Stormwater Pollution Prevention Plan

Prepared for:
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LaBella
Powered by partnership.

iPark 87 – East Campus

Town of Ulster, Ulster County, New York

DATE: NOVEMBER 27, 2023
PROJECT NO. 2222588.01

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PREPARER OF THE SWPPP

"I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the 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."

Name and Title[1]: Walter Kubow, PE

Date: November 27, 2023

[1] *This is a signature of a New York State licensed Professional Engineer employed by LaBella Associates that is duly authorized to sign and seal Stormwater Pollution Prevention Plans (SWPPPs), NOIs, and NOTs prepared under their direct supervision. Refer to Appendix B for the SWPPP Preparer Certification Form, and Appendix I for the LaBella Certifying Professionals Letter.*

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1.0 EXECUTIVE SUMMARY

This Stormwater Pollution Prevention Plan (SWPPP) has been prepared for major activities associated with construction of 880 multifamily dwelling units and commercial retail space with associated parking and roadways at the iPark 87 East Campus located in the Town of Ulster. This SWPPP includes the elements necessary to comply with the national baseline general permit for construction activities enacted by the U.S. Environmental Protection Agency (EPA) under the National Pollutant Discharge Elimination System (NPDES) program and all local governing agency requirements. This SWPPP must be executed and permit coverage must be obtained prior to the commencement of construction activity.

This SWPPP has been developed in accordance with the "New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity," Permit No. GP-0-20-001, effective January 29, 2020 through January 28, 2025. The SWPPP and accompanying plans identify and detail stormwater management, pollution prevention, and erosion and sediment control measures necessary during and following completion of construction.

This SWPPP and the accompanying plans entitled "iPark 87 – East Campus" have been submitted as a set. These engineering drawings are considered an integral part of this SWPPP. Therefore, this SWPPP is not considered complete without them. References made herein to "the plans" or to a specific "sheet" refer to these drawings.

This report considers the impacts associated with the intended development with the purpose of:

1. Maintaining existing drainage patterns as much as possible while continuing the conveyance of upland watershed runoff;
2. Controlling increases in the rate of stormwater runoff resulting from the proposed development so as not to adversely alter downstream conditions; and
3. Mitigating potential stormwater quality impacts and preventing soil erosion and sedimentation resulting from stormwater runoff generated both during and after construction.

The analysis and design completed and documented in this report is intended to be part of the application made for a mixed-use redevelopment project with an increase in impervious area completed on behalf of the Owner/Operator.

1.1 Project Description

iPark 87, LLC is proposing redevelopment project with an increase in impervious area, to include 880 multifamily dwelling units and commercial retail space with associated parking and roadways. The project will disturb greater than 1-acre of land. A Site Location Map has been provided in Appendix A, as Figure A-1.

This type of project is included in Table 2 of Appendix B of GP-0-20-001; and the project site is not located in one of the watersheds listed in Appendix C of GP-0-20-001. Therefore, this SWPPP includes post-construction stormwater management practices, as well as erosion and sediment controls.

This project is located within the Town Of Ulster regulated, traditional land use control Municipal Separate Stormwater Sewer System (MS4). Therefore, an MS4 SWPPP Acceptance Form is required to accompany NOIs submitted to the NYSDEC.

Runoff from the project site will discharge to the lower Esopus Creek, which is not included in the list of Section 303(d) water bodies included in Appendix E of GP-0-20-001.

Project construction activities will consist primarily of site grading, paving, building construction, and the installation of storm drainage, water supply, and sanitary sewer infrastructure necessary to support the proposed redevelopment project with an increase in impervious area. Construction phase pollutant sources anticipated at the site are disturbed (exposed) soil, vehicle fuels and lubricants, chemicals associated with building construction, and building materials. Without adequate control there is the potential for each type of pollutant to be transported by stormwater.

1.2 Stormwater Pollution Controls

The stormwater pollution controls outlined herein have been designed and evaluated in accordance with the following standards and guidelines:

- New York State Stormwater Management Design Manual, dated January 2015 (Design Manual).
- New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016 (SSESC).
- Chapter 88 Stormwater Management and Erosion and Sediment Control of the Code of the Town of Ulster, dated April 02, 2009.
- Chapter 89 Municipal Separate Stormwater Sewer System Control of the Code of the Town of Ulster, dated March 19, 2009.

Stormwater quality will be enhanced through the implementation of temporary and permanent erosion and sediment control measures, the proposed stormwater management practice(s), and other construction-phase pollution controls outlined herein.

