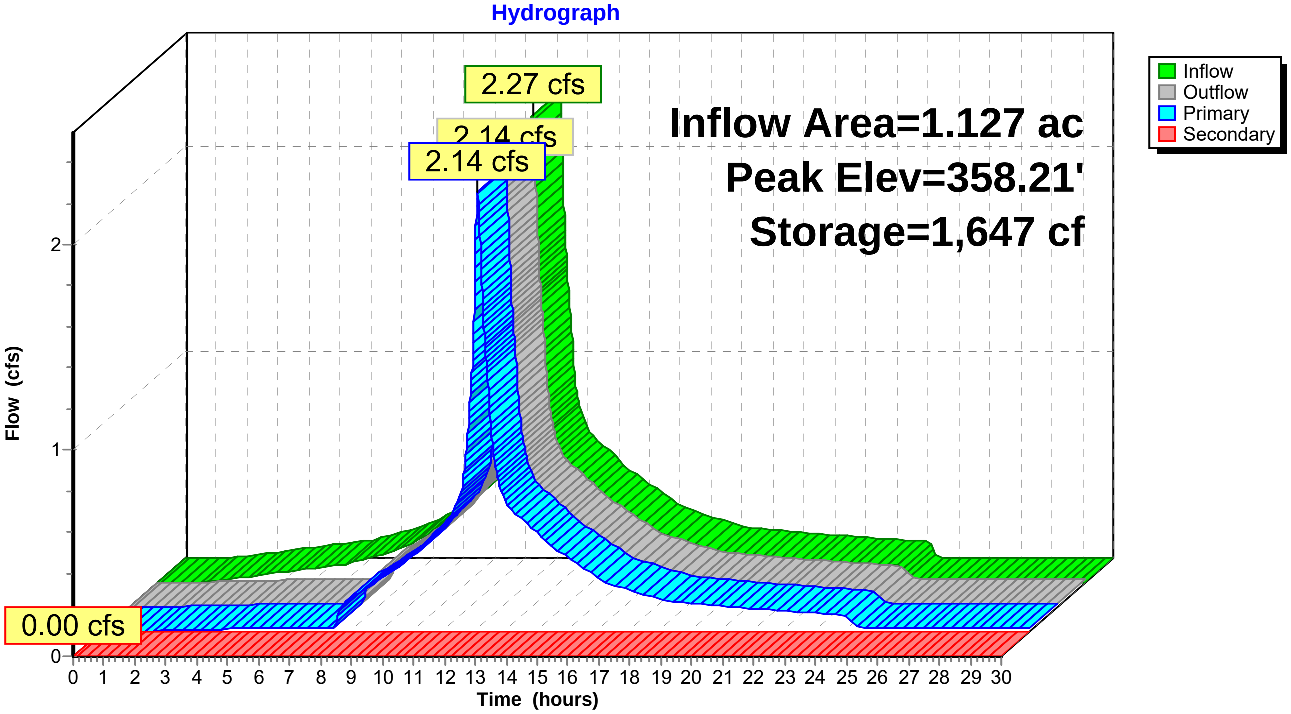
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
357.50	2,136	236.5	0	0	2,136
358.50	2,669	250.1	2,398	2,398	2,716

Device	Routing	Invert	Outlet Devices
#1	Primary	354.33'	**12.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 354.33' / 354.25' S= 0.0053 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	354.33'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	357.50'	**0.250 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 351.00'
#4	Device 1	357.99'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	358.30'	**10.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=2.14 cfs @ 12.17 hrs HW=358.21' (Free Discharge)
└─**1=Culvert** (Passes 2.14 cfs of 5.49 cfs potential flow)
  ├─**2=Orifice/Grate** (Passes 0.02 cfs of 1.80 cfs potential flow)
  │ └─**3=Exfiltration** (Controls 0.02 cfs)
  └─**4=Orifice/Grate** (Weir Controls 2.12 cfs @ 1.53 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=357.50' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond P1: Bioretention



Hydrograph for Pond P1: Bioretention

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
0.00	0.00	0	357.50	0.00	0.00	**0.00**
1.00	0.00	0	357.50	0.00	0.00	0.00
2.00	0.01	8	357.50	0.00	0.00	0.00
3.00	0.03	45	357.52	0.01	0.01	0.00
4.00	0.05	145	357.57	0.01	0.01	0.00
5.00	0.07	312	357.64	0.01	0.01	0.00
6.00	0.09	544	357.75	0.01	0.01	0.00
7.00	0.13	871	357.89	0.01	0.01	0.00
8.00	0.17	1,197	358.03	0.16	0.16	0.00
9.00	0.26	1,231	358.04	0.25	0.25	0.00
10.00	0.37	1,266	358.06	0.36	0.36	0.00
11.00	0.52	1,310	358.07	0.51	0.51	0.00
12.00	**1.46**	**1,488**	**358.15**	**1.28**	**1.28**	0.00
13.00	**0.64**	**1,350**	**358.09**	**0.66**	**0.66**	0.00
14.00	0.48	1,305	358.07	0.49	0.49	0.00
15.00	0.36	1,269	358.06	0.37	0.37	0.00
16.00	0.26	1,236	358.04	0.27	0.27	0.00
17.00	0.20	1,214	358.03	0.21	0.21	0.00
18.00	0.16	1,196	358.03	0.16	0.16	0.00
19.00	0.14	1,187	358.02	0.14	0.14	0.00
20.00	0.12	1,181	358.02	0.12	0.12	0.00
21.00	0.11	1,176	358.02	0.11	0.11	0.00
22.00	0.10	1,170	358.02	0.10	0.10	0.00
23.00	0.09	1,165	358.01	0.09	0.09	0.00
24.00	0.08	1,160	358.01	0.08	0.08	0.00
25.00	0.00	1,088	357.98	0.01	0.01	0.00
26.00	0.00	1,035	357.96	0.01	0.01	0.00
27.00	0.00	981	357.94	0.01	0.01	0.00
28.00	0.00	929	357.91	0.01	0.01	0.00
29.00	0.00	877	357.89	0.01	0.01	0.00
30.00	0.00	825	357.87	0.01	0.01	0.00

Summary for Pond P2: StormTech SC-740

Inflow	=	5.02 cfs @	12.16 hrs,	Volume=	0.207 af
Outflow	=	2.71 cfs @	12.35 hrs,	Volume=	0.200 af, Atten= 46%, Lag= 11.1 min
Primary	=	2.71 cfs @	12.35 hrs,	Volume=	0.200 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 359.62' @ 12.35 hrs Surf.Area= 0.048 ac Storage= 0.102 af

Plug-Flow detention time= 41.1 min calculated for 0.200 af (96% of inflow)
Center-of-Mass det. time= 39.1 min (771.0 - 731.9)

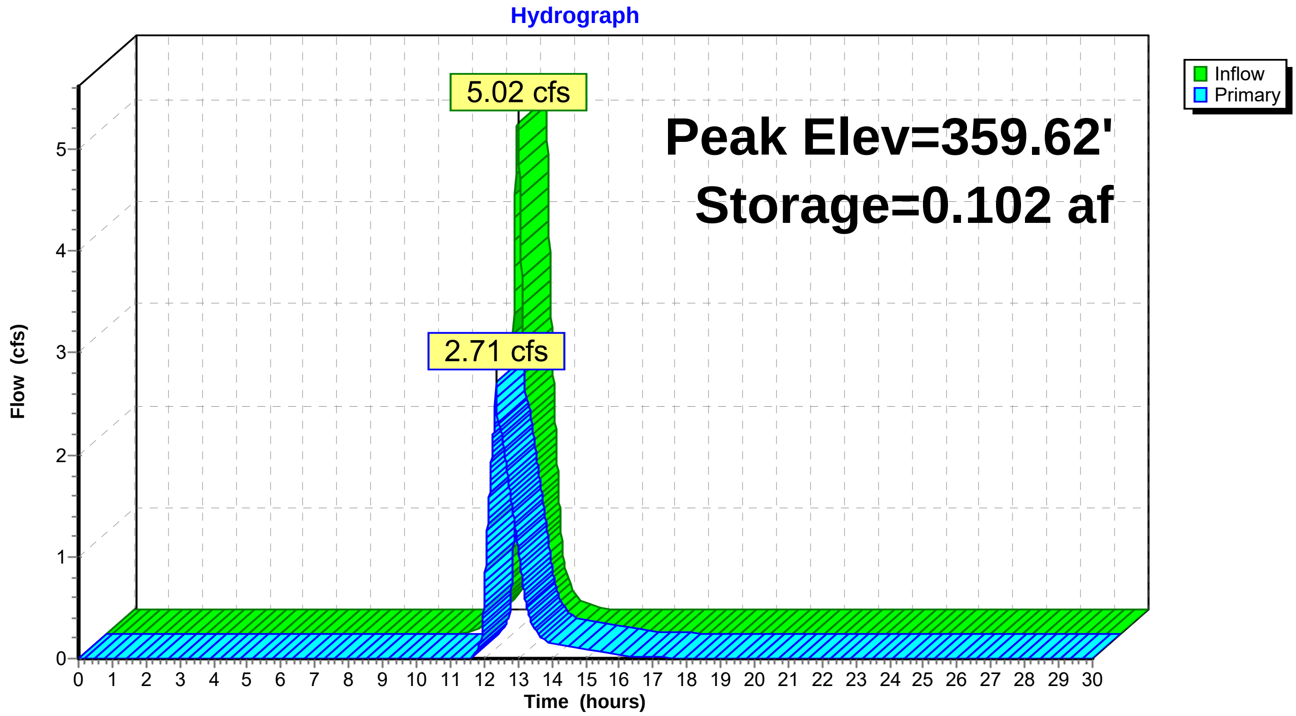
Volume	Invert	Avail.Storage	Storage Description
#1A	356.16'	0.044 af	**39.50'W x 53.46'L x 3.50'H Field A** 0.170 af Overall - 0.059 af Embedded = 0.111 af x 40.0% Voids
#2A	356.66'	0.059 af	**ADS_StormTech SC-740 +Cap** x 56 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 8 Rows of 7 Chambers
#3	365.85'	0.005 af	**24.0" Round Pipe Storage** L= 66.0'
		0.108 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	356.34'	**12.0" Round Culvert** L= 2.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 356.34' / 356.14' S= 0.1000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	356.54'	**3.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	357.05'	**6.0" W x 6.3" H Vert. Orifice/Grate** C= 0.600
#4	Device 1	359.60'	**36.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

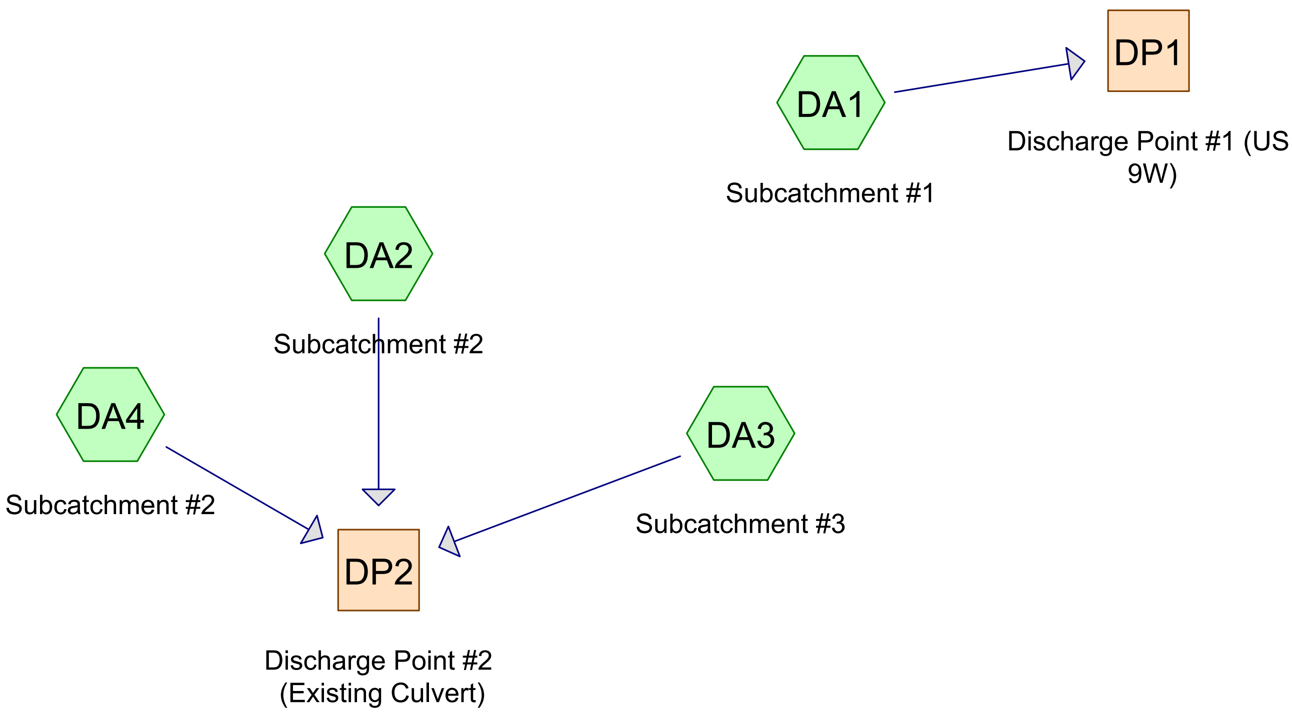
Primary OutFlow Max=2.52 cfs @ 12.35 hrs HW=359.62' (Free Discharge)
└─**1=Culvert** (Passes 2.52 cfs of 4.97 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.41 cfs @ 8.27 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.92 cfs @ 7.30 fps)
  └─**4=Broad-Crested Rectangular Weir** (Weir Controls 0.19 cfs @ 0.35 fps)

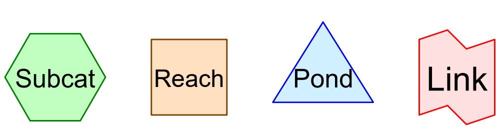
Pond P2: StormTech SC-740



Hydrograph for Pond P2: StormTech SC-740

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.000	356.16	0.00
1.00	0.00	0.000	356.16	0.00
2.00	0.00	0.000	356.16	0.00
3.00	0.00	0.000	356.16	0.00
4.00	0.00	0.000	356.16	0.00
5.00	0.00	0.000	356.16	0.00
6.00	0.00	0.000	356.16	0.00
7.00	0.00	0.000	356.16	0.00
8.00	0.00	0.000	356.16	0.00
9.00	0.00	0.000	356.16	0.00
10.00	0.00	0.000	356.16	0.00
11.00	0.05	0.001	356.21	0.00
12.00	**2.30**	**0.039**	**357.41**	**0.55**
13.00	**0.18**	**0.052**	**357.77**	**1.09**
14.00	0.00	0.025	357.04	0.14
15.00	0.00	0.015	356.80	0.08
16.00	0.00	0.010	356.68	0.04
17.00	0.00	0.009	356.61	0.01
18.00	0.00	0.008	356.57	0.01
19.00	0.00	0.008	356.55	0.00
20.00	0.00	0.008	356.55	0.00
21.00	0.00	0.007	356.54	0.00
22.00	0.00	0.007	356.54	0.00
23.00	0.00	0.007	356.54	0.00
24.00	0.00	0.007	356.54	0.00
25.00	0.00	0.007	356.54	0.00
26.00	0.00	0.007	356.54	0.00
27.00	0.00	0.007	356.54	0.00
28.00	0.00	0.007	356.54	0.00
29.00	0.00	0.007	356.54	0.00
30.00	0.00	0.007	356.54	0.00





Routing Diagram for Postdevelopment No Control
Prepared by Stewart's Shops, Printed 5/4/2021
HydroCAD® 10.00-22 s/n 08847 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.578	80	>75% Grass cover, Good, HSG D (DA1, DA2, DA3, DA4)
0.764	98	Paved parking, HSG D (DA2, DA4)
1.342	**90**	**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: Subcatchment #1 Runoff Area=1,903 sf 0.00% Impervious Runoff Depth=0.97"
Tc=6.0 min CN=80 Runoff=0.05 cfs 0.004 af

Subcatchment DA2: Subcatchment #2 Runoff Area=40,196 sf 81.61% Impervious Runoff Depth=2.08"
Flow Length=128' Tc=12.2 min CN=95 Runoff=1.77 cfs 0.160 af

Subcatchment DA3: Subcatchment #3 Runoff Area=8,907 sf 0.00% Impervious Runoff Depth=0.97"
Flow Length=72' Tc=8.7 min CN=80 Runoff=0.21 cfs 0.017 af

Subcatchment DA4: Subcatchment #2 Runoff Area=7,458 sf 6.64% Impervious Runoff Depth=1.03"
Flow Length=334' Tc=8.6 min CN=81 Runoff=0.18 cfs 0.015 af

Reach DP1: Discharge Point #1 (US 9W) Inflow=0.05 cfs 0.004 af
Outflow=0.05 cfs 0.004 af

Reach DP2: Discharge Point #2 (Existing Culvert) Inflow=2.14 cfs 0.191 af
Outflow=2.14 cfs 0.191 af

Total Runoff Area = 1.342 ac Runoff Volume = 0.195 af Average Runoff Depth = 1.74"
43.04% Pervious = 0.578 ac 56.96% Impervious = 0.764 ac

Summary for Subcatchment DA1: Subcatchment #1

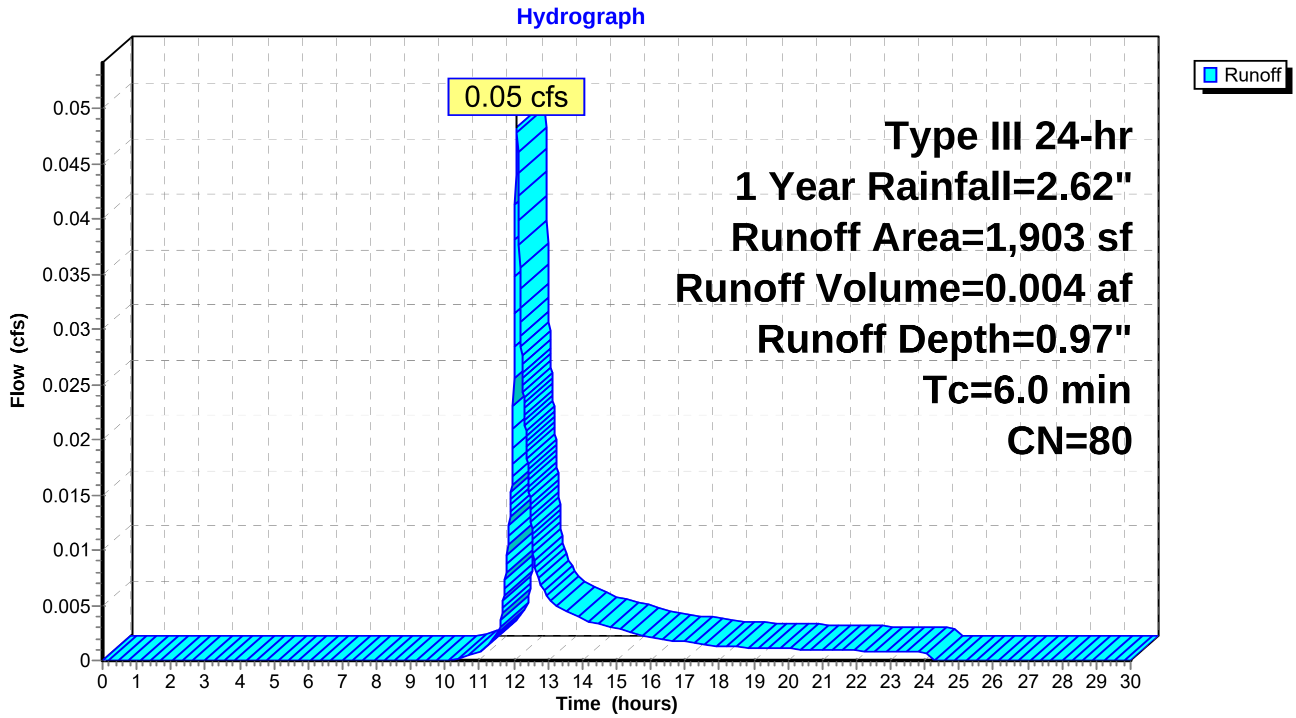
Runoff = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.62"

Area (sf)	CN	Description
1,903	80	>75% Grass cover, Good, HSG D
1,903		100.00% Pervious Area

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

Subcatchment DA1: Subcatchment #1



Hydrograph for Subcatchment DA1: Subcatchment #1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.01	0.00	0.00
1.00	0.03	0.00	0.00
1.50	0.04	0.00	0.00
2.00	0.05	0.00	0.00
2.50	0.07	0.00	0.00
3.00	0.08	0.00	0.00
3.50	0.10	0.00	0.00
4.00	0.11	0.00	0.00
4.50	0.13	0.00	0.00
5.00	0.15	0.00	0.00
5.50	0.17	0.00	0.00
6.00	0.19	0.00	0.00
6.50	0.21	0.00	0.00
7.00	0.24	0.00	0.00
7.50	0.27	0.00	0.00
8.00	0.30	0.00	0.00
8.50	0.34	0.00	0.00
9.00	0.38	0.00	0.00
9.50	0.43	0.00	0.00
10.00	0.50	0.00	0.00
10.50	0.57	0.00	0.00
11.00	0.65	0.01	0.00
11.50	0.78	0.03	0.00
12.00	1.31	0.20	**0.03**
12.50	1.84	0.47	**0.01**
13.00	1.96	0.54	0.01
13.50	2.05	0.59	0.00
14.00	2.12	0.64	0.00
14.50	2.19	0.68	0.00
15.00	2.24	0.71	0.00
15.50	2.28	0.74	0.00
16.00	2.32	0.77	0.00
16.50	2.35	0.79	0.00
17.00	2.38	0.81	0.00
17.50	2.41	0.83	0.00
18.00	2.43	0.84	0.00
18.50	2.45	0.86	0.00
19.00	2.47	0.87	0.00
19.50	2.49	0.88	0.00
20.00	2.51	0.89	0.00
20.50	2.52	0.91	0.00
21.00	2.54	0.92	0.00
21.50	2.56	0.93	0.00
22.00	2.57	0.94	0.00
22.50	2.58	0.95	0.00
23.00	2.60	0.96	0.00
23.50	2.61	0.96	0.00
24.00	**2.62**	**0.97**	0.00
24.50	2.62	0.97	0.00
25.00	2.62	0.97	0.00
25.50	2.62	0.97	0.00
26.00	2.62	0.97	0.00
26.50	2.62	0.97	0.00
27.00	2.62	0.97	0.00
27.50	2.62	0.97	0.00
28.00	2.62	0.97	0.00
28.50	2.62	0.97	0.00
29.00	2.62	0.97	0.00
29.50	2.62	0.97	0.00
30.00	2.62	0.97	0.00

Summary for Subcatchment DA2: Subcatchment #2

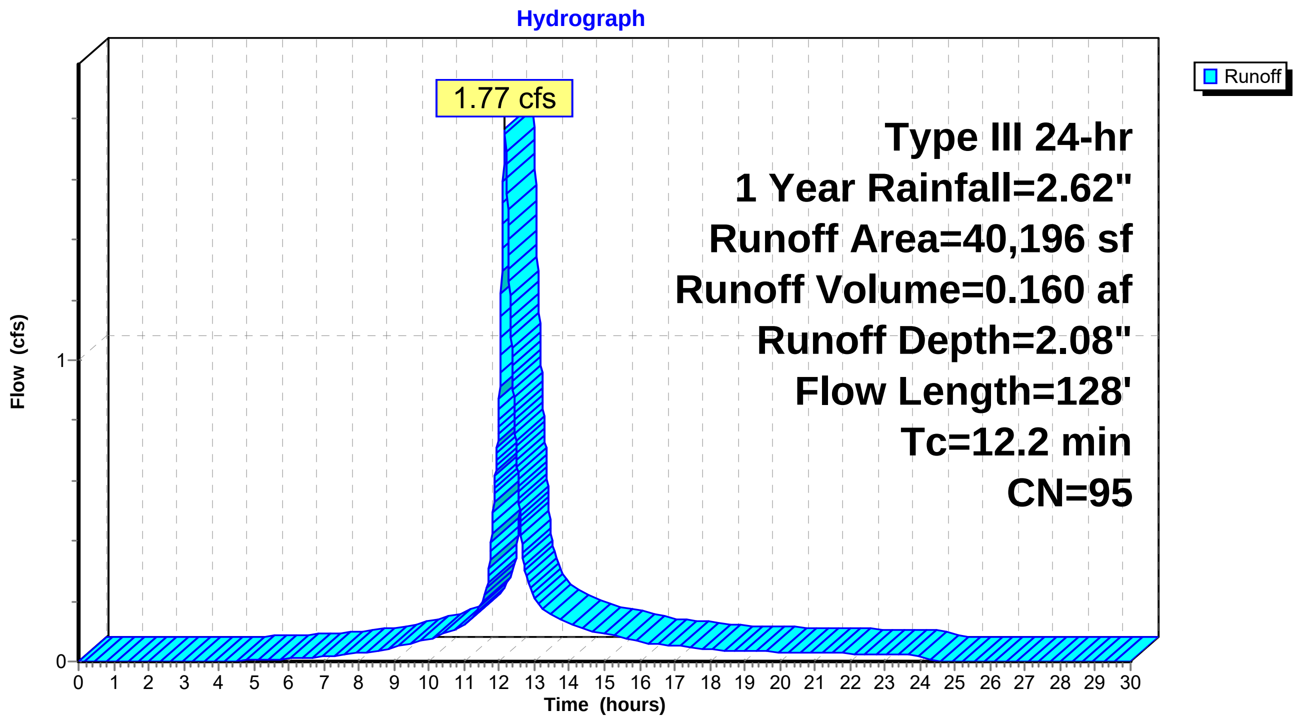
Runoff = 1.77 cfs @ 12.16 hrs, Volume= 0.160 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.62"

Area (sf)	CN	Description
32,805	98	Paved parking, HSG D
7,391	80	>75% Grass cover, Good, HSG D
40,196	95	Weighted Average
7,391		18.39% Pervious Area
32,805		81.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	72	0.0250	0.11		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
0.5	28	0.0200	0.94		**Sheet Flow, Sheet Flow 2** Smooth surfaces n= 0.011 P2= 2.48"
0.3	28	0.0050	1.44		**Shallow Concentrated Flow, Shallow Concnetrated Flow 1** Paved Kv= 20.3 fps
12.2	128	Total			

Subcatchment DA2: Subcatchment #2



Hydrograph for Subcatchment DA2: Subcatchment #2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.01	0.00	0.00
1.00	0.03	0.00	0.00
1.50	0.04	0.00	0.00
2.00	0.05	0.00	0.00
2.50	0.07	0.00	0.00
3.00	0.08	0.00	0.00
3.50	0.10	0.00	0.00
4.00	0.11	0.00	0.00
4.50	0.13	0.00	0.00
5.00	0.15	0.00	0.00
5.50	0.17	0.01	0.01
6.00	0.19	0.01	0.01
6.50	0.21	0.02	0.01
7.00	0.24	0.03	0.02
7.50	0.27	0.04	0.02
8.00	0.30	0.05	0.03
8.50	0.34	0.07	0.04
9.00	0.38	0.10	0.05
9.50	0.43	0.13	0.06
10.00	0.50	0.17	0.07
10.50	0.57	0.22	0.10
11.00	0.65	0.28	0.12
11.50	0.78	0.38	0.20
12.00	1.31	0.84	**0.87**
12.50	1.84	1.33	**0.67**
13.00	1.96	1.45	0.21
13.50	2.05	1.53	0.15
14.00	2.12	1.60	0.12
14.50	2.19	1.66	0.11
15.00	2.24	1.71	0.09
15.50	2.28	1.75	0.08
16.00	2.32	1.79	0.07
16.50	2.35	1.82	0.06
17.00	2.38	1.85	0.05
17.50	2.41	1.88	0.05
18.00	2.43	1.90	0.04
18.50	2.45	1.92	0.04
19.00	2.47	1.94	0.03
19.50	2.49	1.95	0.03
20.00	2.51	1.97	0.03
20.50	2.52	1.99	0.03
21.00	2.54	2.00	0.03
21.50	2.56	2.02	0.03
22.00	2.57	2.03	0.03
22.50	2.58	2.04	0.02
23.00	2.60	2.06	0.02
23.50	2.61	2.07	0.02
24.00	**2.62**	**2.08**	0.02
24.50	2.62	2.08	0.00
25.00	2.62	2.08	0.00
25.50	2.62	2.08	0.00
26.00	2.62	2.08	0.00
26.50	2.62	2.08	0.00
27.00	2.62	2.08	0.00
27.50	2.62	2.08	0.00
28.00	2.62	2.08	0.00
28.50	2.62	2.08	0.00
29.00	2.62	2.08	0.00
29.50	2.62	2.08	0.00
30.00	2.62	2.08	0.00

Summary for Subcatchment DA3: Subcatchment #3

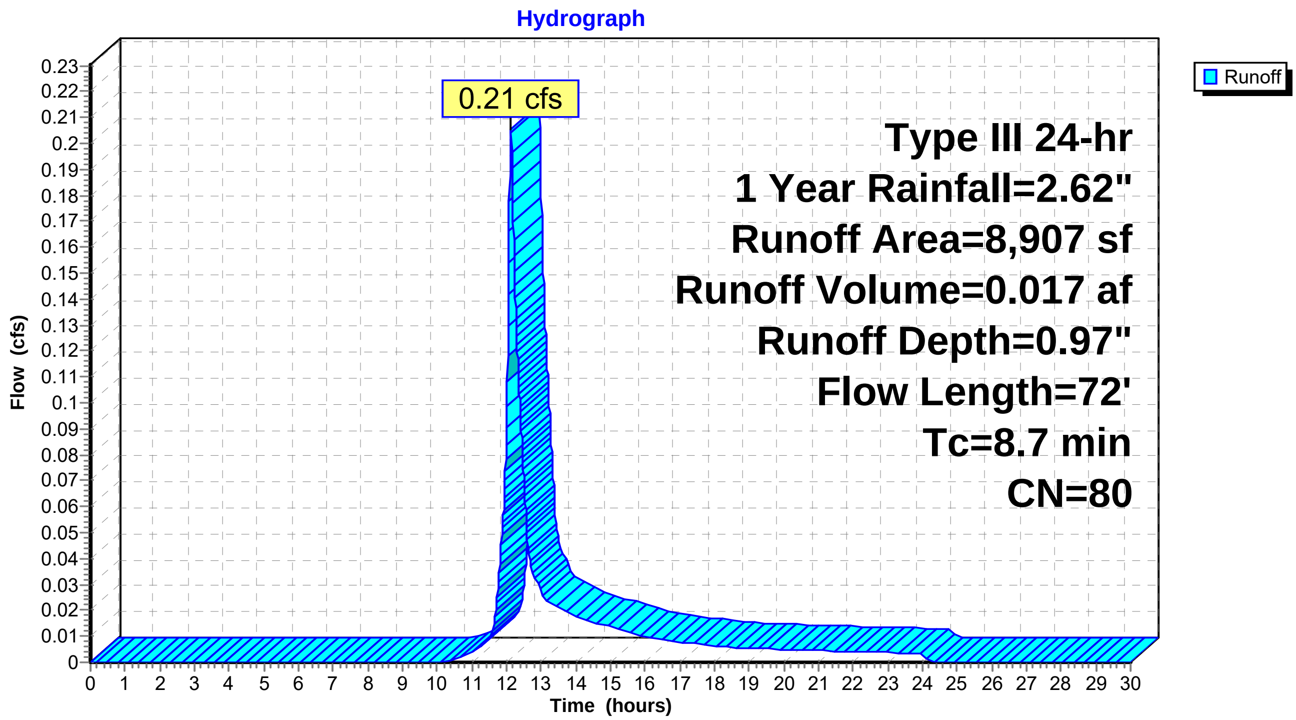
Runoff = 0.21 cfs @ 12.13 hrs, Volume= 0.017 af, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.62"

Area (sf)	CN	Description
8,907	80	>75% Grass cover, Good, HSG D
8,907		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	44	0.0550	0.13		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
3.1	28	0.1000	0.15		**Sheet Flow, Sheet Flow 2** Grass: Dense n= 0.240 P2= 2.48"
8.7	72	Total			

Subcatchment DA3: Subcatchment #3



Hydrograph for Subcatchment DA3: Subcatchment #3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.01	0.00	0.00
1.00	0.03	0.00	0.00
1.50	0.04	0.00	0.00
2.00	0.05	0.00	0.00
2.50	0.07	0.00	0.00
3.00	0.08	0.00	0.00
3.50	0.10	0.00	0.00
4.00	0.11	0.00	0.00
4.50	0.13	0.00	0.00
5.00	0.15	0.00	0.00
5.50	0.17	0.00	0.00
6.00	0.19	0.00	0.00
6.50	0.21	0.00	0.00
7.00	0.24	0.00	0.00
7.50	0.27	0.00	0.00
8.00	0.30	0.00	0.00
8.50	0.34	0.00	0.00
9.00	0.38	0.00	0.00
9.50	0.43	0.00	0.00
10.00	0.50	0.00	0.00
10.50	0.57	0.00	0.00
11.00	0.65	0.01	0.00
11.50	0.78	0.03	0.01
12.00	1.31	0.20	**0.09**
12.50	1.84	0.47	**0.07**
13.00	1.96	0.54	0.03
13.50	2.05	0.59	0.02
14.00	2.12	0.64	0.02
14.50	2.19	0.68	0.02
15.00	2.24	0.71	0.01
15.50	2.28	0.74	0.01
16.00	2.32	0.77	0.01
16.50	2.35	0.79	0.01
17.00	2.38	0.81	0.01
17.50	2.41	0.83	0.01
18.00	2.43	0.84	0.01
18.50	2.45	0.86	0.01
19.00	2.47	0.87	0.01
19.50	2.49	0.88	0.01
20.00	2.51	0.89	0.00
20.50	2.52	0.91	0.00
21.00	2.54	0.92	0.00
21.50	2.56	0.93	0.00
22.00	2.57	0.94	0.00
22.50	2.58	0.95	0.00
23.00	2.60	0.96	0.00
23.50	2.61	0.96	0.00
24.00	**2.62**	**0.97**	0.00
24.50	2.62	0.97	0.00
25.00	2.62	0.97	0.00
25.50	2.62	0.97	0.00
26.00	2.62	0.97	0.00
26.50	2.62	0.97	0.00
27.00	2.62	0.97	0.00
27.50	2.62	0.97	0.00
28.00	2.62	0.97	0.00
28.50	2.62	0.97	0.00
29.00	2.62	0.97	0.00
29.50	2.62	0.97	0.00
30.00	2.62	0.97	0.00

Summary for Subcatchment DA4: Subcatchment #2

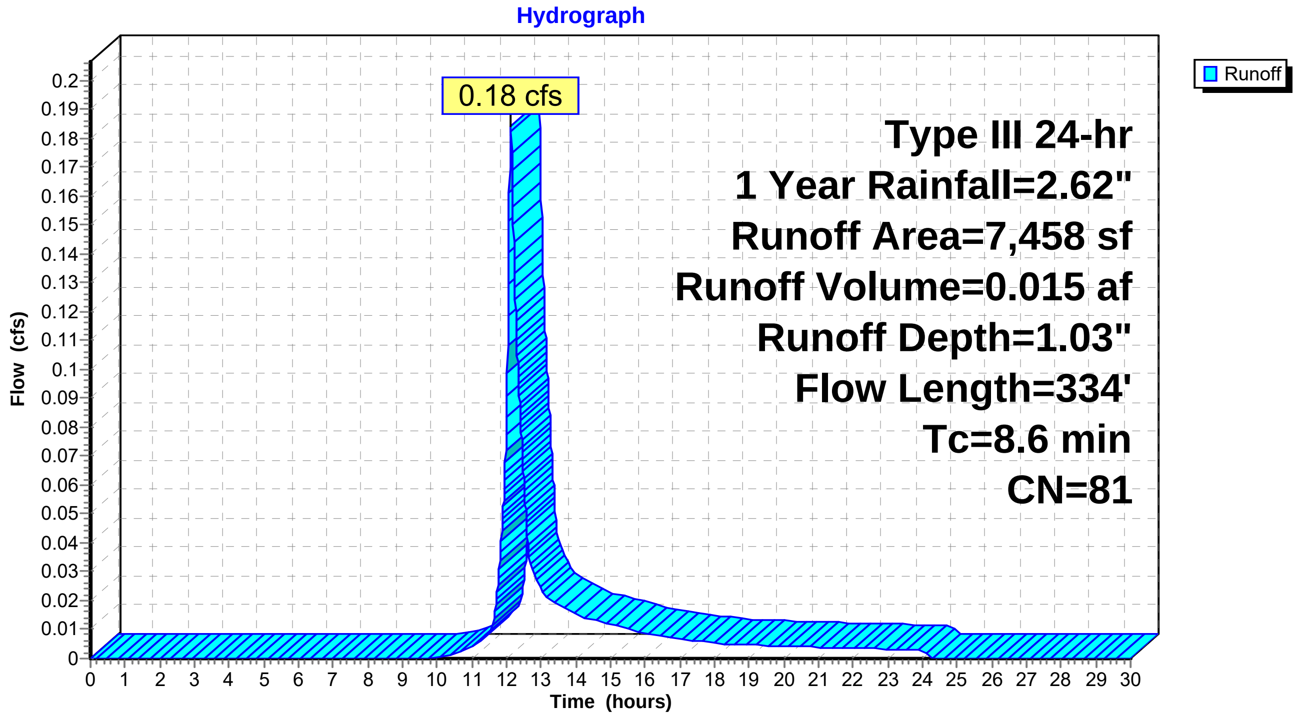
Runoff = 0.18 cfs @ 12.13 hrs, Volume= 0.015 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1 Year Rainfall=2.62"

Area (sf)	CN	Description
495	98	Paved parking, HSG D
6,963	80	>75% Grass cover, Good, HSG D
7,458	81	Weighted Average
6,963		93.36% Pervious Area
495		6.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	56	0.0480	0.13		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
0.7	158	0.0300	3.52		**Shallow Concentrated Flow, Shallow Concnetrated Flow 1** Paved Kv= 20.3 fps
0.0	7	0.3700	4.26		**Shallow Concentrated Flow, Shallow Concentrated Flow 2** Short Grass Pasture Kv= 7.0 fps
0.7	113	0.0060	2.63	11.85	**Channel Flow, Channel 1** Area= 4.5 sf Perim= 12.6' r= 0.36' n= 0.022 Earth, clean & straight
8.6	334	Total			

Subcatchment DA4: Subcatchment #2



Hydrograph for Subcatchment DA4: Subcatchment #2

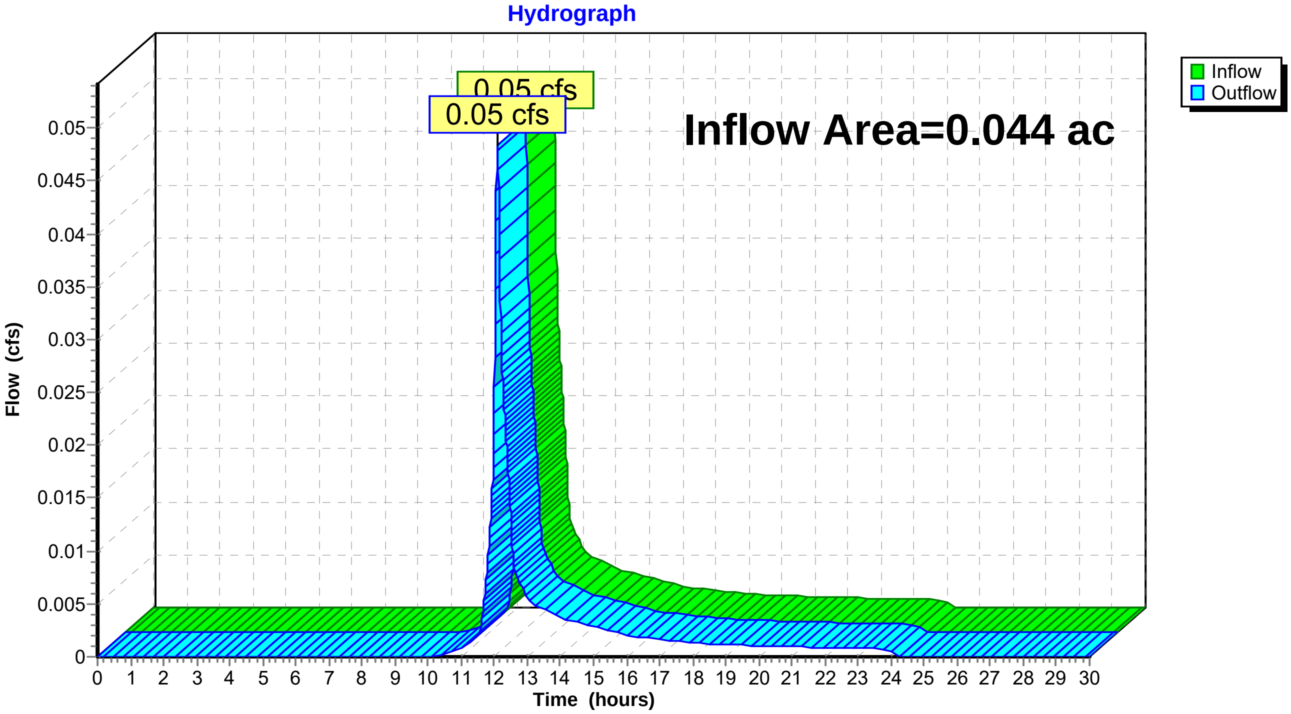
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.01	0.00	0.00
1.00	0.03	0.00	0.00
1.50	0.04	0.00	0.00
2.00	0.05	0.00	0.00
2.50	0.07	0.00	0.00
3.00	0.08	0.00	0.00
3.50	0.10	0.00	0.00
4.00	0.11	0.00	0.00
4.50	0.13	0.00	0.00
5.00	0.15	0.00	0.00
5.50	0.17	0.00	0.00
6.00	0.19	0.00	0.00
6.50	0.21	0.00	0.00
7.00	0.24	0.00	0.00
7.50	0.27	0.00	0.00
8.00	0.30	0.00	0.00
8.50	0.34	0.00	0.00
9.00	0.38	0.00	0.00
9.50	0.43	0.00	0.00
10.00	0.50	0.00	0.00
10.50	0.57	0.00	0.00
11.00	0.65	0.01	0.00
11.50	0.78	0.04	0.01
12.00	1.31	0.22	**0.08**
12.50	1.84	0.51	**0.06**
13.00	1.96	0.58	0.02
13.50	2.05	0.64	0.02
14.00	2.12	0.69	0.02
14.50	2.19	0.73	0.01
15.00	2.24	0.76	0.01
15.50	2.28	0.79	0.01
16.00	2.32	0.82	0.01
16.50	2.35	0.84	0.01
17.00	2.38	0.86	0.01
17.50	2.41	0.88	0.01
18.00	2.43	0.89	0.01
18.50	2.45	0.91	0.00
19.00	2.47	0.92	0.00
19.50	2.49	0.94	0.00
20.00	2.51	0.95	0.00
20.50	2.52	0.96	0.00
21.00	2.54	0.97	0.00
21.50	2.56	0.98	0.00
22.00	2.57	0.99	0.00
22.50	2.58	1.00	0.00
23.00	2.60	1.01	0.00
23.50	2.61	1.02	0.00
24.00	**2.62**	**1.03**	0.00
24.50	2.62	1.03	0.00
25.00	2.62	1.03	0.00
25.50	2.62	1.03	0.00
26.00	2.62	1.03	0.00
26.50	2.62	1.03	0.00
27.00	2.62	1.03	0.00
27.50	2.62	1.03	0.00
28.00	2.62	1.03	0.00
28.50	2.62	1.03	0.00
29.00	2.62	1.03	0.00
29.50	2.62	1.03	0.00
30.00	2.62	1.03	0.00

Summary for Reach DP1: Discharge Point #1 (US 9W)

Inflow Area =	0.044 ac,	0.00% Impervious, Inflow Depth = 0.97"	for 1 Year event
Inflow =	0.05 cfs @	12.09 hrs, Volume=	0.004 af
Outflow =	0.05 cfs @	12.09 hrs, Volume=	0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach DP1: Discharge Point #1 (US 9W)