The proposed stormwater management approach consisting of pipes and on-site stormwater management practices will adequately collect, treat, and convey the stormwater runoff.

Bioretention basins, tree plantings, and hydrodynamic separators will be used to manage and treat stormwater runoff generated by the proposed redevelopment project with an increase in impervious area.

Pre- and post-development surface runoff rates have been evaluated for the 1-, 10-, and 100-year 24-hour storm events. Comparison of pre- and post-development watershed conditions demonstrates that the peak rate of runoff from the project site will not be increased.

The post-construction stormwater management practice(s) will be privately owned by the iPark 87, LLC. Deed restrictions will be in place, which require operation and maintenance of the practice(s) in accordance with the operation and maintenance plan. In addition, a maintenance easement will provide for access to the facility at reasonable times for periodic inspection by the Town of Ulster to ensure the facility is maintained in proper working condition. A sample Town of Ulster stormwater control facility maintenance agreement is provided in Appendix K.

2.0 SITE CHARACTERISTICS

2.1 Land Use and Topography

The project site is located within the OM-Office Manufacturing zoning district. Residential dwelling units above non-residential uses are subject to a special use permit within this district. iPark 87, LLC has applied to rezone the site under the ROD-Redevelopment Overlay District.

The overall site is slightly sloping, with slopes ranging from 0.0 to 7.0 percent. Site elevations range from approximately 167 feet above mean sea level (MSL) to 183 feet MSL. The slight sloping that occurs across the site runs from southeast corner, which is the highest portion of the site, to the northwest corner of the site, being the lowest.

2.2 Soils and Groundwater

The US Department of Agriculture (USDA) Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/) was used to obtain surficial soil conditions for the study area, as follows:

Table 1: USDA Soil Data

Map Symbol & Description	Hydrologic Soil Group	Permeability (inches/hour)	Erosion Factor K	Depth to Water Table (feet)	Depth to Bedrock (feet)
Lm, Lamson fine sandy loam	A/D	0.57 – 5.95	0.17	0.0	>6.67
Pt, Pompton fine sandy loam	B/D	0.57 – 1.98	-	0.5 – 2.0	>6.67
RvA, Riverhead fine sandy loam, 0 – 3 percent slope	A	1.98 – 5.95	0.20	>6.67	>6.67
RvB, Riverhead fine sandy loam, 3 – 8 percent slope	A	1.98 – 5.95	0.20	>6.67	>6.67

Upon review of the soil data presented in Table 1, the project site does not contain soils with a soil slope phase of D with a map unit name that inclusive of slopes greater than 25%, and does not contain soils with a soil slope phase of E or F.

The project site is composed of HSG A soils and HSG D soils, as shown in the table below. For the purposes of this report, HSG A/D or HSG B/D soils were modeled as HSG D soils to reflect the undrained condition.

Table 2: Project Site HSG Data

HSG A	HSG B	HSG C	HSG D
90.9%	0%	0%	9.1%

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

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

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

The soils map for the study area is presented in Appendix A, as Figure A-2.

2.3 Watershed Designation

The project site is not located in a restricted watershed identified in Appendix C of GP-0-20-001.

2.4 Receiving Water Bodies

The nearest natural classified water course into which runoff from the project site will discharge is the lower Esopus Creek. The lower Esopus Creek is classified by NYSDEC as a Class B water course, and is not included in the Section 303(d) list of impaired waters found in Appendix E of GP-0-20-001.

2.5 Aquifer Designation

The project site is not located over a US EPA designated Sole Source aquifer; nor is it located over a Primary or Principal aquifer listed in the NYSDEC Technical and Operational Guidance Series (TOGS) 2.1.3 (1980).

2.6 Wetlands

A search on the NYSDEC Environmental Resource Mapper on August 28, 2023, and a review of GIS data, determined that there are no known regulated wetlands located on or in the vicinity of the project site.

2.7 Flood Plains

According to the National Flood Insurance Program Flood Insurance Rate Map (FIRM), Town of Ulster, New York, Community Panel Number 0480, the project site lies within Flood Zone X, areas determined to be outside 500-year floodplain. The FEMA Flood Map has been provided in Appendix A, as Figure A-5.

2.8 Listed, Endangered, or Threatened Species

A search was performed on the NYSDEC Environmental Resource Mapper on August 28, 2023, and determined that the project site may contain threatened or endangered species, or critical habitat. As the site was formerly developed as an industrial campus, no impacts to listed, endangered or threatened species or habitat is anticipated. An Environmental Resource Map has been provided in Appendix A, as Figure A-4.