Hydrograph for Reach DP1: Discharge Point #1 (US 9W)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.00		0.00
7.00	0.00		0.00
7.50	0.00		0.00
8.00	0.00		0.00
8.50	0.00		0.00
9.00	0.00		0.00
9.50	0.00		0.00
10.00	0.00		0.00
10.50	0.00		0.00
11.00	0.00		0.00
11.50	0.00		0.00
12.00	**0.03**		**0.03**
12.50	**0.01**		**0.01**
13.00	0.01		0.01
13.50	0.00		0.00
14.00	0.00		0.00
14.50	0.00		0.00
15.00	0.00		0.00
15.50	0.00		0.00
16.00	0.00		0.00
16.50	0.00		0.00
17.00	0.00		0.00
17.50	0.00		0.00
18.00	0.00		0.00
18.50	0.00		0.00
19.00	0.00		0.00
19.50	0.00		0.00
20.00	0.00		0.00
20.50	0.00		0.00
21.00	0.00		0.00
21.50	0.00		0.00
22.00	0.00		0.00
22.50	0.00		0.00
23.00	0.00		0.00
23.50	0.00		0.00
24.00	0.00		0.00
24.50	0.00		0.00
25.00	0.00		0.00
25.50	0.00		0.00

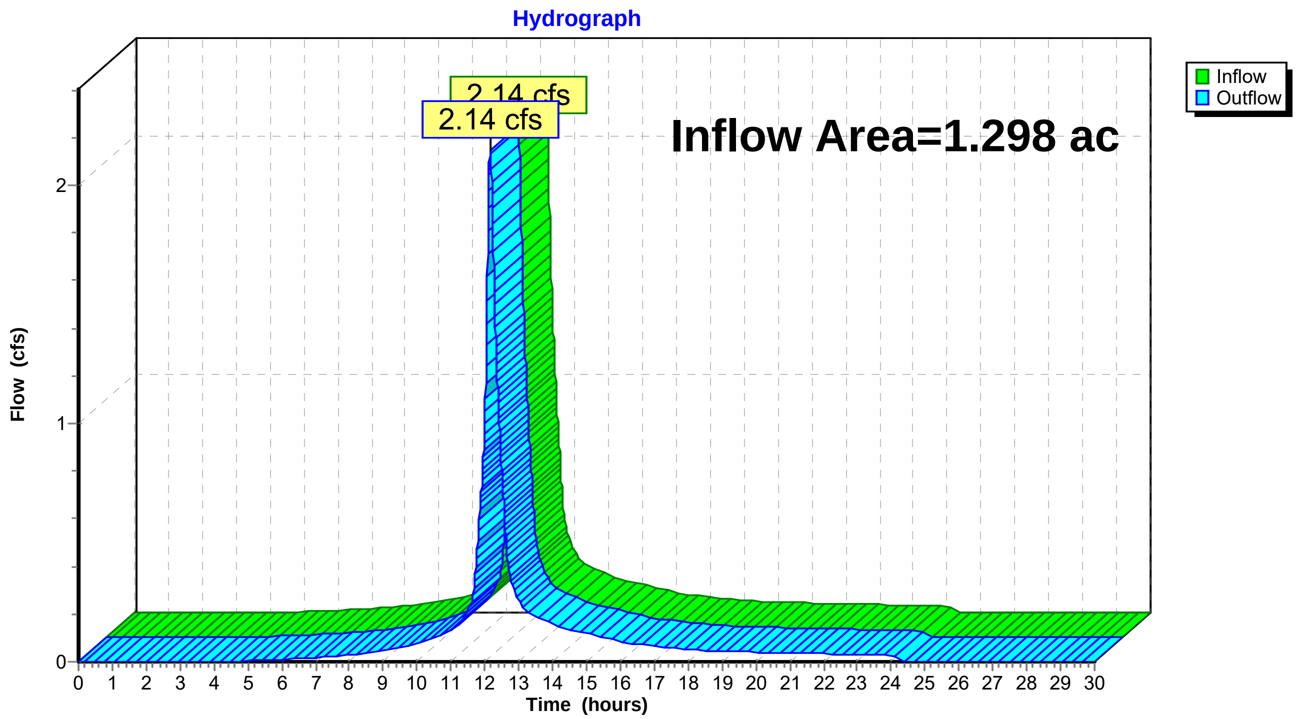
Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
26.00	0.00		0.00
26.50	0.00		0.00
27.00	0.00		0.00
27.50	0.00		0.00
28.00	0.00		0.00
28.50	0.00		0.00
29.00	0.00		0.00
29.50	0.00		0.00
30.00	0.00		0.00

Summary for Reach DP2: Discharge Point #2 (Existing Culvert)

Inflow Area = 1.298 ac, 58.87% Impervious, Inflow Depth = 1.77" for 1 Year event
Inflow = 2.14 cfs @ 12.16 hrs, Volume= 0.191 af
Outflow = 2.14 cfs @ 12.16 hrs, Volume= 0.191 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach DP2: Discharge Point #2 (Existing Culvert)



Hydrograph for Reach DP2: Discharge Point #2 (Existing Culvert)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.01		0.01
6.00	0.01		0.01
6.50	0.01		0.01
7.00	0.02		0.02
7.50	0.02		0.02
8.00	0.03		0.03
8.50	0.04		0.04
9.00	0.05		0.05
9.50	0.06		0.06
10.00	0.07		0.07
10.50	0.10		0.10
11.00	0.13		0.13
11.50	0.22		0.22
12.00	**1.05**		**1.05**
12.50	**0.80**		**0.80**
13.00	0.26		0.26
13.50	0.19		0.19
14.00	0.16		0.16
14.50	0.14		0.14
15.00	0.12		0.12
15.50	0.10		0.10
16.00	0.08		0.08
16.50	0.07		0.07
17.00	0.07		0.07
17.50	0.06		0.06
18.00	0.05		0.05
18.50	0.05		0.05
19.00	0.04		0.04
19.50	0.04		0.04
20.00	0.04		0.04
20.50	0.04		0.04
21.00	0.04		0.04
21.50	0.04		0.04
22.00	0.03		0.03
22.50	0.03		0.03
23.00	0.03		0.03
23.50	0.03		0.03
24.00	0.03		0.03
24.50	0.00		0.00
25.00	0.00		0.00
25.50	0.00		0.00
26.00	0.00		0.00
26.50	0.00		0.00
27.00	0.00		0.00
27.50	0.00		0.00
28.00	0.00		0.00
28.50	0.00		0.00
29.00	0.00		0.00
29.50	0.00		0.00
30.00	0.00		0.00

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: Subcatchment #1 Runoff Area=1,903 sf 0.00% Impervious Runoff Depth=2.62"
Tc=6.0 min CN=80 Runoff=0.13 cfs 0.010 af

Subcatchment DA2: Subcatchment #2 Runoff Area=40,196 sf 81.61% Impervious Runoff Depth=4.11"
Flow Length=128' Tc=12.2 min CN=95 Runoff=3.38 cfs 0.316 af

Subcatchment DA3: Subcatchment #3 Runoff Area=8,907 sf 0.00% Impervious Runoff Depth=2.62"
Flow Length=72' Tc=8.7 min CN=80 Runoff=0.57 cfs 0.045 af

Subcatchment DA4: Subcatchment #2 Runoff Area=7,458 sf 6.64% Impervious Runoff Depth=2.71"
Flow Length=334' Tc=8.6 min CN=81 Runoff=0.50 cfs 0.039 af

Reach DP1: Discharge Point #1 (US 9W) Inflow=0.13 cfs 0.010 af
Outflow=0.13 cfs 0.010 af

Reach DP2: Discharge Point #2 (Existing Culvert) Inflow=4.39 cfs 0.400 af
Outflow=4.39 cfs 0.400 af

Total Runoff Area = 1.342 ac Runoff Volume = 0.409 af Average Runoff Depth = 3.66"
43.04% Pervious = 0.578 ac 56.96% Impervious = 0.764 ac

Summary for Subcatchment DA1: Subcatchment #1

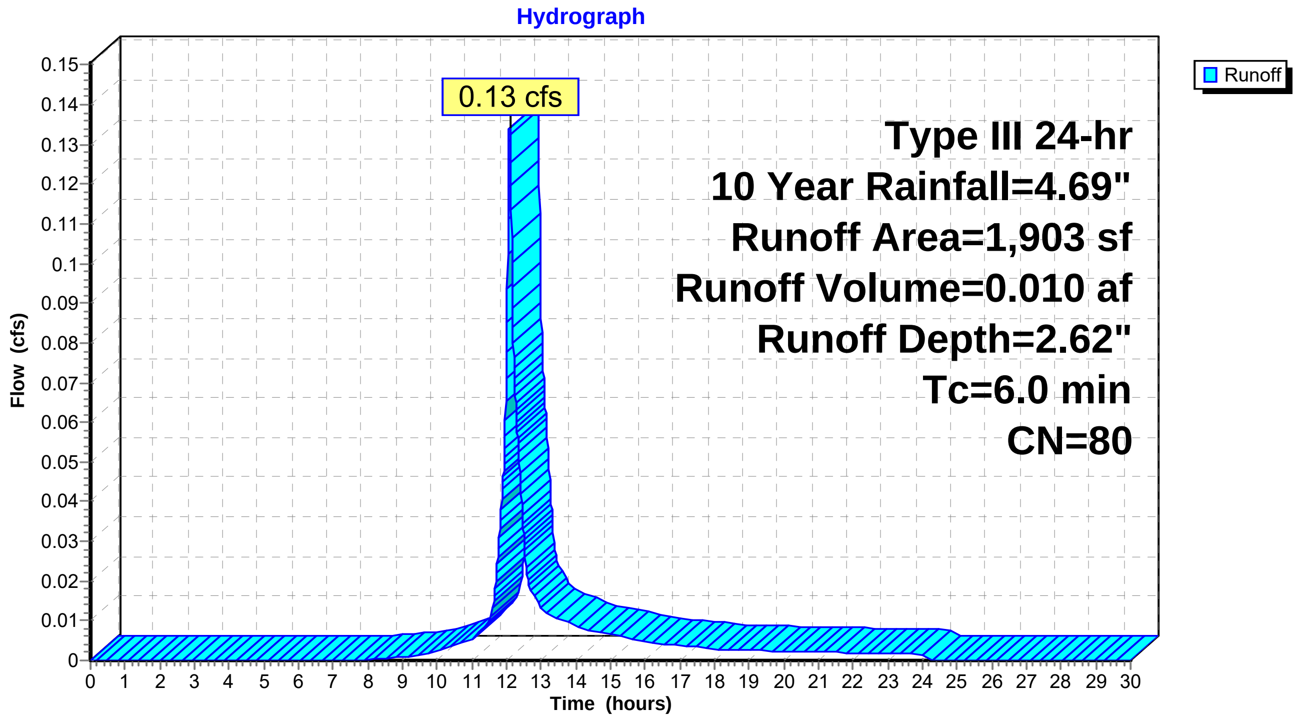
Runoff = 0.13 cfs @ 12.09 hrs, Volume= 0.010 af, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.69"

Area (sf)	CN	Description
1,903	80	>75% Grass cover, Good, HSG D
1,903		100.00% Pervious Area

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

Subcatchment DA1: Subcatchment #1



Hydrograph for Subcatchment DA1: Subcatchment #1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.09	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.14	0.00	0.00
3.50	0.17	0.00	0.00
4.00	0.20	0.00	0.00
4.50	0.23	0.00	0.00
5.00	0.27	0.00	0.00
5.50	0.30	0.00	0.00
6.00	0.34	0.00	0.00
6.50	0.38	0.00	0.00
7.00	0.42	0.00	0.00
7.50	0.48	0.00	0.00
8.00	0.53	0.00	0.00
8.50	0.60	0.00	0.00
9.00	0.68	0.01	0.00
9.50	0.78	0.03	0.00
10.00	0.89	0.05	0.00
10.50	1.02	0.09	0.00
11.00	1.17	0.14	0.01
11.50	1.40	0.24	0.01
12.00	2.34	0.78	**0.08**
12.50	3.29	1.47	**0.03**
13.00	3.52	1.65	0.01
13.50	3.67	1.78	0.01
14.00	3.80	1.88	0.01
14.50	3.91	1.97	0.01
15.00	4.01	2.05	0.01
15.50	4.09	2.11	0.01
16.00	4.16	2.17	0.00
16.50	4.21	2.22	0.00
17.00	4.27	2.26	0.00
17.50	4.31	2.30	0.00
18.00	4.35	2.34	0.00
18.50	4.39	2.37	0.00
19.00	4.42	2.40	0.00
19.50	4.46	2.42	0.00
20.00	4.49	2.45	0.00
20.50	4.52	2.48	0.00
21.00	4.55	2.50	0.00
21.50	4.57	2.52	0.00
22.00	4.60	2.55	0.00
22.50	4.62	2.57	0.00
23.00	4.65	2.59	0.00
23.50	4.67	2.61	0.00
24.00	**4.69**	**2.62**	0.00
24.50	4.69	2.62	0.00
25.00	4.69	2.62	0.00
25.50	4.69	2.62	0.00

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
26.00	4.69	2.62	0.00
26.50	4.69	2.62	0.00
27.00	4.69	2.62	0.00
27.50	4.69	2.62	0.00
28.00	4.69	2.62	0.00
28.50	4.69	2.62	0.00
29.00	4.69	2.62	0.00
29.50	4.69	2.62	0.00
30.00	4.69	2.62	0.00

Summary for Subcatchment DA2: Subcatchment #2

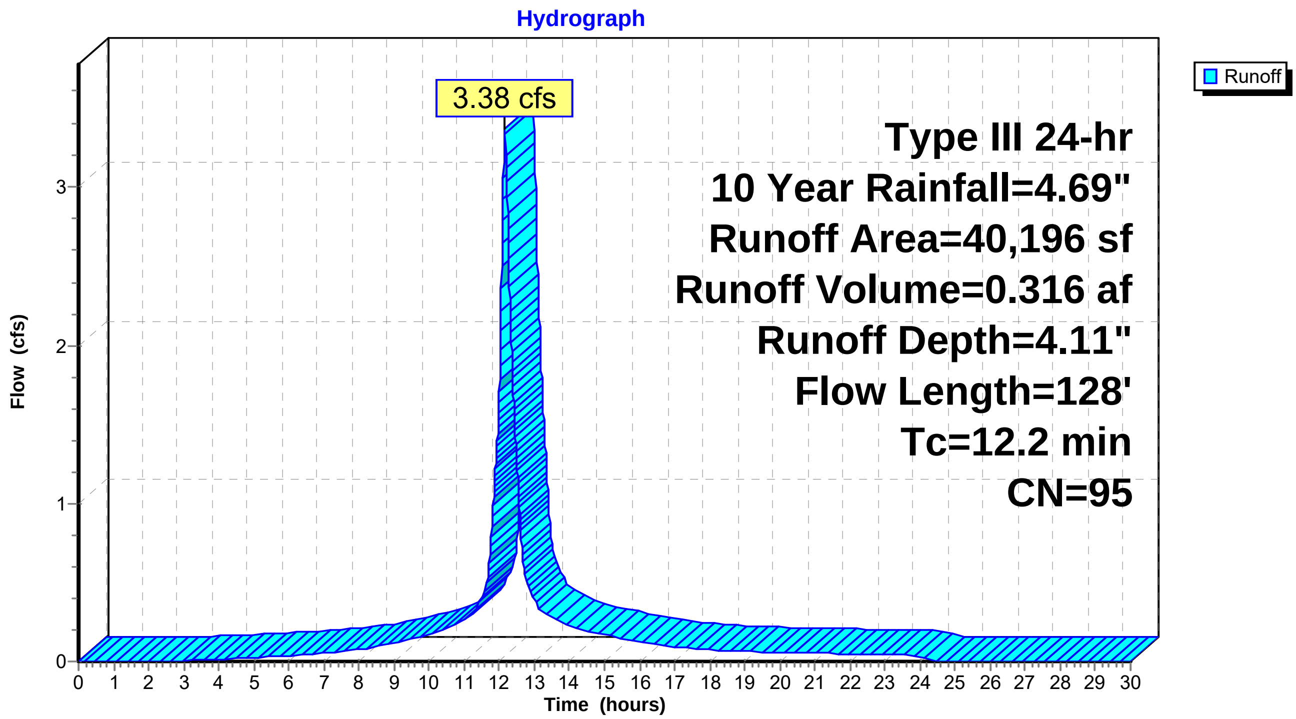
Runoff = 3.38 cfs @ 12.16 hrs, Volume= 0.316 af, Depth= 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.69"

Area (sf)	CN	Description
32,805	98	Paved parking, HSG D
7,391	80	>75% Grass cover, Good, HSG D
40,196	95	Weighted Average
7,391		18.39% Pervious Area
32,805		81.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	72	0.0250	0.11		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
0.5	28	0.0200	0.94		**Sheet Flow, Sheet Flow 2** Smooth surfaces n= 0.011 P2= 2.48"
0.3	28	0.0050	1.44		**Shallow Concentrated Flow, Shallow Concnetrated Flow 1** Paved Kv= 20.3 fps
12.2	128	Total			

Subcatchment DA2: Subcatchment #2



Hydrograph for Subcatchment DA2: Subcatchment #2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	26.00	4.69	4.11	0.00
0.50	0.02	0.00	0.00	26.50	4.69	4.11	0.00
1.00	0.05	0.00	0.00	27.00	4.69	4.11	0.00
1.50	0.07	0.00	0.00	27.50	4.69	4.11	0.00
2.00	0.09	0.00	0.00	28.00	4.69	4.11	0.00
2.50	0.12	0.00	0.00	28.50	4.69	4.11	0.00
3.00	0.14	0.00	0.00	29.00	4.69	4.11	0.00
3.50	0.17	0.01	0.01	29.50	4.69	4.11	0.00
4.00	0.20	0.01	0.01	30.00	4.69	4.11	0.00
4.50	0.23	0.02	0.02				
5.00	0.27	0.04	0.02				
5.50	0.30	0.05	0.03				
6.00	0.34	0.07	0.03				
6.50	0.38	0.09	0.04				
7.00	0.42	0.12	0.05				
7.50	0.48	0.15	0.06				
8.00	0.53	0.19	0.07				
8.50	0.60	0.24	0.09				
9.00	0.68	0.30	0.12				
9.50	0.78	0.38	0.14				
10.00	0.89	0.47	0.17				
10.50	1.02	0.58	0.21				
11.00	1.17	0.71	0.26				
11.50	1.40	0.92	0.40				
12.00	2.34	1.81	**1.71**				
12.50	3.29	2.74	**1.25**				
13.00	3.52	2.96	0.39				
13.50	3.67	3.11	0.28				
14.00	3.80	3.24	0.23				
14.50	3.91	3.34	0.20				
15.00	4.01	3.44	0.17				
15.50	4.09	3.52	0.15				
16.00	4.16	3.58	0.12				
16.50	4.21	3.64	0.11				
17.00	4.27	3.69	0.09				
17.50	4.31	3.74	0.08				
18.00	4.35	3.78	0.07				
18.50	4.39	3.81	0.07				
19.00	4.42	3.85	0.06				
19.50	4.46	3.88	0.06				
20.00	4.49	3.91	0.06				
20.50	4.52	3.94	0.05				
21.00	4.55	3.97	0.05				
21.50	4.57	4.00	0.05				
22.00	4.60	4.02	0.05				
22.50	4.62	4.05	0.04				
23.00	4.65	4.07	0.04				
23.50	4.67	4.09	0.04				
24.00	**4.69**	**4.11**	0.04				
24.50	4.69	4.11	0.00				
25.00	4.69	4.11	0.00				
25.50	4.69	4.11	0.00				

Summary for Subcatchment DA3: Subcatchment #3

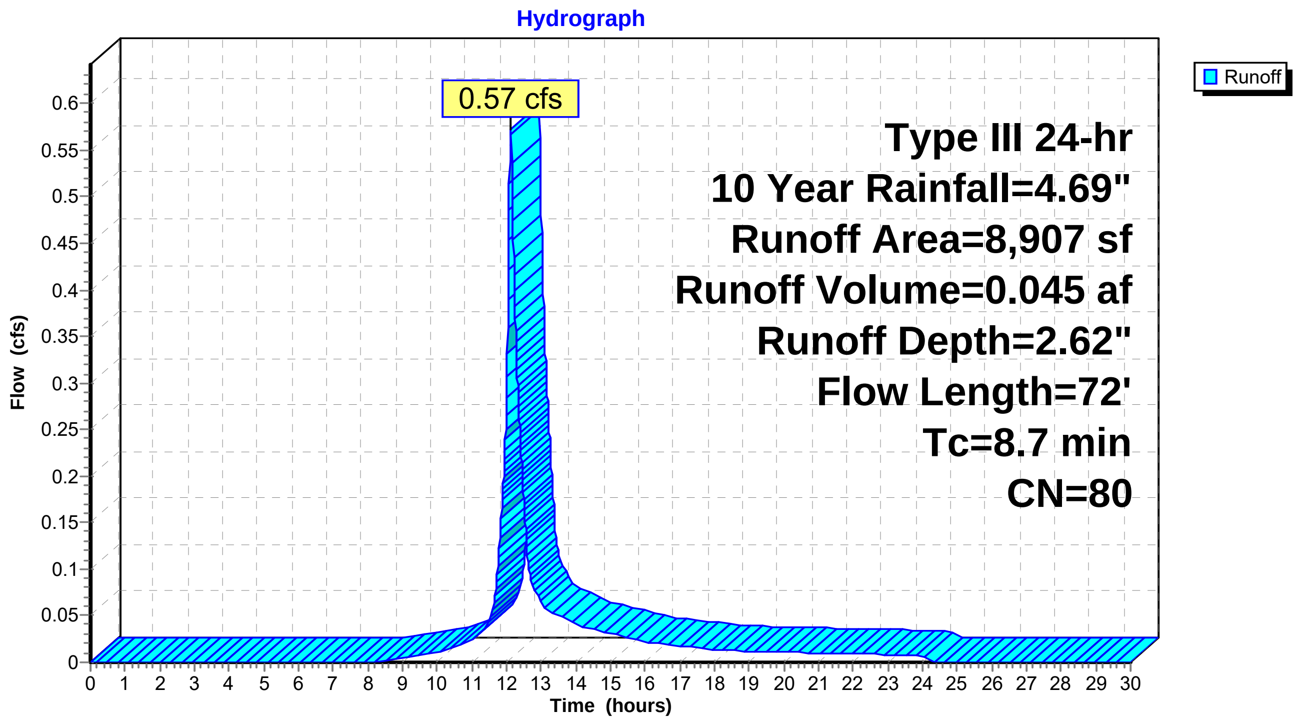
Runoff = 0.57 cfs @ 12.12 hrs, Volume= 0.045 af, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.69"

Area (sf)	CN	Description
8,907	80	>75% Grass cover, Good, HSG D
8,907		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	44	0.0550	0.13		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
3.1	28	0.1000	0.15		**Sheet Flow, Sheet Flow 2** Grass: Dense n= 0.240 P2= 2.48"
8.7	72	Total			

Subcatchment DA3: Subcatchment #3



Hydrograph for Subcatchment DA3: Subcatchment #3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.09	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.14	0.00	0.00
3.50	0.17	0.00	0.00
4.00	0.20	0.00	0.00
4.50	0.23	0.00	0.00
5.00	0.27	0.00	0.00
5.50	0.30	0.00	0.00
6.00	0.34	0.00	0.00
6.50	0.38	0.00	0.00
7.00	0.42	0.00	0.00
7.50	0.48	0.00	0.00
8.00	0.53	0.00	0.00
8.50	0.60	0.00	0.00
9.00	0.68	0.01	0.00
9.50	0.78	0.03	0.01
10.00	0.89	0.05	0.01
10.50	1.02	0.09	0.02
11.00	1.17	0.14	0.02
11.50	1.40	0.24	0.04
12.00	2.34	0.78	**0.28**
12.50	3.29	1.47	**0.18**
13.00	3.52	1.65	0.07
13.50	3.67	1.78	0.05
14.00	3.80	1.88	0.04
14.50	3.91	1.97	0.04
15.00	4.01	2.05	0.03
15.50	4.09	2.11	0.03
16.00	4.16	2.17	0.02
16.50	4.21	2.22	0.02
17.00	4.27	2.26	0.02
17.50	4.31	2.30	0.02
18.00	4.35	2.34	0.01
18.50	4.39	2.37	0.01
19.00	4.42	2.40	0.01
19.50	4.46	2.42	0.01
20.00	4.49	2.45	0.01
20.50	4.52	2.48	0.01
21.00	4.55	2.50	0.01
21.50	4.57	2.52	0.01
22.00	4.60	2.55	0.01
22.50	4.62	2.57	0.01
23.00	4.65	2.59	0.01
23.50	4.67	2.61	0.01
24.00	**4.69**	**2.62**	0.01
24.50	4.69	2.62	0.00
25.00	4.69	2.62	0.00
25.50	4.69	2.62	0.00
26.00	4.69	2.62	0.00
26.50	4.69	2.62	0.00
27.00	4.69	2.62	0.00
27.50	4.69	2.62	0.00
28.00	4.69	2.62	0.00
28.50	4.69	2.62	0.00
29.00	4.69	2.62	0.00
29.50	4.69	2.62	0.00
30.00	4.69	2.62	0.00

Summary for Subcatchment DA4: Subcatchment #2

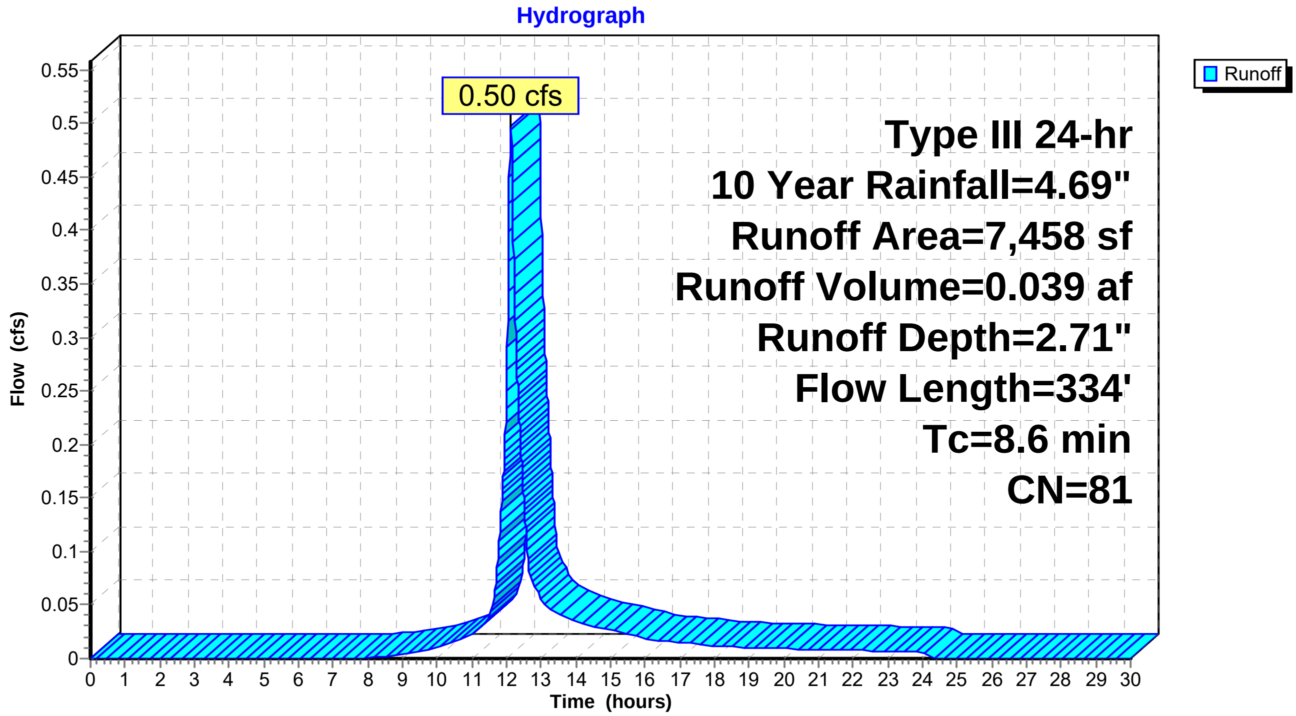
Runoff = 0.50 cfs @ 12.12 hrs, Volume= 0.039 af, Depth= 2.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.69"

Area (sf)	CN	Description
495	98	Paved parking, HSG D
6,963	80	>75% Grass cover, Good, HSG D
7,458	81	Weighted Average
6,963		93.36% Pervious Area
495		6.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	56	0.0480	0.13		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
0.7	158	0.0300	3.52		**Shallow Concentrated Flow, Shallow Concnetrated Flow 1** Paved Kv= 20.3 fps
0.0	7	0.3700	4.26		**Shallow Concentrated Flow, Shallow Concentrated Flow 2** Short Grass Pasture Kv= 7.0 fps
0.7	113	0.0060	2.63	11.85	**Channel Flow, Channel 1** Area= 4.5 sf Perim= 12.6' r= 0.36' n= 0.022 Earth, clean & straight
8.6	334	Total			

Subcatchment DA4: Subcatchment #2



Hydrograph for Subcatchment DA4: Subcatchment #2

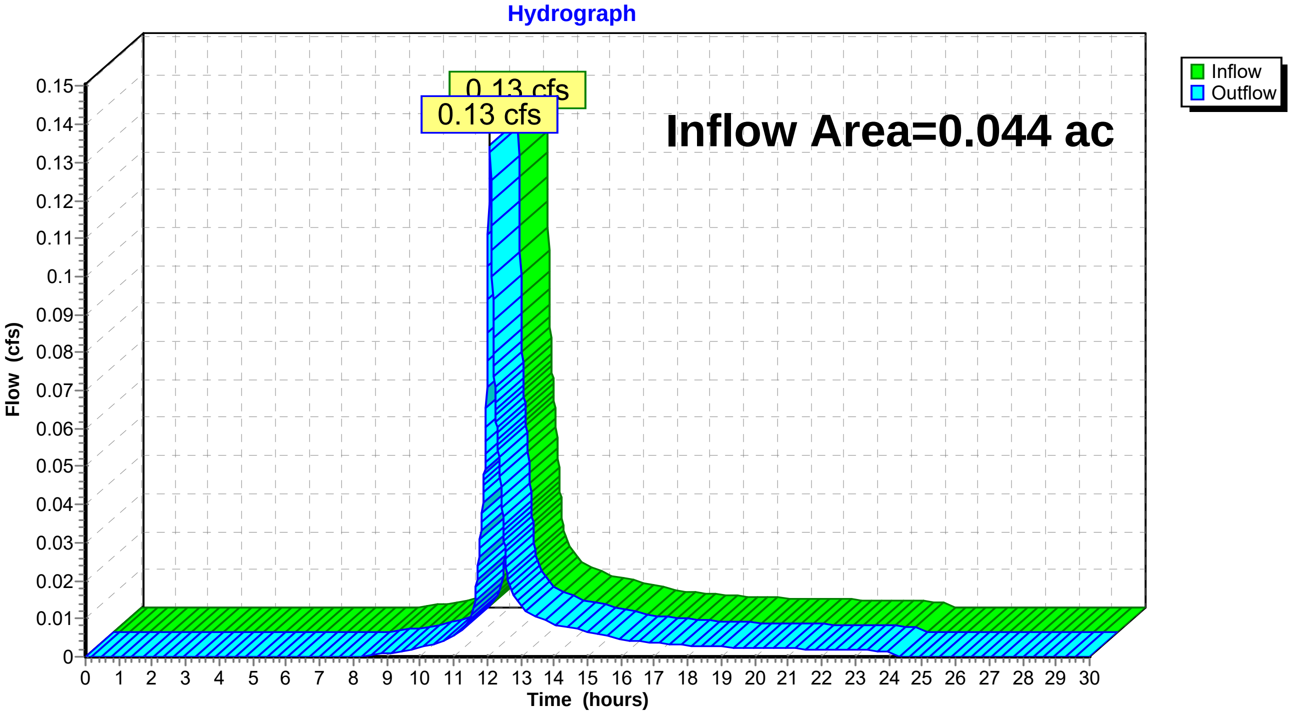
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.05	0.00	0.00
1.50	0.07	0.00	0.00
2.00	0.09	0.00	0.00
2.50	0.12	0.00	0.00
3.00	0.14	0.00	0.00
3.50	0.17	0.00	0.00
4.00	0.20	0.00	0.00
4.50	0.23	0.00	0.00
5.00	0.27	0.00	0.00
5.50	0.30	0.00	0.00
6.00	0.34	0.00	0.00
6.50	0.38	0.00	0.00
7.00	0.42	0.00	0.00
7.50	0.48	0.00	0.00
8.00	0.53	0.00	0.00
8.50	0.60	0.01	0.00
9.00	0.68	0.02	0.00
9.50	0.78	0.04	0.01
10.00	0.89	0.06	0.01
10.50	1.02	0.10	0.02
11.00	1.17	0.16	0.02
11.50	1.40	0.26	0.04
12.00	2.34	0.83	**0.25**
12.50	3.29	1.54	**0.15**
13.00	3.52	1.72	0.06
13.50	3.67	1.85	0.04
14.00	3.80	1.96	0.03
14.50	3.91	2.05	0.03
15.00	4.01	2.13	0.03
15.50	4.09	2.20	0.02
16.00	4.16	2.25	0.02
16.50	4.21	2.30	0.02
17.00	4.27	2.35	0.01
17.50	4.31	2.39	0.01
18.00	4.35	2.42	0.01
18.50	4.39	2.45	0.01
19.00	4.42	2.48	0.01
19.50	4.46	2.51	0.01
20.00	4.49	2.54	0.01
20.50	4.52	2.56	0.01
21.00	4.55	2.59	0.01
21.50	4.57	2.61	0.01
22.00	4.60	2.63	0.01
22.50	4.62	2.66	0.01
23.00	4.65	2.68	0.01
23.50	4.67	2.70	0.01
24.00	**4.69**	**2.71**	0.01
24.50	4.69	2.71	0.00
25.00	4.69	2.71	0.00
25.50	4.69	2.71	0.00
26.00	4.69	2.71	0.00
26.50	4.69	2.71	0.00
27.00	4.69	2.71	0.00
27.50	4.69	2.71	0.00
28.00	4.69	2.71	0.00
28.50	4.69	2.71	0.00
29.00	4.69	2.71	0.00
29.50	4.69	2.71	0.00
30.00	4.69	2.71	0.00

Summary for Reach DP1: Discharge Point #1 (US 9W)

Inflow Area =	0.044 ac, 0.00% Impervious, Inflow Depth = 2.62"	for 10 Year event
Inflow =	0.13 cfs @ 12.09 hrs, Volume=	0.010 af
Outflow =	0.13 cfs @ 12.09 hrs, Volume=	0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach DP1: Discharge Point #1 (US 9W)



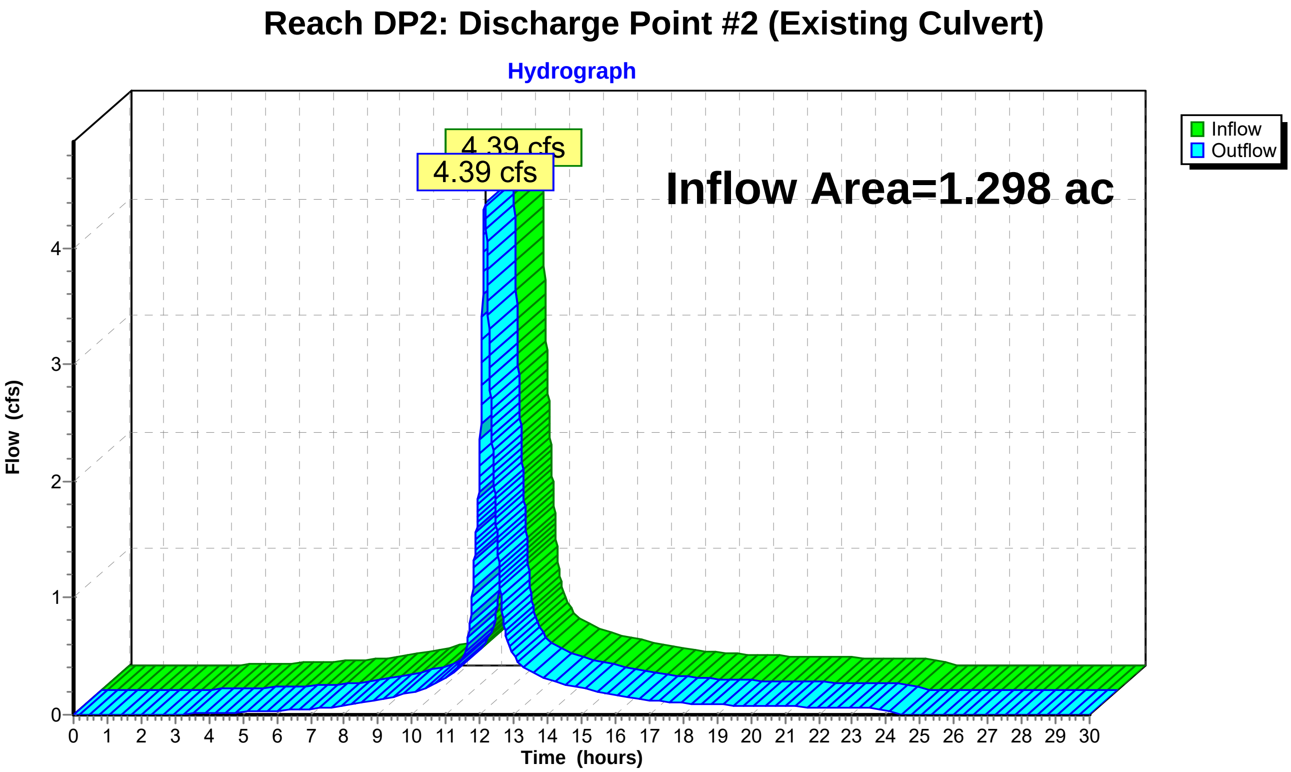
Hydrograph for Reach DP1: Discharge Point #1 (US 9W)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.00		0.00
7.00	0.00		0.00
7.50	0.00		0.00
8.00	0.00		0.00
8.50	0.00		0.00
9.00	0.00		0.00
9.50	0.00		0.00
10.00	0.00		0.00
10.50	0.00		0.00
11.00	0.01		0.01
11.50	0.01		0.01
12.00	**0.08**		**0.08**
12.50	**0.03**		**0.03**
13.00	0.01		0.01
13.50	0.01		0.01
14.00	0.01		0.01
14.50	0.01		0.01
15.00	0.01		0.01
15.50	0.01		0.01
16.00	0.00		0.00
16.50	0.00		0.00
17.00	0.00		0.00
17.50	0.00		0.00
18.00	0.00		0.00
18.50	0.00		0.00
19.00	0.00		0.00
19.50	0.00		0.00
20.00	0.00		0.00
20.50	0.00		0.00
21.00	0.00		0.00
21.50	0.00		0.00
22.00	0.00		0.00
22.50	0.00		0.00
23.00	0.00		0.00
23.50	0.00		0.00
24.00	0.00		0.00
24.50	0.00		0.00
25.00	0.00		0.00
25.50	0.00		0.00
26.00	0.00		0.00
26.50	0.00		0.00
27.00	0.00		0.00
27.50	0.00		0.00
28.00	0.00		0.00
28.50	0.00		0.00
29.00	0.00		0.00
29.50	0.00		0.00
30.00	0.00		0.00

Summary for Reach DP2: Discharge Point #2 (Existing Culvert)

Inflow Area =	1.298 ac, 58.87% Impervious,	Inflow Depth = 3.69"	for 10 Year event	
Inflow =	4.39 cfs @	12.15 hrs, Volume=	0.400 af	
Outflow =	4.39 cfs @	12.15 hrs, Volume=	0.400 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs



Hydrograph for Reach DP2: Discharge Point #2 (Existing Culvert)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.01		0.01
4.00	0.01		0.01
4.50	0.02		0.02
5.00	0.02		0.02
5.50	0.03		0.03
6.00	0.03		0.03
6.50	0.04		0.04
7.00	0.05		0.05
7.50	0.06		0.06
8.00	0.08		0.08
8.50	0.10		0.10
9.00	0.13		0.13
9.50	0.16		0.16
10.00	0.19		0.19
10.50	0.24		0.24
11.00	0.31		0.31
11.50	0.49		0.49
12.00	**2.24**		**2.24**
12.50	**1.57**		**1.57**
13.00	0.51		0.51
13.50	0.37		0.37
14.00	0.31		0.31
14.50	0.26		0.26
15.00	0.23		0.23
15.50	0.20		0.20
16.00	0.16		0.16
16.50	0.14		0.14
17.00	0.13		0.13
17.50	0.11		0.11
18.00	0.10		0.10
18.50	0.09		0.09
19.00	0.09		0.09
19.50	0.08		0.08
20.00	0.08		0.08
20.50	0.07		0.07
21.00	0.07		0.07
21.50	0.07		0.07
22.00	0.06		0.06
22.50	0.06		0.06
23.00	0.06		0.06
23.50	0.05		0.05
24.00	0.05		0.05
24.50	0.00		0.00
25.00	0.00		0.00
25.50	0.00		0.00

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
26.00	0.00		0.00
26.50	0.00		0.00
27.00	0.00		0.00
27.50	0.00		0.00
28.00	0.00		0.00
28.50	0.00		0.00
29.00	0.00		0.00
29.50	0.00		0.00
30.00	0.00		0.00

Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA1: Subcatchment #1 Runoff Area=1,903 sf 0.00% Impervious Runoff Depth=5.83"
Tc=6.0 min CN=80 Runoff=0.29 cfs 0.021 af

Subcatchment DA2: Subcatchment #2 Runoff Area=40,196 sf 81.61% Impervious Runoff Depth=7.62"
Flow Length=128' Tc=12.2 min CN=95 Runoff=6.06 cfs 0.586 af

Subcatchment DA3: Subcatchment #3 Runoff Area=8,907 sf 0.00% Impervious Runoff Depth=5.83"
Flow Length=72' Tc=8.7 min CN=80 Runoff=1.25 cfs 0.099 af

Subcatchment DA4: Subcatchment #2 Runoff Area=7,458 sf 6.64% Impervious Runoff Depth=5.95"
Flow Length=334' Tc=8.6 min CN=81 Runoff=1.07 cfs 0.085 af

Reach DP1: Discharge Point #1 (US 9W) Inflow=0.29 cfs 0.021 af
Outflow=0.29 cfs 0.021 af

Reach DP2: Discharge Point #2 (Existing Culvert) Inflow=8.25 cfs 0.770 af
Outflow=8.25 cfs 0.770 af

Total Runoff Area = 1.342 ac Runoff Volume = 0.791 af Average Runoff Depth = 7.08"
43.04% Pervious = 0.578 ac 56.96% Impervious = 0.764 ac

Summary for Subcatchment DA1: Subcatchment #1

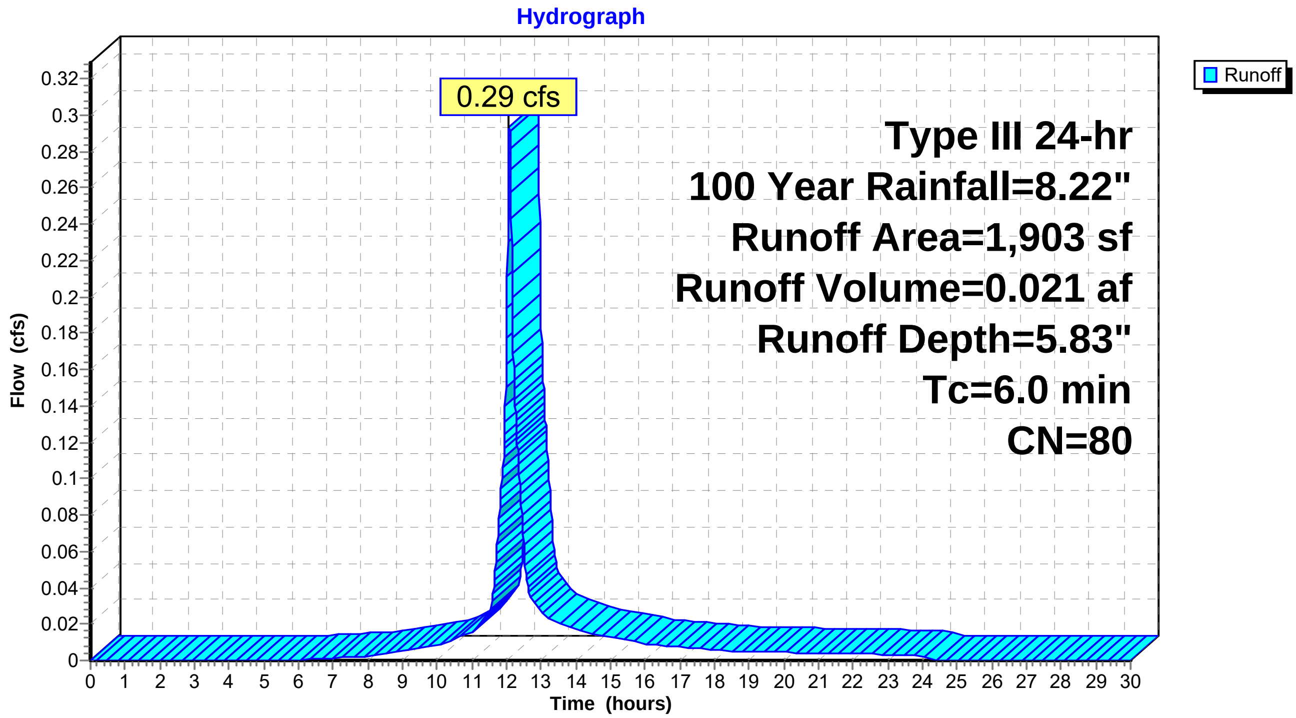
Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.22"