2.9 Historic Places

A search on the New York State Cultural Resource Information System (CRIS) database, performed on August 28, 2023, revealed the construction activity is located within an archeologically sensitive area. A printout of the historic places screening map is presented in Appendix A, as Figure A-3.

As such, NYSOPRHP coordination has been initiated. A copy of the NYSOPRHP documentation, in accordance with part I.F.8. of GP-0-20-001, will be provided in Appendix A, as Figure A-3A upon receipt.

2.10 Rainfall Data

Rainfall data utilized in the modeling and analysis was obtained from the Cornell University online Extreme Precipitation in New York & New England website (http://precip.eas.cornell.edu/). A local IDF file was imported, and specific mass curves were generated, in HydroCAD to evaluate the pre- and post-development stormwater runoff characteristics. Rainfall data specific to the portion of Ulster County under consideration, for various 24-hour storm events, is presented in the following Table:

Table 3: Rainfall Data

Storm Event Return Period	24-Hour Rainfall (inches)
1-year	2.60
10-year	4.70
100-year	8.33

2.11 Pre-development Watershed Conditions

The pre-development project site is covered predominantly by buildings, asphalt parking lots and driveways, and grass soccer fields. Analysis of pre-development conditions considered existing drainage patterns, soil types, ground cover, and topography. The Pre-Development Watershed Delineation Map has been provided in Appendix A, as Figure A-6.

The results of the computer modeling used to analyze the overall watershed under pre-development conditions are presented in Appendix D. A summary of the pre-development watershed runoff rates at each analysis point is presented in Table 13.

2.12 Post-development Watershed Conditions

The post-development project site is covered predominantly by buildings, asphalt parking lots and driveways, and grass landscaped areas. The analysis of post-development conditions considered existing drainage patterns, soil types, ground cover to remain, planned site development, site grading, and stormwater management facilities proposed as part of site improvements. The Post-Development Watershed Delineation Map has been provided in Appendix A, as Figure A-7.

The results of the computer modeling used to analyze the overall watershed under post-development conditions are presented in Appendix E. A summary of the post-development watershed runoff rates at each analysis point is presented in Table 13.

There are numerous locations and methods for providing controls of off-site discharge of stormwater from the project site. Each has been designed to provide the above quantity controls by attenuating stormwater runoff and releasing runoff to off-site locations at a rate equal to or less than that which existed prior to development of the site. Each device is detailed on the accompanying plans. A Post-Development Watershed Delineation Map, with the tributary areas to each stormwater management practice proposed, has been provided in Appendix A, as Figure A-7.

2.13 Description of Analysis Points

The study area consists of an overall watershed that encompasses approximately 143.46 acres, including the 137.47 acre project site and 47.19 acre area of disturbance. The overall watershed was broken down into smaller watersheds, or subcatchments, to allow for analysis of runoff conditions at several locations throughout the study area. Each of these locations was defined as a Analysis Point (AP) in order to compare the effects resulting from stormwater management facilities proposed as part of the project. Descriptions of each of the selected analysis points are provided below.

- Analysis Point 1: An existing 42" RCP culvert, located approximately 340 feet south of the east campus horseshoe entrance located off of Enterprise Drive. The culvert flows from southeast to northwest and ultimately discharges to the Esopus Creek on the west campus.
- Analysis Point 2: An existing low point on parcel 48.7-1-29.260 located on the northern end of the east campus. An existing 60" RCP culvert discharges to this area before crossing Enterprise Drive and entering the Esopus Creek. The total tributary area, as well as impervious area, discharging to Analysis Point 2 remains unchanged under post-development conditions. Therefore, this analysis point has not been analyzed.
- Analysis Point 3: An existing catch basin onsite located in a wood/lawn area approximately 210 feet south of existing building #032.
- Analysis Point 4: An existing storm sewer culvert, located approximately 500 feet north of the east campus horseshoe entrance located off of Enterprise Drive. The culvert flows from east to west and ultimately discharges to the Esopus Creek on the west campus. The total tributary area, as well as impervious area, discharging to Analysis Point 4 remains unchanged under post-development conditions. Therefore, this analysis point has not been analyzed.