Area (sf)	CN	Description
1,903	80	>75% Grass cover, Good, HSG D
1,903		100.00% Pervious Area

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

Subcatchment DA1: Subcatchment #1



Hydrograph for Subcatchment DA1: Subcatchment #1

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.08	0.00	0.00
1.50	0.12	0.00	0.00
2.00	0.16	0.00	0.00
2.50	0.21	0.00	0.00
3.00	0.25	0.00	0.00
3.50	0.30	0.00	0.00
4.00	0.35	0.00	0.00
4.50	0.41	0.00	0.00
5.00	0.47	0.00	0.00
5.50	0.53	0.00	0.00
6.00	0.59	0.00	0.00
6.50	0.66	0.01	0.00
7.00	0.74	0.02	0.00
7.50	0.84	0.04	0.00
8.00	0.94	0.07	0.00
8.50	1.06	0.10	0.00
9.00	1.20	0.15	0.00
9.50	1.36	0.22	0.01
10.00	1.55	0.31	0.01
10.50	1.78	0.43	0.01
11.00	2.06	0.60	0.02
11.50	2.45	0.85	0.03
12.00	4.11	2.13	**0.18**
12.50	5.77	3.57	**0.06**
13.00	6.16	3.93	0.03
13.50	6.44	4.18	0.02
14.00	6.67	4.39	0.02
14.50	6.86	4.56	0.01
15.00	7.02	4.71	0.01
15.50	7.16	4.85	0.01
16.00	7.28	4.96	0.01
16.50	7.38	5.05	0.01
17.00	7.48	5.14	0.01
17.50	7.56	5.21	0.01
18.00	7.63	5.28	0.01
18.50	7.69	5.34	0.01
19.00	7.75	5.39	0.00
19.50	7.81	5.45	0.00
20.00	7.87	5.50	0.00
20.50	7.92	5.55	0.00
21.00	7.97	5.60	0.00
21.50	8.02	5.64	0.00
22.00	8.06	5.68	0.00
22.50	8.10	5.72	0.00
23.00	8.15	5.76	0.00
23.50	8.18	5.80	0.00
24.00	**8.22**	**5.83**	0.00
24.50	8.22	5.83	0.00
25.00	8.22	5.83	0.00
25.50	8.22	5.83	0.00
26.00	8.22	5.83	0.00
26.50	8.22	5.83	0.00
27.00	8.22	5.83	0.00
27.50	8.22	5.83	0.00
28.00	8.22	5.83	0.00
28.50	8.22	5.83	0.00
29.00	8.22	5.83	0.00
29.50	8.22	5.83	0.00
30.00	8.22	5.83	0.00

Summary for Subcatchment DA2: Subcatchment #2

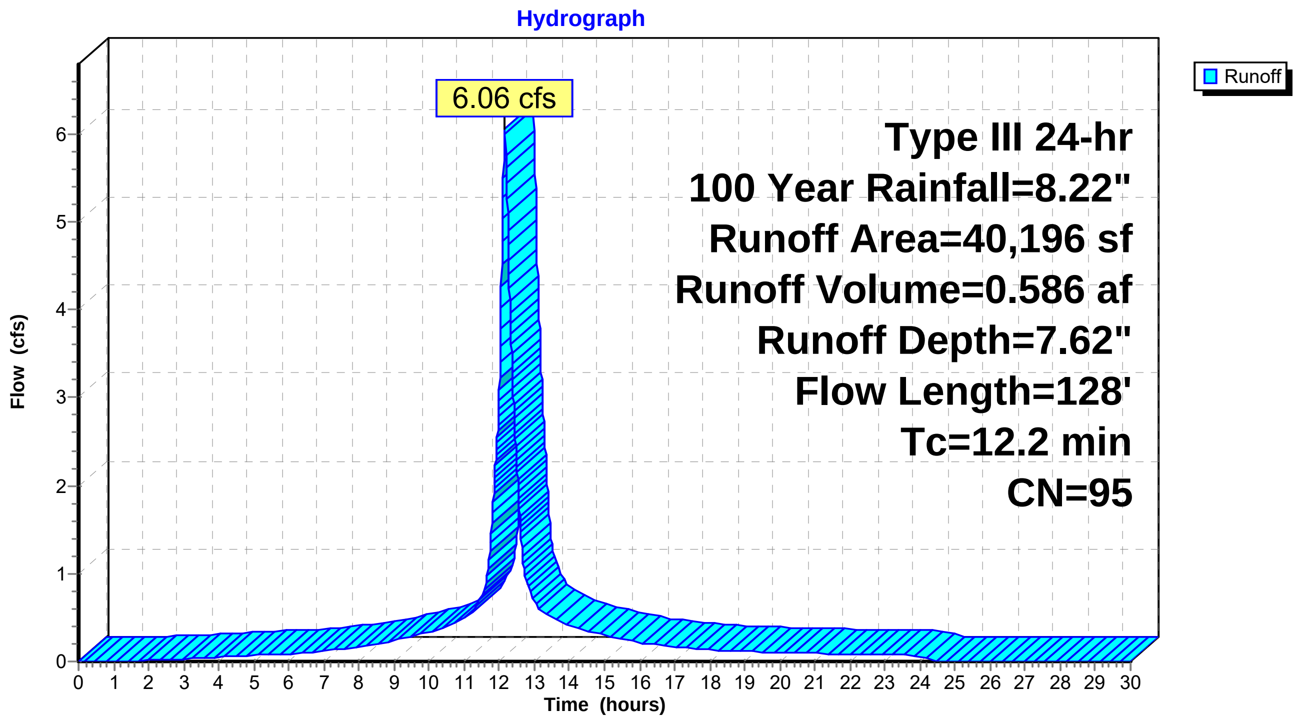
Runoff = 6.06 cfs @ 12.16 hrs, Volume= 0.586 af, Depth= 7.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.22"

Area (sf)	CN	Description
32,805	98	Paved parking, HSG D
7,391	80	>75% Grass cover, Good, HSG D
40,196	95	Weighted Average
7,391		18.39% Pervious Area
32,805		81.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	72	0.0250	0.11		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
0.5	28	0.0200	0.94		**Sheet Flow, Sheet Flow 2** Smooth surfaces n= 0.011 P2= 2.48"
0.3	28	0.0050	1.44		**Shallow Concentrated Flow, Shallow Concnetrated Flow 1** Paved Kv= 20.3 fps
12.2	128	Total			

Subcatchment DA2: Subcatchment #2



Hydrograph for Subcatchment DA2: Subcatchment #2

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.08	0.00	0.00
1.50	0.12	0.00	0.00
2.00	0.16	0.01	0.01
2.50	0.21	0.02	0.02
3.00	0.25	0.03	0.03
3.50	0.30	0.05	0.04
4.00	0.35	0.08	0.05
4.50	0.41	0.11	0.06
5.00	0.47	0.15	0.07
5.50	0.53	0.19	0.08
6.00	0.59	0.23	0.09
6.50	0.66	0.29	0.10
7.00	0.74	0.35	0.12
7.50	0.84	0.42	0.14
8.00	0.94	0.51	0.16
8.50	1.06	0.61	0.20
9.00	1.20	0.74	0.24
9.50	1.36	0.89	0.28
10.00	1.55	1.06	0.33
10.50	1.78	1.27	0.41
11.00	2.06	1.54	0.50
11.50	2.45	1.91	0.75
12.00	4.11	3.54	**3.10**
12.50	5.77	5.18	**2.22**
13.00	6.16	5.58	0.69
13.50	6.44	5.85	0.50
14.00	6.67	6.07	0.41
14.50	6.86	6.26	0.35
15.00	7.02	6.43	0.30
15.50	7.16	6.57	0.26
16.00	7.28	6.69	0.21
16.50	7.38	6.79	0.19
17.00	7.48	6.88	0.17
17.50	7.56	6.96	0.15
18.00	7.63	7.03	0.13
18.50	7.69	7.09	0.12
19.00	7.75	7.16	0.11
19.50	7.81	7.21	0.11
20.00	7.87	7.27	0.10
20.50	7.92	7.32	0.10
21.00	7.97	7.37	0.09
21.50	8.02	7.42	0.09
22.00	8.06	7.46	0.08
22.50	8.10	7.51	0.08
23.00	8.15	7.55	0.07
23.50	8.18	7.58	0.07
24.00	**8.22**	**7.62**	0.07
24.50	8.22	7.62	0.00
25.00	8.22	7.62	0.00
25.50	8.22	7.62	0.00
26.00	8.22	7.62	0.00
26.50	8.22	7.62	0.00
27.00	8.22	7.62	0.00
27.50	8.22	7.62	0.00
28.00	8.22	7.62	0.00
28.50	8.22	7.62	0.00
29.00	8.22	7.62	0.00
29.50	8.22	7.62	0.00
30.00	8.22	7.62	0.00

Summary for Subcatchment DA3: Subcatchment #3

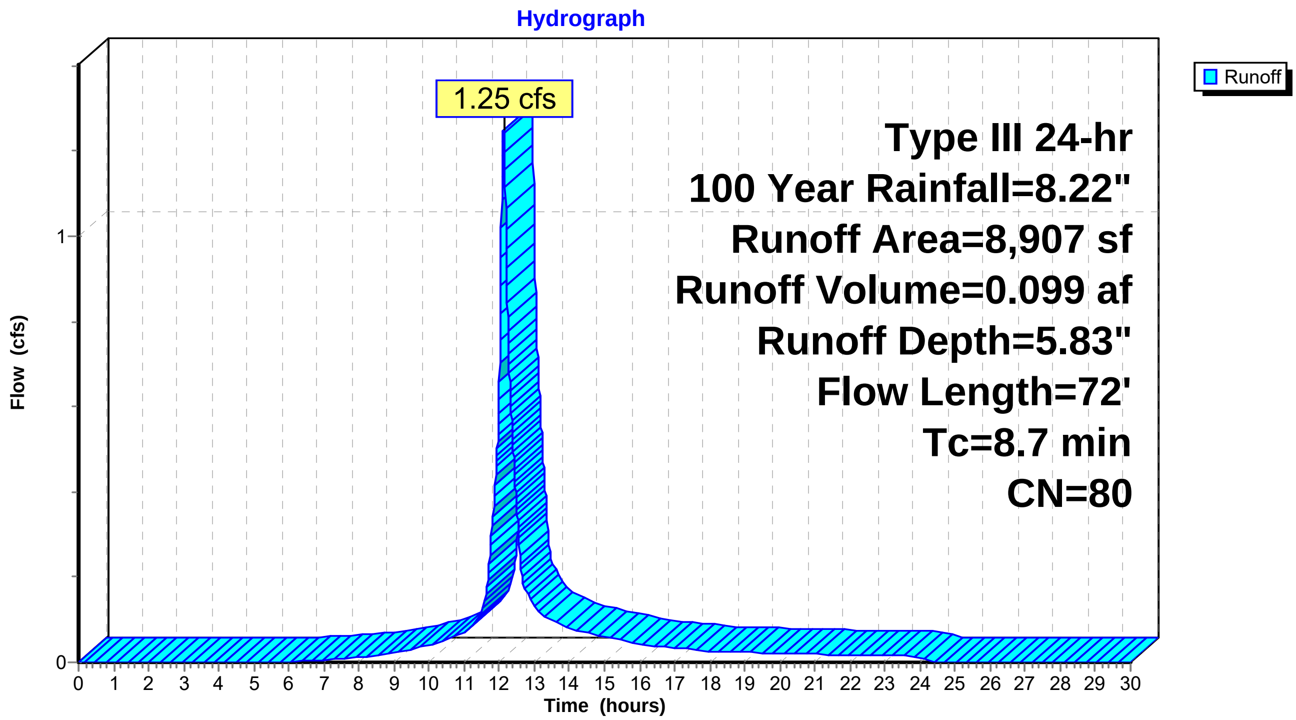
Runoff = 1.25 cfs @ 12.12 hrs, Volume= 0.099 af, Depth= 5.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.22"

Area (sf)	CN	Description
8,907	80	>75% Grass cover, Good, HSG D
8,907		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	44	0.0550	0.13		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
3.1	28	0.1000	0.15		**Sheet Flow, Sheet Flow 2** Grass: Dense n= 0.240 P2= 2.48"
8.7	72	Total			

Subcatchment DA3: Subcatchment #3



Hydrograph for Subcatchment DA3: Subcatchment #3

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.08	0.00	0.00
1.50	0.12	0.00	0.00
2.00	0.16	0.00	0.00
2.50	0.21	0.00	0.00
3.00	0.25	0.00	0.00
3.50	0.30	0.00	0.00
4.00	0.35	0.00	0.00
4.50	0.41	0.00	0.00
5.00	0.47	0.00	0.00
5.50	0.53	0.00	0.00
6.00	0.59	0.00	0.00
6.50	0.66	0.01	0.00
7.00	0.74	0.02	0.01
7.50	0.84	0.04	0.01
8.00	0.94	0.07	0.01
8.50	1.06	0.10	0.02
9.00	1.20	0.15	0.02
9.50	1.36	0.22	0.03
10.00	1.55	0.31	0.04
10.50	1.78	0.43	0.05
11.00	2.06	0.60	0.07
11.50	2.45	0.85	0.12
12.00	4.11	2.13	**0.66**
12.50	5.77	3.57	**0.36**
13.00	6.16	3.93	0.13
13.50	6.44	4.18	0.10
14.00	6.67	4.39	0.08
14.50	6.86	4.56	0.07
15.00	7.02	4.71	0.06
15.50	7.16	4.85	0.05
16.00	7.28	4.96	0.04
16.50	7.38	5.05	0.04
17.00	7.48	5.14	0.03
17.50	7.56	5.21	0.03
18.00	7.63	5.28	0.03
18.50	7.69	5.34	0.02
19.00	7.75	5.39	0.02
19.50	7.81	5.45	0.02
20.00	7.87	5.50	0.02
20.50	7.92	5.55	0.02
21.00	7.97	5.60	0.02
21.50	8.02	5.64	0.02
22.00	8.06	5.68	0.02
22.50	8.10	5.72	0.02
23.00	8.15	5.76	0.02
23.50	8.18	5.80	0.01
24.00	**8.22**	**5.83**	0.01
24.50	8.22	5.83	0.00
25.00	8.22	5.83	0.00
25.50	8.22	5.83	0.00
26.00	8.22	5.83	0.00
26.50	8.22	5.83	0.00
27.00	8.22	5.83	0.00
27.50	8.22	5.83	0.00
28.00	8.22	5.83	0.00
28.50	8.22	5.83	0.00
29.00	8.22	5.83	0.00
29.50	8.22	5.83	0.00
30.00	8.22	5.83	0.00

Summary for Subcatchment DA4: Subcatchment #2

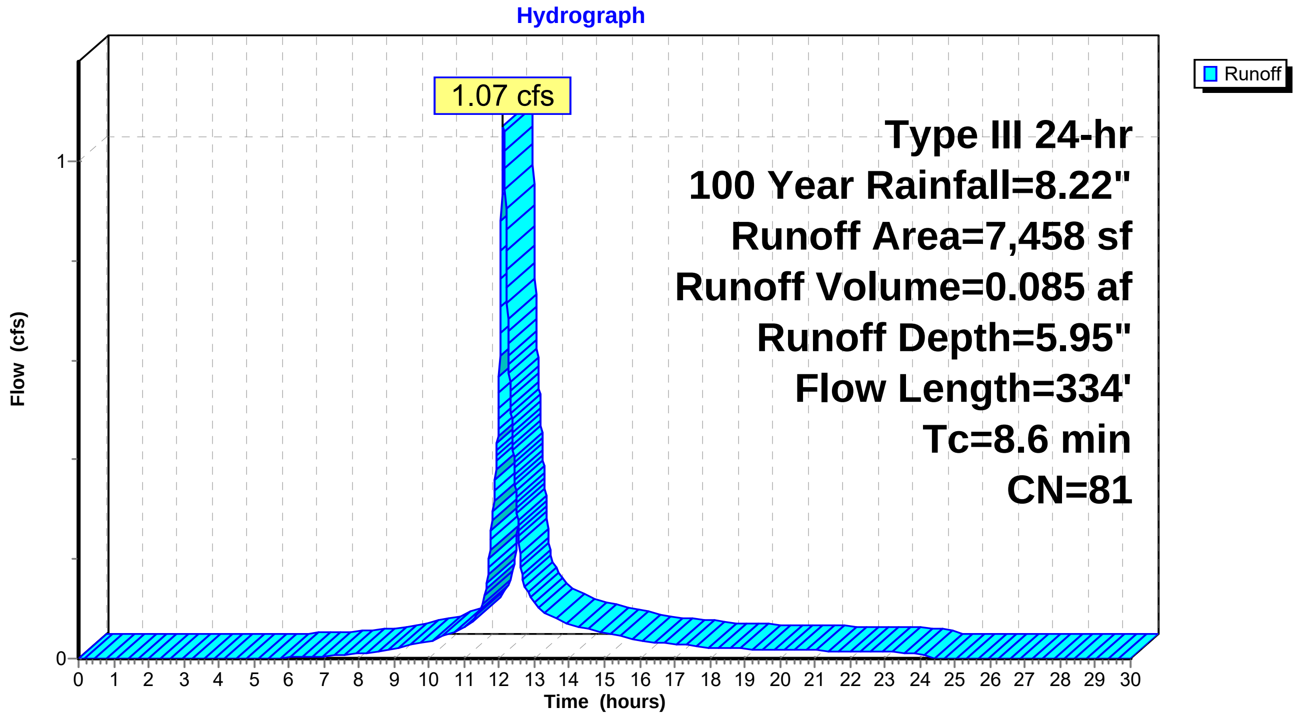
Runoff = 1.07 cfs @ 12.12 hrs, Volume= 0.085 af, Depth= 5.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.22"

Area (sf)	CN	Description
495	98	Paved parking, HSG D
6,963	80	>75% Grass cover, Good, HSG D
7,458	81	Weighted Average
6,963		93.36% Pervious Area
495		6.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	56	0.0480	0.13		**Sheet Flow, Sheet Flow 1** Grass: Dense n= 0.240 P2= 2.48"
0.7	158	0.0300	3.52		**Shallow Concentrated Flow, Shallow Concnetrated Flow 1** Paved Kv= 20.3 fps
0.0	7	0.3700	4.26		**Shallow Concentrated Flow, Shallow Concentrated Flow 2** Short Grass Pasture Kv= 7.0 fps
0.7	113	0.0060	2.63	11.85	**Channel Flow, Channel 1** Area= 4.5 sf Perim= 12.6' r= 0.36' n= 0.022 Earth, clean & straight
8.6	334	Total			

Subcatchment DA4: Subcatchment #2



Hydrograph for Subcatchment DA4: Subcatchment #2

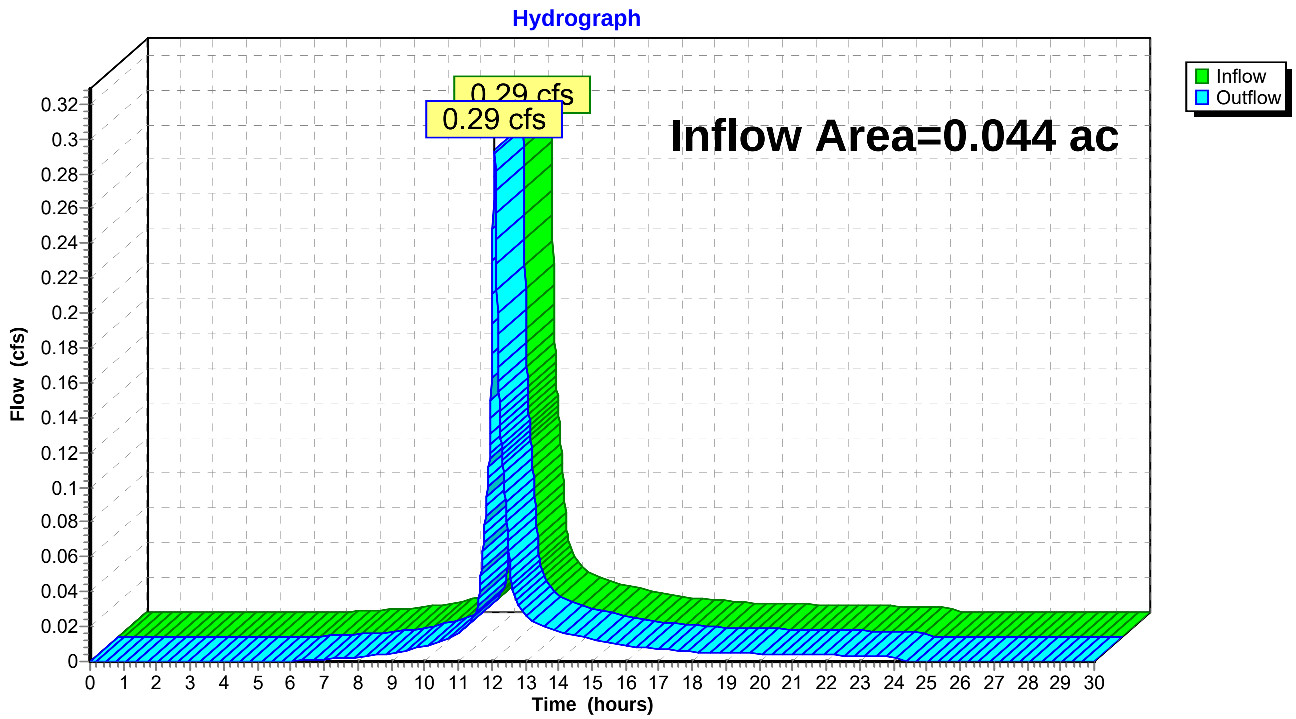
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.08	0.00	0.00
1.50	0.12	0.00	0.00
2.00	0.16	0.00	0.00
2.50	0.21	0.00	0.00
3.00	0.25	0.00	0.00
3.50	0.30	0.00	0.00
4.00	0.35	0.00	0.00
4.50	0.41	0.00	0.00
5.00	0.47	0.00	0.00
5.50	0.53	0.00	0.00
6.00	0.59	0.01	0.00
6.50	0.66	0.01	0.00
7.00	0.74	0.03	0.01
7.50	0.84	0.05	0.01
8.00	0.94	0.08	0.01
8.50	1.06	0.12	0.01
9.00	1.20	0.17	0.02
9.50	1.36	0.25	0.03
10.00	1.55	0.34	0.03
10.50	1.78	0.47	0.05
11.00	2.06	0.64	0.06
11.50	2.45	0.91	0.10
12.00	4.11	2.21	**0.57**
12.50	5.77	3.68	**0.30**
13.00	6.16	4.03	0.11
13.50	6.44	4.29	0.08
14.00	6.67	4.50	0.07
14.50	6.86	4.67	0.06
15.00	7.02	4.83	0.05
15.50	7.16	4.96	0.04
16.00	7.28	5.07	0.04
16.50	7.38	5.16	0.03
17.00	7.48	5.25	0.03
17.50	7.56	5.33	0.03
18.00	7.63	5.39	0.02
18.50	7.69	5.45	0.02
19.00	7.75	5.51	0.02
19.50	7.81	5.56	0.02
20.00	7.87	5.62	0.02
20.50	7.92	5.67	0.02
21.00	7.97	5.71	0.02
21.50	8.02	5.76	0.02
22.00	8.06	5.80	0.01
22.50	8.10	5.84	0.01
23.00	8.15	5.88	0.01
23.50	8.18	5.92	0.01
24.00	**8.22**	**5.95**	0.01
24.50	8.22	5.95	0.00
25.00	8.22	5.95	0.00
25.50	8.22	5.95	0.00
26.00	8.22	5.95	0.00
26.50	8.22	5.95	0.00
27.00	8.22	5.95	0.00
27.50	8.22	5.95	0.00
28.00	8.22	5.95	0.00
28.50	8.22	5.95	0.00
29.00	8.22	5.95	0.00
29.50	8.22	5.95	0.00
30.00	8.22	5.95	0.00

Summary for Reach DP1: Discharge Point #1 (US 9W)

Inflow Area =	0.044 ac,	0.00% Impervious,	Inflow Depth = 5.83"	for 100 Year event	
Inflow =	0.29 cfs @	12.09 hrs,	Volume=	0.021 af	
Outflow =	0.29 cfs @	12.09 hrs,	Volume=	0.021 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Reach DP1: Discharge Point #1 (US 9W)



Hydrograph for Reach DP1: Discharge Point #1 (US 9W)

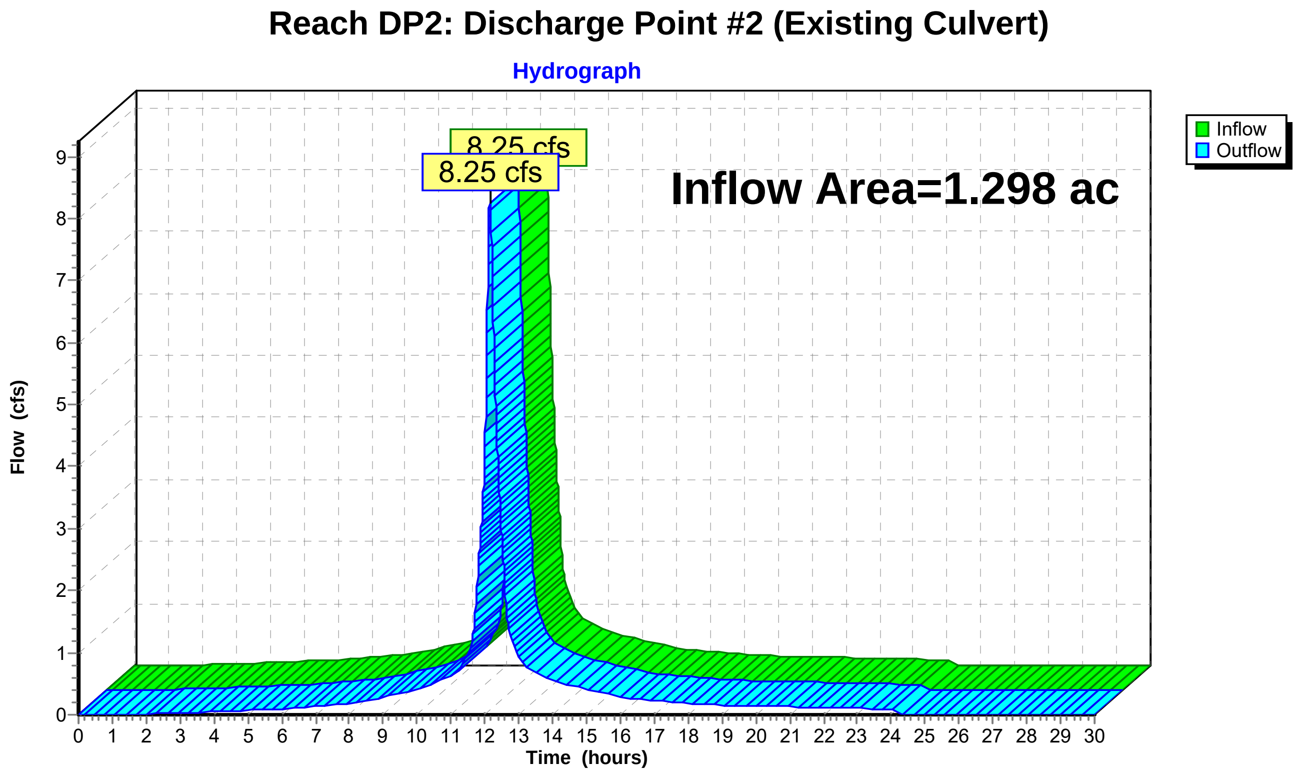
Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.00		0.00
2.50	0.00		0.00
3.00	0.00		0.00
3.50	0.00		0.00
4.00	0.00		0.00
4.50	0.00		0.00
5.00	0.00		0.00
5.50	0.00		0.00
6.00	0.00		0.00
6.50	0.00		0.00
7.00	0.00		0.00
7.50	0.00		0.00
8.00	0.00		0.00
8.50	0.00		0.00
9.00	0.00		0.00
9.50	0.01		0.01
10.00	0.01		0.01
10.50	0.01		0.01
11.00	0.02		0.02
11.50	0.03		0.03
12.00	**0.18**		**0.18**
12.50	**0.06**		**0.06**
13.00	0.03		0.03
13.50	0.02		0.02
14.00	0.02		0.02
14.50	0.01		0.01
15.00	0.01		0.01
15.50	0.01		0.01
16.00	0.01		0.01
16.50	0.01		0.01
17.00	0.01		0.01
17.50	0.01		0.01
18.00	0.01		0.01
18.50	0.01		0.01
19.00	0.00		0.00
19.50	0.00		0.00
20.00	0.00		0.00
20.50	0.00		0.00
21.00	0.00		0.00
21.50	0.00		0.00
22.00	0.00		0.00
22.50	0.00		0.00
23.00	0.00		0.00
23.50	0.00		0.00
24.00	0.00		0.00
24.50	0.00		0.00
25.00	0.00		0.00
25.50	0.00		0.00

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
26.00	0.00		0.00
26.50	0.00		0.00
27.00	0.00		0.00
27.50	0.00		0.00
28.00	0.00		0.00
28.50	0.00		0.00
29.00	0.00		0.00
29.50	0.00		0.00
30.00	0.00		0.00

Summary for Reach DP2: Discharge Point #2 (Existing Culvert)

Inflow Area =	1.298 ac, 58.87% Impervious, Inflow Depth = 7.12"			for 100 Year event
Inflow =	8.25 cfs @	12.15 hrs, Volume=	0.770 af	
Outflow =	8.25 cfs @	12.15 hrs, Volume=	0.770 af, Atten= 0%, Lag= 0.0 min	

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs



Hydrograph for Reach DP2: Discharge Point #2 (Existing Culvert)

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
0.00	0.00		0.00
0.50	0.00		0.00
1.00	0.00		0.00
1.50	0.00		0.00
2.00	0.01		0.01
2.50	0.02		0.02
3.00	0.03		0.03
3.50	0.04		0.04
4.00	0.05		0.05
4.50	0.06		0.06
5.00	0.07		0.07
5.50	0.08		0.08
6.00	0.09		0.09
6.50	0.11		0.11
7.00	0.13		0.13
7.50	0.16		0.16
8.00	0.18		0.18
8.50	0.23		0.23
9.00	0.28		0.28
9.50	0.34		0.34
10.00	0.40		0.40
10.50	0.51		0.51
11.00	0.63		0.63
11.50	0.97		0.97
12.00	**4.32**		**4.32**
12.50	**2.88**		**2.88**
13.00	0.93		0.93
13.50	0.68		0.68
14.00	0.56		0.56
14.50	0.47		0.47
15.00	0.41		0.41
15.50	0.35		0.35
16.00	0.29		0.29
16.50	0.26		0.26
17.00	0.23		0.23
17.50	0.20		0.20
18.00	0.18		0.18
18.50	0.16		0.16
19.00	0.16		0.16
19.50	0.15		0.15
20.00	0.14		0.14
20.50	0.13		0.13
21.00	0.13		0.13
21.50	0.12		0.12
22.00	0.12		0.12
22.50	0.11		0.11
23.00	0.10		0.10
23.50	0.10		0.10
24.00	0.09		0.09
24.50	0.00		0.00
25.00	0.00		0.00
25.50	0.00		0.00

Time (hours)	Inflow (cfs)	Elevation (feet)	Outflow (cfs)
26.00	0.00		0.00
26.50	0.00		0.00
27.00	0.00		0.00
27.50	0.00		0.00
28.00	0.00		0.00
28.50	0.00		0.00
29.00	0.00		0.00
29.50	0.00		0.00
30.00	0.00		0.00

Exhibit D – Drainage Calculations

.1 Closed Drainage System Expected Flow Calculations

STORM DRAINAGE
Highland

By: S. Kitchner

Date: 4/27/2021

Revised: ___________

PIPE LINE DESIGNED FOR: 10-YEAR DRAINAGE DESIGN

ENTER CATCH BASIN LINE #'s HERE:	FOR C.B. LINE CB1-HDS	FOR C.B. LINE CB2-MH1	FOR C.B. LINE CB3-MH1	FOR C.B. LINE MH1-MH2	FOR C.B. LINE MH2-HDS	FOR C.B. LINE HDS-MH3	FOR C.B. LINE CB2-HDS	FOR C.B. LINE	FOR C.B. LINE	FOR C.B. LINE	FOR C.B. LINE	FOR C.B. LINE
AREA	0.50	0.04	0.39	0.43	0.43	0.93	0.07					
LENGTH (ft.)	77	19	19	35	84	2	12					
Qa, RUNOFF (cfs.)	2.04	0.12	1.41	1.53	1.53	3.50	0.37					
D, PIPE DIAMETER (in.)	12	12	12	12	12	15	12					
A, PIPE AREA (sf.)	0.785	0.785	0.785	0.785	0.785	1.227	0.785	0.000	0.000	0.000	0.000	0.000
n, FRICTIONAL PIPE VALUE	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
s, PIPE SLOPE	0.010	0.010	0.0370	0.005	0.005	0.0050	0.060					
s^1/2 =	0.1000	0.1000	0.1924	0.0707	0.0707	0.0707	0.2449	0.0000	0.0000	0.0000	0.0000	0.0000
r, WETTED PERIMETER (ft.)	0.25	0.25	0.25	0.25	0.25	0.3125	0.25	0	0	0	0	0
r^2/3 =	0.397	0.397	0.397	0.397	0.397	0.461	0.397	0.000	0.000	0.000	0.000	0.000
Qc, PIPE CAPACITY (cfs.)												
(A)(1.486/n)(r^2/3)(s^1/2) =	3.858	3.858	7.421	2.728	2.728	4.946	9.450	0.000	0.000	0.000	0.000	0.000
....THIS SIZE PIPE IS ACCEPTABLE	12	12	12	12	12	15	12	0	0	0	0	0
....THIS SIZE PIPE HAS FAILED	0	0	0	0	0	0	0	0	0	0	0	0
PIPE VELOCITY												
(1.486/n)(r^2/3)(s^1/2) =	4.914	4.914	9.453	3.475	3.475	4.032	12.038	0.000	0.000	0.000	0.000	0.000

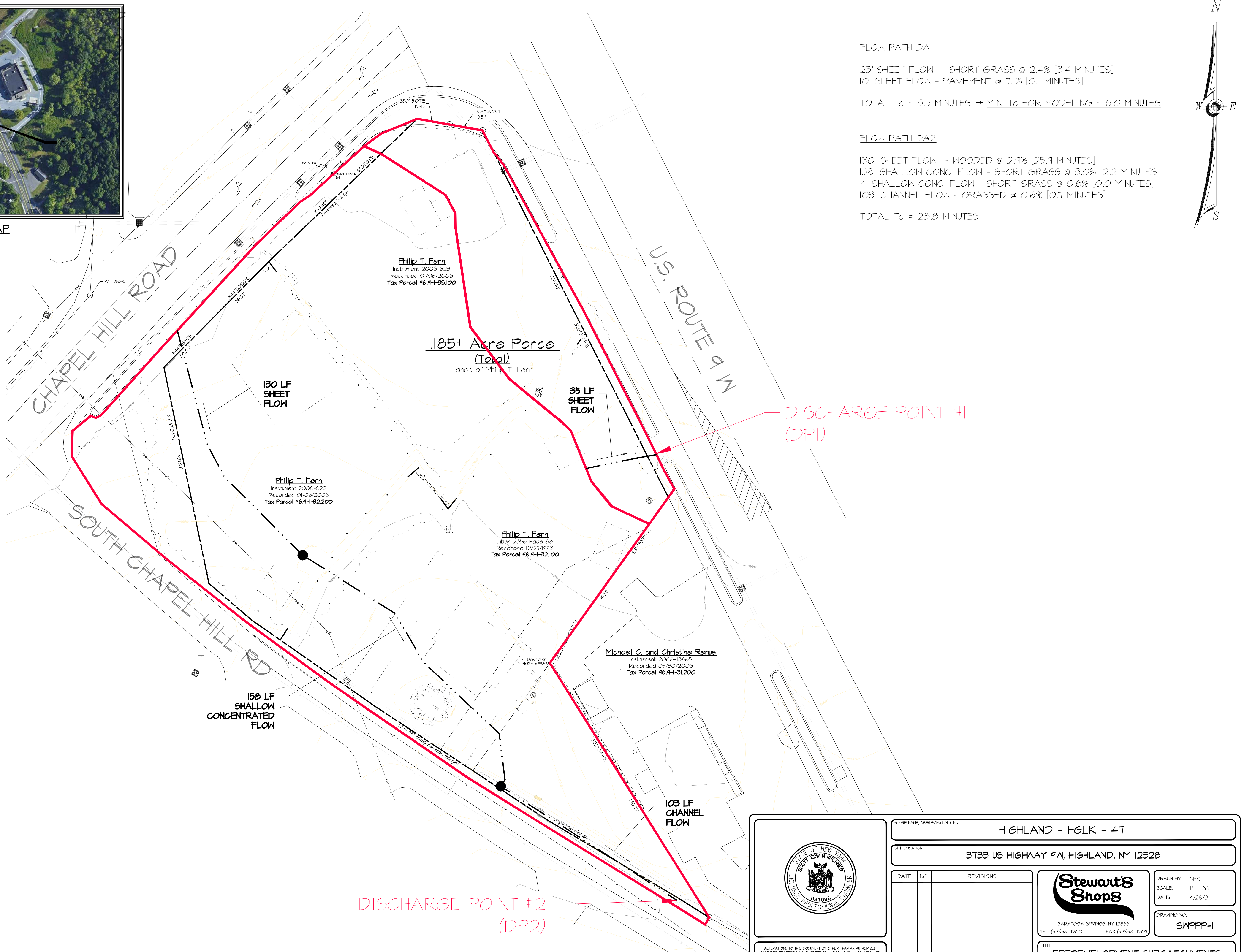
Exhibit E – Maps

.1 Pre Development Subcatchments

.2 Post Development Subcatchments

.3 Catch Basin Subcatchments

SITE VICINITY MAP
SCALE: 1" = 200'



FLOW PATH DA1

25' SHEET FLOW - SHORT GRASS @ 2.4% [3.4 MINUTES]
10' SHEET FLOW - PAVEMENT @ 7.1% [0.1 MINUTES]

TOTAL Tc = 3.5 MINUTES → MIN. Tc FOR MODELING = 6.0 MINUTES

FLOW PATH DA2

130' SHEET FLOW - WOODED @ 2.9% [25.9 MINUTES]
158' SHALLOW CONC. FLOW - SHORT GRASS @ 3.0% [2.2 MINUTES]
4' SHALLOW CONC. FLOW - SHORT GRASS @ 0.6% [0.0 MINUTES]
103' CHANNEL FLOW - GRASSED @ 0.6% [0.7 MINUTES]

TOTAL Tc = 28.8 MINUTES

STATE OF NEW YORK · SCOTT EDWIN KITCHNER · LICENSED PROFESSIONAL ENGINEER · 091096

ALTERATIONS TO THIS DOCUMENT BY OTHER THAN AN AUTHORIZED LICENSED PROFESSIONAL ENGINEER IS ILLEGAL AND A VIOLATION OF THE NEW YORK STATE EDUCATION LAW

STORE NAME, ABBREVIATION & NO.: HIGHLAND - HGLK - 471

SITE LOCATION: 3733 US HIGHWAY 9W, HIGHLAND, NY 12528

DATE	NO.	REVISIONS

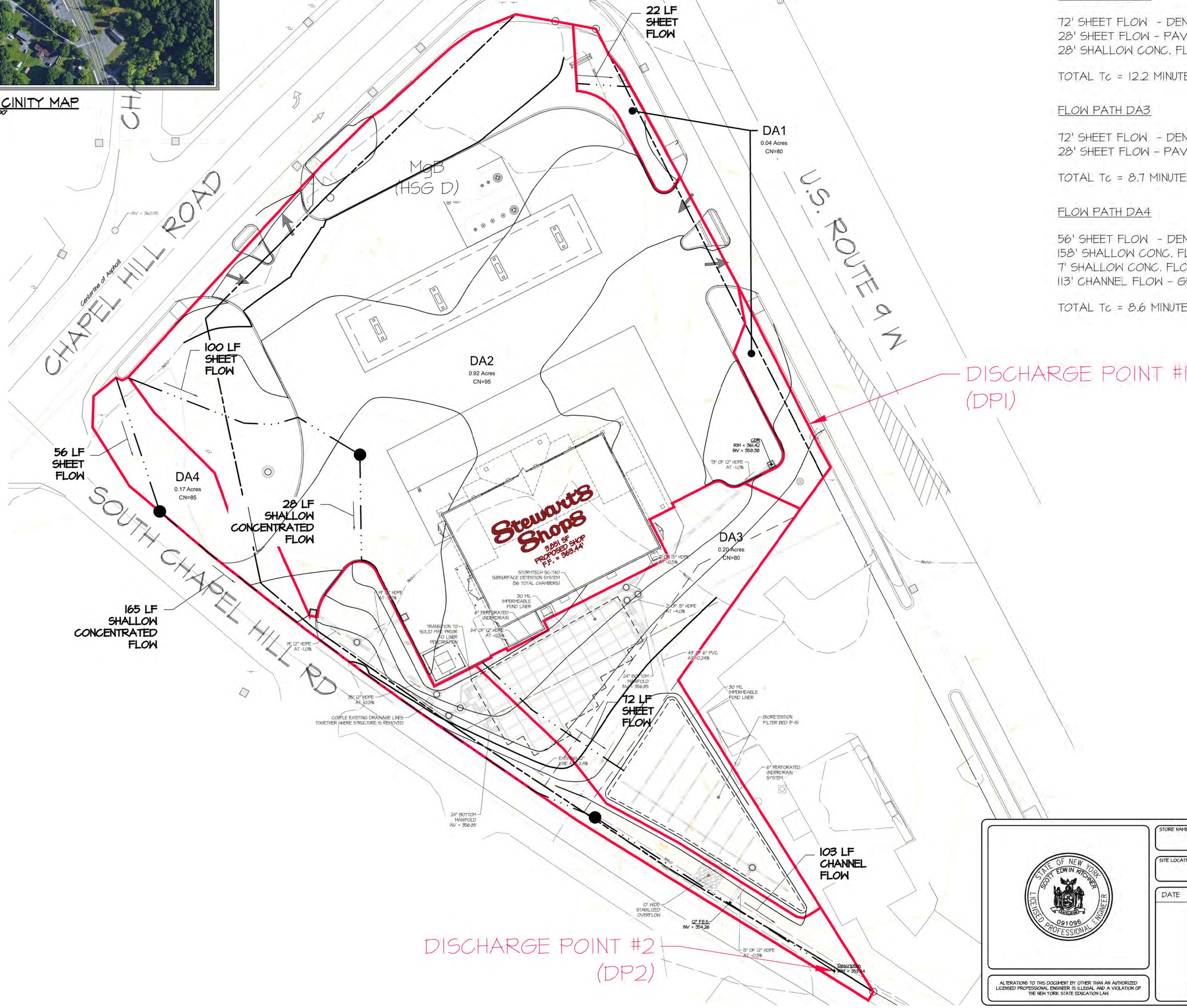
Stewart's Shops
SARATOGA SPRINGS, NY 12866
TEL. (518)581-1200 FAX (518)581-1204