3.0 STORMWATER MANAGEMENT PLANNING

Chapter 3 of the Design Manual outlines a six-step planning process for site planning and selection of stormwater management practices that must be implemented for both new development and redevelopment projects. This process is intended to develop a design that maintains pre-construction hydrologic conditions through the application of environmentally sound development principles, as well as treatment and control of runoff discharges from the site. The following sections outline the step-by-step process and how it has been applied to this project.

The goals of this Stormwater Management Plan are to analyze the peak rate of runoff under pre- and post-development conditions, to maintain the pre-development rate of runoff in order to minimize impacts to adjacent or downstream properties, and to minimize the impact to the quality of runoff exiting the site.

The Design Manual provides both water quality and water quantity objectives to be met by projects requiring a "Full SWPPP". These objectives will be met by applying stormwater control practices to limit peak runoff rates and improve the quality of runoff leaving the developed site.

3.1 STEP 1 – Site Planning

During the Site Planning process, the project site is evaluated for implementation of the green infrastructure planning measures identified in Table 3.1 of the Design Manual, in order to preserve natural resources and reduce impervious cover. Table A of Appendix C provides a description of each green infrastructure planning measure, along with a project specific evaluation.

3.2 STEP 2 – Calculate Water Quality Treatment Volume (WQv)

Stormwater runoff from impervious surfaces is recognized as a significant contributor of pollution that can adversely affect the quality of receiving water bodies. Therefore, treatment of stormwater runoff is important since most runoff related water quality contaminants are transported from land, particularly the impervious surfaces, during the initial stages of storm events.

3.2.1 NYSDEC Requirements for Water Quality Volume

The Design Manual requires that water quality treatment be provided for the initial flush of runoff from every storm. The NYSDEC refers to the amount of runoff to be treated as the “Water Quality Volume” (WQv). Section 4.2 of the Design Manual defines the Water Quality Volume as follows:

$$WQv = \frac{[(P)(R_V)(A)]}{12}$$

Where: P = 90% Rainfall Event Number (per DEC 1.0 inch minimum)

R_v = 0.05 + 0.009 (I)

I = Impervious Cover (Percent)

A = Contributing Area in Acres

This definition ensures that, all other things being equal, the Water Quality Volume will increase along with the impervious cover percentage.

3.2.2 Methodology for Redevelopment Projects

Chapter 9 of the Design Manual outlines alternative WQv treatment objectives for redevelopment projects.

According to Section 9.2.1.B.III, redevelopment activities can achieve the water quality treatment objective by treating 75% of the water quality volume associated with the disturbed, impervious area, as well as any additional runoff from tributary areas that are not within the disturbed, impervious area, through an Alternative SMP. This project will implement hydrodynamic separators to meet the water quality objective. In this case, 100% of any new increase in impervious area must be treated by approved alternate SMPs, standard SMPs, or RR techniques. This project will implement bioretention areas and tree plantings to meet the water quality objective.

Table 4: Required WQv Summary

100% New Development WQv Required		75% Alternative SMP WQv Required	
20,600 cf	0.473 af	82,230 cf	1.888 af
Total WQv Required 102,830 cf (2.361 af)			

3.2.3 Methodology

The Water Quality Volume equation has been applied to the drainage area tributary to each of the stormwater quality practices proposed for this project. The practices have been sized to accommodate the Water Quality Volume, as per the performance criteria presented in Chapter 6 and Chapter 9 of the Design Manual. Water quality volume calculations for each of the proposed practices are presented in Table B,C,D, and E of Appendix C.

3.3 STEP 3 – Apply RR Techniques and Standard SMPs with RRv Capacity to Reduce Total WQv

Land use change and development in the watershed increases the volume of runoff. As such, reductions in the amount of runoff from new development, accomplished through the implementation of a stormwater management plan for the site, will play an important role in the success or failure of the watershed-wide stormwater management plan. Runoff reduction techniques can be applied to manage, reduce, and treat stormwater, while maintaining and restoring natural hydrology through infiltration, evapo-transpiration, and the capture and reuse of stormwater. Volume reduction techniques by themselves typically are not sufficient to provide adequate attenuation of stormwater runoff, but they can decrease the size of the peak runoff rate reduction facilities.

3.3.1 NYSDEC Requirements for New Development

The Design Manual states that runoff reduction shall be achieved through infiltration, groundwater recharge, reuse, recycle, and/or evaporation/evapotranspiration of 100-percent of the post-development water quality volume to replicate pre-development hydrology. Runoff control techniques provide treatment in a distributed manner before runoff reaches the collection system, by maintaining pre-construction infiltration, peak runoff flow, discharge volume