DRAWN BY: SEK
SCALE: 1" = 20'
DATE: 4/26/21

DRAWING NO.: SWPPP-1

TITLE: PREDEVELOPMENT SUBCATCHMENTS

SITE VICINITY MAP
SCALE: 1" = 200'



FLOW PATH DA1

22' SHEET FLOW - DENSE GRASS @ 2.0% [4.8 MINUTES]

TOTAL Tc = 3.5 MINUTES → MIN. Tc FOR MODELING = 6.0 MINUTES

FLOW PATH DA2

72' SHEET FLOW - DENSE GRASS @ 2.5% [11.4 MINUTES]
28' SHEET FLOW - PAVEMENT @ 2.0% [0.5 MINUTES]
28' SHALLOW CONC. FLOW - PAVEMENT @ 0.5% [0.3 MINUTES]

TOTAL Tc = 12.2 MINUTES

FLOW PATH DA3

72' SHEET FLOW - DENSE GRASS @ 2.5% [5.6 MINUTES]
28' SHEET FLOW - PAVEMENT @ 10.0% [3.1 MINUTES]

TOTAL Tc = 8.7 MINUTES

FLOW PATH DA4

56' SHEET FLOW - DENSE GRASS @ 4.8% [7.2 MINUTES]
158' SHALLOW CONC. FLOW - PAVEMENT @ 3.0% [0.7 MINUTES]
7' SHALLOW CONC. FLOW - DENSE GRASS @ 37.0% [0.0 MINUTES]
113' CHANNEL FLOW - GRASS CHANNEL @ 0.6% [0.7 MINUTES]

TOTAL Tc = 8.6 MINUTES

STORE NAME, ABBREVIATION & NO.	HIGHLAND - HGLK - 471
SITE LOCATION	3733 US HIGHWAY 9W, HIGHLAND, NY 12528

STATE OF NEW YORK · SCOTT EDWIN KITCHER · 091096 · LICENSED PROFESSIONAL ENGINEER

ALTERATIONS TO THIS DOCUMENT BY OTHER THAN AN AUTHORIZED LICENSED PROFESSIONAL ENGINEER IS ILLEGAL AND A VIOLATION OF THE NEW YORK STATE EDUCATION LAW

DATE	NO.	REVISIONS

Stewart's Shops
SARATOGA SPRINGS, NY 12866
TEL. (518)581-1200 FAX (518)581-1209

DRAWN BY: SEK
SCALE: AS SHOWN
DATE: 4/26/21

DRAWING NO. SWPPP-2

TITLE: POSTDEVELOPMENT SUBCATCHMENTS

SITE VICINITY MAP
SCALE: 1" = 200'

N
W E
S

FLOW PATH CB1

41' SHEET FLOW - DENSE GRASS @ 2.5% [7.3 MINUTES]
21' SHEET FLOW - PAVEMENTE @ 2.0% [0.4 MINUTES]
154' SHALLOW CONC. FLOW - PAVEMENT @ 2.0% [0.9 MINUTES]

TOTAL Tc = 8.6 MINUTES

FLOW PATH CB2

80' SHEET FLOW - DENSE GRASS @ 3.0% [11.5 MINUTES]
37' SHALLOW CONC. FLOW - PAVEMENT @ 2.0% [0.2 MINUTES]

TOTAL Tc = 11.7 MINUTES

FLOW PATH CB3

72' SHEET FLOW - DENSE GRASS @ 2.5% [11.4 MINUTES]
28' SHEET FLOW - PAVEMENT @ 2.0% [0.5 MINUTES]
28' SHEET FLOW - PAVEMENT @ 0.5% [0.3 MINUTES]

TOTAL Tc = 12.2 MINUTES

STATE OF NEW YORK
SCOTT EDWIN KIRCHNER
091096
LICENSED PROFESSIONAL ENGINEER

STORE NAME, ABBREVIATION & NO.
HIGHLAND - HGLK - 471

SITE LOCATION
3733 US HIGHWAY 9W, HIGHLAND, NY 12528

DATE	NO.	REVISIONS

Stewart's Shops
SARATOGA SPRINGS, NY 12866
TEL. (518)581-1200 FAX (518)581-1209

DRAWN BY: SEK
SCALE: AS SHOWN
DATE: 4/26/21

DRAWING NO.
SWPPP-3

TITLE:
CATCH BASIN SUBCATCHMENTS

Exhibit F – Certifications

.1 Owner/Contractor Certifications

OWNER AND CONTRACTOR'S/SUBCONTRACTOR'S CERTIFICATION

Notice of Intent (NOI) Permitee and General Contractor and Subcontractors shall thoroughly read the Stormwater Pollution Prevention Plan (SWPPP). Each representative of his or her company shall fully understand, based upon their scope of work, that Erosion and Pollution Controls are required for this project and when their individual responsibilities are. The NOI Permitee, General Contractor and all Subcontractors shall sign the "logbook" listed below. If a Subcontractor wishes to NOT sign the logbook, the General Contractor is to obtain the name, company and phone number of this Subcontractor and list the information in the logbook.

1.1 NOI Permittee's Certification

"I hereby certify 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 New York State Pollutant Discharge Elimination System (SPDES) General Permit (GP-0-20-001) for Stormwater Discharges from Construction Activity and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings."

Print Name:______________________ Company Name:______________________

Signature:______________________ Company Address:______________________

Phone #:______________________ ______________________

1.2 General Site Contractor's Contractor and Subcontractor's Certification:

"I hereby certify 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 New York State Pollutant Discharge Elimination System (SPDES) General Permit (GP-0-20-001) for Stormwater Discharges from Construction Activity and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings."

General Site Contractor

Print Name:______________________ Company Name:______________________

Signature:______________________ Company Address:______________________

Phone #:______________________ ______________________

Each Subcontractor to the General Contractor (GC) or contractor responsible for site construction aspects shall list their company responsibility (e.g. Landscaper, Underground Utilities (water or sewer) Installer, Electric Service Installer, Gas Service Installer, Asphalt Pavement Installer, etc.)

Subcontractor to the Site GC (list responsibility)____

Print Name:_____________________________________ Company Name:______________________________

Signature:______________________________________ Phone #:___________________________________

Subcontractor to the Site GC (list responsibility)____

Print Name:_____________________________________ Company Name:______________________________

Signature:______________________________________ Phone #:___________________________________

Subcontractor to the Site GC (list responsibility)____

Print Name:_____________________________________ Company Name:______________________________

Signature:______________________________________ Phone #:___________________________________

Subcontractor to the Site GC (list responsibility)____

Print Name:_____________________________________ Company Name:______________________________

Signature:______________________________________ Phone #:___________________________________

Subcontractor to the Site GC (list responsibility)____

Print Name:_____________________________________ Company Name:______________________________

Signature:______________________________________ Phone #:___________________________________

Subcontractor to the Site GC (list responsibility)____

Print Name:_____________________________________ Company Name:______________________________

Signature:______________________________________ Phone #:___________________________________

For each Subcontractor listed, the affidavit statement in Section 1.2 of this document shall apply.

Subcontractor to the Site GC (list responsibility)____

Print Name:____ Company Name:________________________________

Signature:____ Phone #:_____________________________________

Subcontractor to the Site GC (list responsibility)____

Print Name:____ Company Name:________________________________

Signature:____ Phone #:_____________________________________

Subcontractor to the Site GC (list responsibility)____

Print Name:____ Company Name:________________________________

Signature:____ Phone #:_____________________________________

Subcontractor to the Site GC (list responsibility)____

Print Name:____ Company Name:________________________________

Signature:____ Phone #:_____________________________________

Subcontractor to the Site GC (list responsibility)____

Print Name:____ Company Name:________________________________

Signature:____ Phone #:_____________________________________

Subcontractor to the Site GC (list responsibility)____

Print Name:____ Company Name:________________________________

Signature:____ Phone #:_____________________________________

Subcontractor to the Site GC (list responsibility)____

Print Name:____ Company Name:________________________________

Signature:____ Phone #:_____________________________________

For each Subcontractor listed, the affidavit statement in Section 1.2 of this document shall apply.

1.3 Building Contractor and Subcontractor's Certification (if applicable):

"I hereby certify 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 New York State Pollutant Discharge Elimination System (SPDES) General Permit (GP-0-20-001) for Stormwater Discharges from Construction Activity and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings."

Building Contractor

Print Name:______________________ Company Name:______________________

Signature:______________________ Company Address:______________________

Phone #:______________________ ______________________

Each Subcontractor to the General Contractor (GC) of the building(s) or contractor responsible for building construction aspects shall list their company responsibility (e.g. Electrical, Plumbing, Masonry, Structural, Foundations, etc.)

Subcontractor to the Building GC (list responsibility)______________________

Print Name:______________________ Company Name:______________________

Signature:______________________ Phone #:______________________

Subcontractor to the Building GC (list responsibility)______________________

Print Name:______________________ Company Name:______________________

Signature:______________________ Phone #:______________________

Subcontractor to the Building GC (list responsibility)______________________

Print Name:______________________ Company Name:______________________

Signature:______________________ Phone #:______________________

For each Subcontractor listed, the affidavit statement in Section 1.2 of this document shall apply.

Subcontractor to the Building GC (list responsibility)________________________________

Print Name:______________________________ Company Name:________________________

Signature:_______________________________ Phone #:____________________________

Subcontractor to the Building GC (list responsibility)________________________________

Print Name:______________________________ Company Name:________________________

Signature:_______________________________ Phone #:____________________________

Subcontractor to the Building GC (list responsibility)________________________________

Print Name:______________________________ Company Name:________________________

Signature:_______________________________ Phone #:____________________________

Subcontractor to the Building GC (list responsibility)________________________________

Print Name:______________________________ Company Name:________________________

Signature:_______________________________ Phone #:____________________________

Subcontractor to the Building GC (list responsibility)________________________________

Print Name:______________________________ Company Name:________________________

Signature:_______________________________ Phone #:____________________________

Subcontractor to the Building GC (list responsibility)________________________________

Print Name:______________________________ Company Name:________________________

Signature:_______________________________ Phone #:____________________________

Subcontractor to the Building GC (list responsibility)________________________________

Print Name:______________________________ Company Name:________________________

Signature:_______________________________ Phone #:____________________________

For each Subcontractor listed, the affidavit statement in Section 1.2 of this document shall apply.

<u>Exhibit G – NOI/NOT</u>

.1 Notice of Intent

.2 Notice of Termination

.3 MS4 Acceptance Form

.4 SPDES General Permit GP-0-20-001

.5 SWPPP Inspection Reports

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)
STEWART'S SHOPS

Owner/Operator Contact Person Last Name (NOT CONSULTANT)
RUBADO

Owner/Operator Contact Person First Name
RYAN

Owner/Operator Mailing Address
PO BOX 435

City
SARATOGA SPRINGS

State
NY

Zip
12866 -

Phone (Owner/Operator)
518 5 811 2 0101

Fax (Owner/Operator)
518 5 811 2 0909

Email (Owner/Operator)
rrubado@stewartsshops.com

FED TAX ID
14 1 3236077 (not required for individuals)

6401089828

Project Site Information

Project/Site Name

STEWART'S SHOPS - HIGHLAND

Street Address (NOT P.O. BOX)

3733 US HIGHWAY 94

Side of Street

○ **North** ○ **South** ○ **East** ● **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)

TOWN OF LLOYD

State	Zip	County	DEC Region
NY	12528 -	ULSTER	3

Name of Nearest Cross Street

CHAPEL HILL ROAD

Distance to Nearest Cross Street (Feet)

0

Project In Relation to Cross Street

○ **North** ● **South** ○ **East** ○ **West**

Tax Map Numbers
Section-Block-Parcel

96.9-1-33.100

Tax Map Numbers

96.9-1-32.100

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)
585924	4616561

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**
1.2	1.3	0.5	0.7

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**
0 %	0 %	0 %	100 %

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

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

Start Date 03/07/2022 - **End Date** 12/31/2022

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

Name

UNNAMED TRIBUTARY TO HUDSON RIVER

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?
If no, skip question 13. ○ **Yes** ● **No**

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?

TOWN OF LLOYD

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
STEWART'S SHOPS

Contact Name (Last, Space, First)
KITCHNER, SCOTT E.

Mailing Address
PO BOX 435

City
SARATOGA SPRINGS

State: NY
Zip: 12866 -

Phone: 518-581-2101

Fax: 518-581-2209

Email
skitchner@stewartsshops.com

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: SCOTT

MI: E

Last Name: KITCHNER

Signature

Date: 05/25/2021

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

0.0555 **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.

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

RR Techniques (Area Reduction)	Total Contributing Area (acres)		Total Contributing Impervious Area(acres)
○ 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)	Total Contributing Impervious Area(acres)
○ 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	Total Contributing Impervious Area(acres)
○ Infiltration Trench (I-1)	.
○ Infiltration Basin (I-2)	.
○ Dry Well (I-3)	.
○ Underground Infiltration System (I-4)	.
● Bioretention (F-5)	0 . 70 5 . 73 5 3
○ Dry Swale (O-1)	.

Standard SMPs	Total Contributing Impervious Area(acres)
○ 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

0.0222 **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

0.0008 **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.

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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

0.0333 **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). 0.0555

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	**CPv Provided**
0.000 **acre-feet**	0.0757 **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	**Post-development**
2.778 **CFS**	2.555 **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development	**Post-development**
5.445 **CFS**	4.998 **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

STEWART'S SHOPS

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

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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
RYAN

MI
M

Print Last Name
RUBADO

Owner/Operator Signature

Date
05/05/2021

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: STEWART'S SHOPS
2. Street Address: PO BOX 435
3. City/State/Zip: SARATOGA SPRINGS, NY 12866
4. Contact Person: RYAN RUBADO | 4a.Telephone: 518-581-1201

4b. Contact Person E-Mail: rrubado@stewartsshops.com

II. Project Site Information

5. Project/Site Name: STEWART'S SHOPS - HIGHLAND
6. Street Address: 3733 US HIGHWAY 9W
7. City/Zip: HIGHLAND, NY 12528
8. County: ULSTER

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)?
STEWART'S SHOPS

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? 0.7 ACRES (acres)

11. Is this project subject to the requirements of a regulated, traditional land use control MS4? X□ 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: Ryan Rubado
Title/Position: Project Manager
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: Ryan Rubado
Title/Position: Project Manager
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: Ryan Rubado
Title/Position: Project Manager
Signature: / Date:

(NYS DEC Notice of Termination - January 2015)

New York State 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:	Stewart's Shops
2. Contact Person:	Ryan Rubado
3. Street Address:	PO Box 435
4. City/State/Zip:	Saratoga Springs, NY 12866
II. Project Site Information	
5. Project/Site Name:	Stewart's Shops - Highland
6. Street Address:	3733 US Highway 9W
7. City/State/Zip:	Highland, NY 12528
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 Lloyd
12. MS4 SPDES Permit Identification Number: NYR20A ______________________	
13. Contact Person:	
14. Street Address:	
15. City/State/Zip:	
16. Telephone Number:	

(NYS DEC - MS4 SWPPP Acceptance Form - January 2010)

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s).
Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Additional Information

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

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

Authorized Signature

1-23-20

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 **not** 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*, in writing, 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

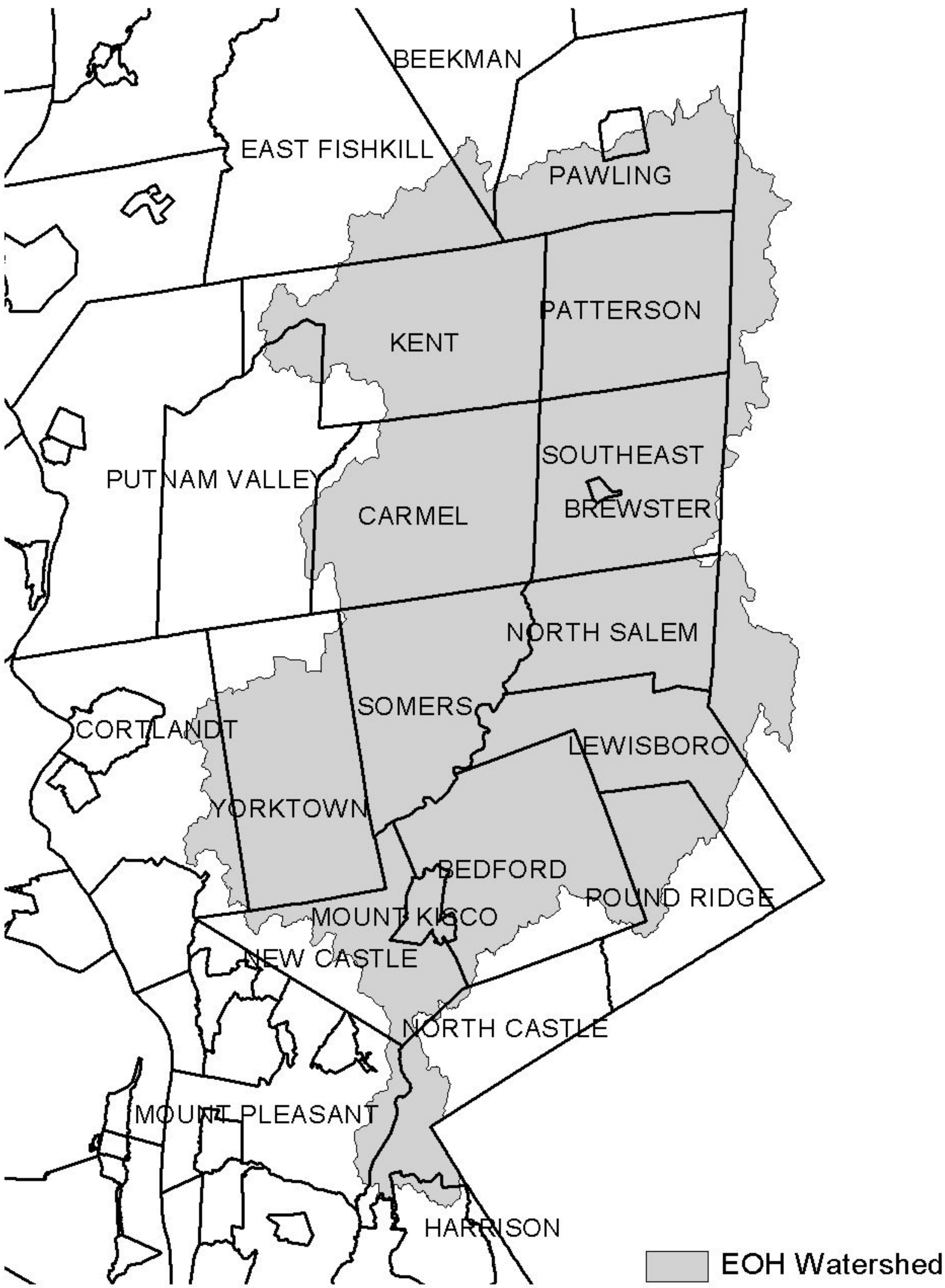


Figure 2 - Onondaga Lake Watershed

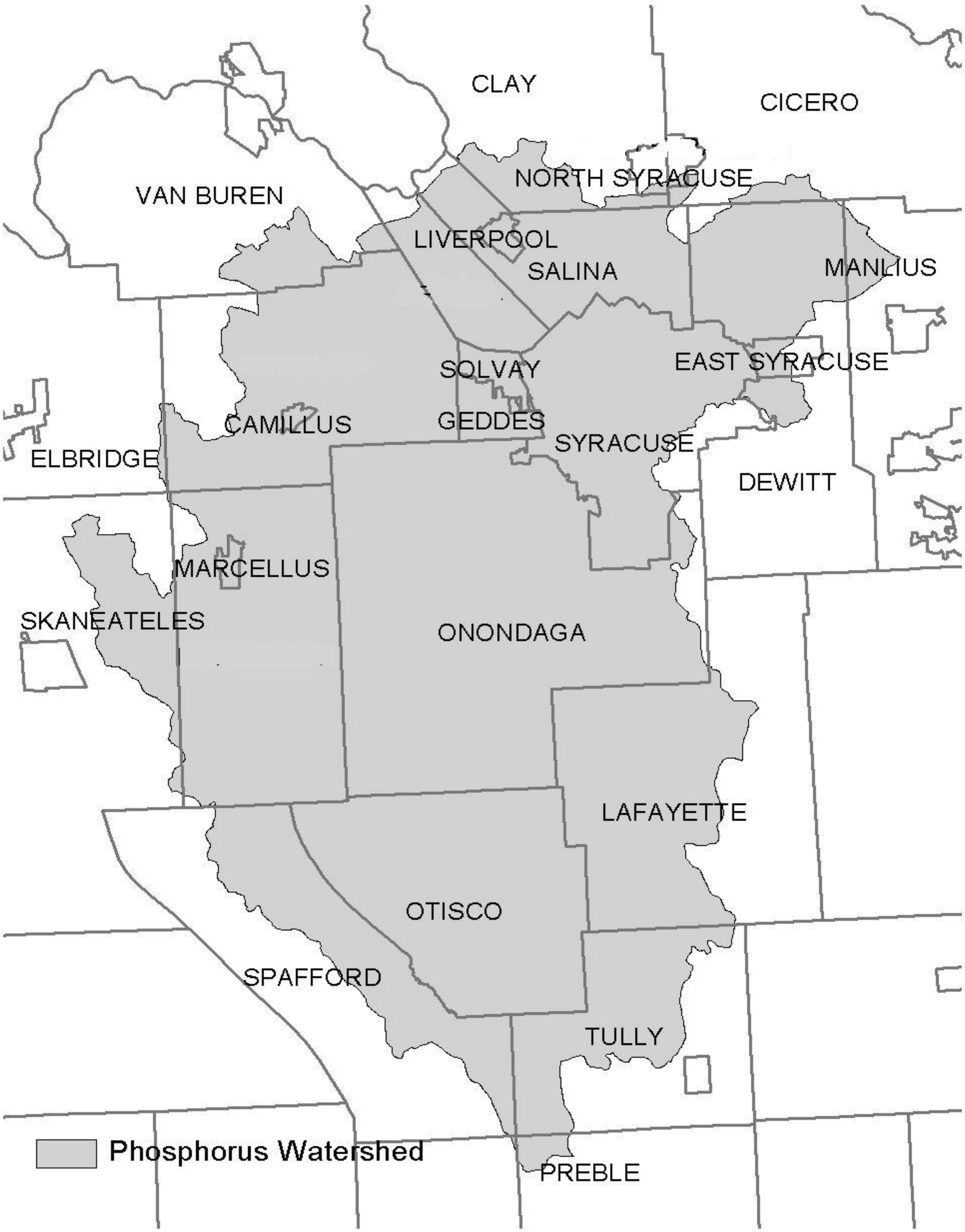


Figure 3 - Greenwood Lake Watershed

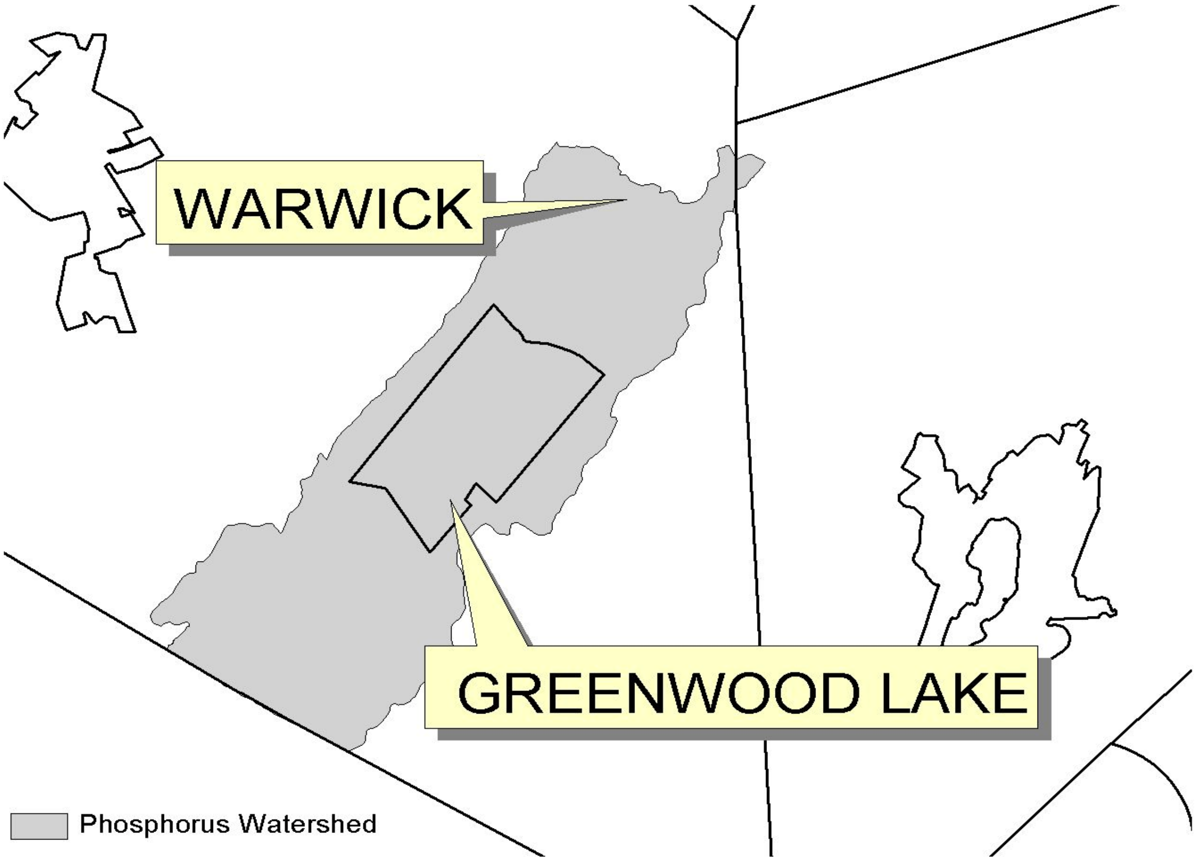


Figure 4 - Oscawana Lake Watershed

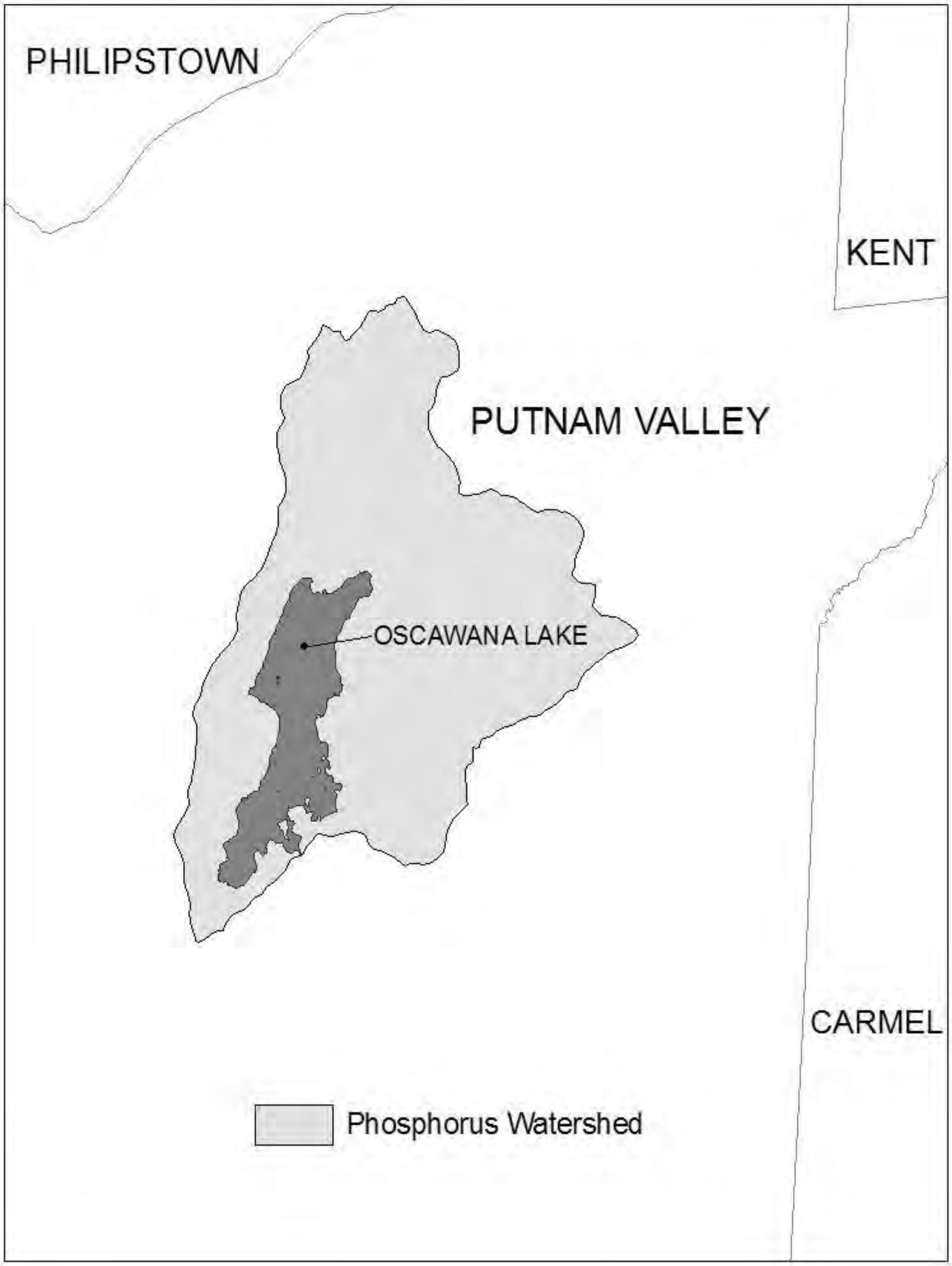
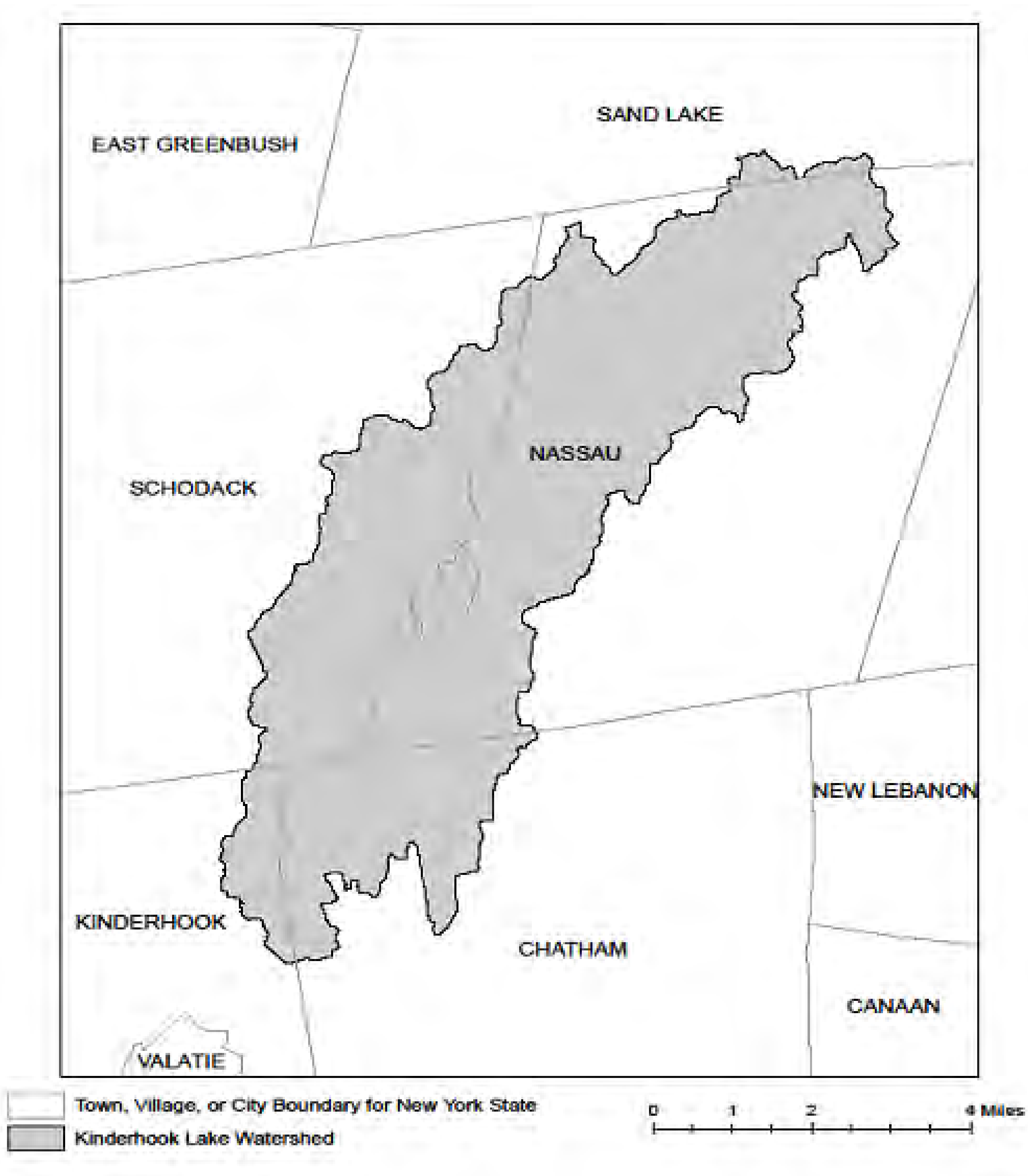


Figure 5 - Kinderhook Lake Watershed



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 G
EROSION AND SEDIMENT CONTROL
PLAN REVIEW CHECKLIST

Project Name Stewart's - Highland Site Location 3733 US Highway 9W, Highland, NY 12528

Applicant's Name & Address Stewart's Shops
PO Box 435
Saratoga Springs, NY 12866

General

A narrative statement shall be provided that describes the proposed project nature and purpose; the existing site conditions including topography, vegetation and drainage; adjacent and off-site areas affected by the project; description of the soils on the site and key properties; notations of critical areas such as steep slopes, channels or wetlands; the overall phasing, sequencing and stabilization plan; total disturbed area and those not to be disturbed.

I. Construction Drawings

Are the following items shown on the construction drawings:	Yes	No	
1. Vicinity Map with scale and north arrow	X		
2. Legend, scales, N arrow on plan view	X		
3. Existing and proposed topography shown with contours labeled with spots elevations in critical areas	X		
4. Scope of the plan noted in the Title Block	X		
5. Limits of clearing and grading shown	X		
6. Existing vegetation delineated	X		
7. Soil boundaries shown on the plan view	X		(In SWPPP)
8. Existing drainage patterns, 100 year floodplain and sub-areas shown	X		(In SWPPP)
9. Existing and proposed development facilities/ improvements shown	X		
10. Location of Erosion and Sediment control practices as phased with construction	X		
11. Phasing plan with 5 acre threshold limits shown		X	(Not Applicable)
12. Stockpile locations, staging areas and access points clearly defined	X		
13. Street profiles, utility locations, property boundaries and, easement delineations shown	X		(Road Profiles N/A)

II. Construction Notes & Details

	Yes	No	
1. Specific sequence of operation given for each phase	X		
2. Inspection and maintenance schedule shown for the specific practices	X		(In SWPPP & Maintenance Manual)
3. Design details show all dimensions and installation details necessary for construction	X		
4. Implementation schedule for E&S practices is provided with removal criteria stated	X		
5. Construction waste management plan incorporated in the notes	X		
6. Site Inspections during construction are noted on the drawings and is in accordance with the General Permit for Stormwater Discharges from Construction Activities	X		(In SWPPP)

III. Erosion & Sediment Control Practices

A. General

	Yes	No	
1. Practice meets purpose and design criteria	X		
2. Standard details and construction notes are provided	X		
3. Special timing of practice noted if applicable			(N/A)
4. Provisions for traffic crossings shown on the drawings where necessary			(N/A)

B. Practices Controlling Runoff

	Yes	No
1. Positive drainage is maintained with contributing drainage area shown	X	
2. Flow grades properly stabilized	X	
3. Adequate outlet or discharge condition stabilized	X	
4. Necessary dimensions, gradations, calculations, and materials shown	X	

C. Practices Stabilizing Soil

	Yes	No
1. Seeding rates and areas properly shown on the drawings	X	
2. Mulch materials and rates specified on the drawings	X	
3. Sequencing and timing provisions limit soil exposure to 14 days	X	

C. Practices Stabilizing Soil (cont'd)

	Yes	No
4. Rolled Erosion Control Products (RECP's) used are specified to location and appropriate weight/tie down	X	
5. All soil seed bed preparation and amendments are specified on the drawings or in the specifications	X	
6. The seeding dates are specified to cover the entire year for both temporary and permanent seedings	X	
7. Maximum created slope is no steeper than 2 foot horizontal to 1 foot vertical with Cut and Fill slopes shown	X	

D. Practices Controlling Sediment

	Yes	No	
1. Sediment traps/basins are sized in accordance with criteria	X		
2. The contributing drainage area is shown on the grading plan			(In SWPPP)
3. All scaled dimensions and volumes are shown on the plan	X		
4. Maintenance requirements and clean out elevations established for all sediment control practices (50% capacity)	X		
5. All access points of the project are shown to be stabilized	X		
6. Storm drain inlets adequately protected	X		
7. Silt fences are shown on the contour lines with no more than one quarter acre per 100 foot drainage to it	X		
8. Temporary sediment traps being used at locations of future stormwater infiltration facilities	X		

Additional Comments

Plan Reviewed By: Scott E. Kitchner, PE Date: 5/5/2021

APPENDIX H

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Table of Contents

Properly completing forms such as those contained in Appendix H meet the inspection requirement of NYS-DEC SPDES GP for Construction Activities. Completed forms shall be kept on site at all times and made available to authorities upon request.

I. PRE-CONSTRUCTION MEETING DOCUMENTS
Project Name ____
Permit No. ___________________________________ Date of Authorization ______________
Name of Operator ____
Prime Contractor ____

a. Preamble to Site Assessment and Inspections
The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified professional[1] conduct an assessment of the site prior to the commencement of construction[2] and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements.

When construction starts, site inspections shall be conducted by the qualified professional at least every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater (Construction Duration Inspections). The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request. The Operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis (Monthly Summary Report).

The operator shall also prepare a written summary of compliance with this general permit at a minimum frequency of every three months (Operator's Compliance Response Form), while coverage exists. The summary should address the status of achieving each component of the SWPPP.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization[3] using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 "Qualified Professional means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a Certified Professional in Erosion and Sediment Control (CPESC), soil scientist, licensed engineer or someone working under the direction and supervision of a licensed engineer (person must have experience in the principles and practices of erosion and sediment control).
2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.
3 "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

b. Operators Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Further, I hereby certify that the SWPPP meets all Federal, State, and local erosion and sediment control requirements. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law.

Name (please print): ____

Title ____________________________________ Date: _______________

Address: ____

Phone: _______________ Email: __________________________________

Signature: ____

c. Qualified Professional's Credentials & Certification

“I hereby certify that I meet the criteria set forth in the General Permit to conduct site inspections for this project and that the appropriate erosion and sediment controls described in the SWPPP and as described in the following Pre-construction Site Assessment Checklist have been adequately installed or implemented, ensuring the overall preparedness of this site for the commencement of construction.”

Name (please print): ____

Title ____ Date:___________

Address: ____

Phone: __________ Email: ______________________________________

Signature: ____

d. Pre-construction Site Assessment Checklist
(NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA
[ ] [ ] [ ] Has a Notice of Intent been filed with the NYS Department of Conservation?
[ ] [ ] [ ] Is the SWPPP on-site? Where?________________________________
[ ] [ ] [ ] Is the Plan current? What is the latest revision date?_______________
[ ] [ ] [ ] Is a copy of the NOI (with brief description) onsite? Where?_______________
[ ] [ ] [ ] Have all contractors involved with stormwater related activities signed a contractor's certification?

2. Resource Protection

Yes No NA
[ ] [ ] [ ] Are construction limits clearly flagged or fenced?
[ ] [ ] [ ] Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
[ ] [ ] [ ] Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA
[ ] [ ] [ ] Clean stormwater runoff has been diverted from areas to be disturbed.
[ ] [ ] [ ] Bodies of water located either on site or in the vicinity of the site have been identified and protected.
[ ] [ ] [ ] Appropriate practices to protect on-site or downstream surface water are installed.
[ ] [ ] [ ] Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Entrance

Yes No NA
[ ] [ ] [ ] A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
[ ] [ ] [ ] Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
[ ] [ ] [ ] Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Perimeter Sediment Controls

Yes No NA
[ ] [ ] [ ] Silt fence material and installation comply with the standard drawing and specifications.
[ ] [ ] [ ] Silt fences are installed at appropriate spacing intervals
[ ] [ ] [ ] Sediment/detention basin was installed as first land disturbing activity.
[ ] [ ] [ ] Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA
[ ] [ ] [ ] The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
[ ] [ ] [ ] The plan is contained in the SWPPP on page ______
[ ] [ ] [ ] Appropriate materials to control spills are onsite. Where? ___________________

II. CONSTRUCTION DURATION INSPECTIONS

a. Directions:
Inspection Forms will be filled out during the entire construction phase of the project.
Required Elements:

(1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

(2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

(3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

(4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

(5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and

(6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

SITE PLAN/SKETCH

______________________________________ ______________________________________
Inspector (print name) **Date of Inspection**

______________________________________ ______________________________________
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 or 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 property?
[ ] [ ] [ ] 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 dams, 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 occurring.
[ ] [ ] [ ] Sediment-laden runoff directed to sediment trapping structure

Runoff Control Practices (continued)

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 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.

Sediment Control Practices (continued)

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.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Drainage area is 1acre 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 ___% 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 stabilized with seed/mulch.
[ ] [ ] [ ] Drainage structure flushed and basin surface restored upon removal of sediment basin facility.
Sediment accumulation is ___% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design.
Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

CONSTRUCTION DURATION INSPECTIONS

b. Modifications to the SWPPP (To be completed as described below)

The Operator shall amend the SWPPP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
   a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
   b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:

III. Monthly Summary of Site Inspection Activities

Name of Permitted Facility:	Today's Date:	Reporting Month:
Location:	Permit Identification #:	
Name and Telephone Number of Site Inspector:		

Date of Inspection	Regular / Rainfall based Inspection	Name of Inspector	Items of Concern

Owner/Operator Certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

Signature of Permittee or Duly Authorized Representative

Name of Permittee or Duly Authorized Representative Date

Duly authorized representatives must have written authorization, submitted to DEC, to sign any permit documents.

Exhibit H – Maintenance Checklist

.1 Maintenance Checklist

Stormwater Practice
Maintenance and Management Inspection Checklist

Project: Stewart's Shops – Rexford

Location: 923 Riverview Road – Rexford, NY 12148

Site Status:

Date/Time:

Inspector:

Maintenance Item	Satisfactory / Unsatisfactory	Comments
1. Closed Drainage System (Annual)		
Condition of piping		
Excessive sediment accumulation		
Condition of drainage structures		
a. Cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (rebar exposed)		
d. Joint failures		
e. Water tightness		
2. Debris Cleanout (Monthly)		
Contributing areas clean of debris		
3. StormTech SC-740 Subsurface Stormwater Detention System (Annual or after 3" rainfall event within 24-hour period Initial Year/Semi-Annual (min.) Follow On Years)		
Excessive sediment accumulation		
a. Depth of sediment - basin		
Condition of inlet/outlet pipes		
Condition of discharge location		
Evidence of clogging		
Accumulation of debris		
Condition of inspection ports		
4. Bioretention Filter (Annual or after 3" rainfall within 24-hour period)		
Excessive sediment accumulation		
Condition of gravel diaphragm		
Condition of mulch layer		
Dead or diseased plant material		
Ponded water (48hrs after storm)		
Excessive veg. growth (>18")		
Accumulation of debris		

5. Hydrodynamic Separator (Tri-Annual Initial Year/Bi-Annual Follow On Years)		
Condition of concrete		
a. Cracks or displacement		
b. Minor spalling (<1”)		
c. Major spalling (rebar exposed)		
d. Joint failures		
e. Water tightness		
Excessive sediment accumulation		
Depth of floatables		
Hydrocarbons requiring removal		

Comments:

Actions to be Taken: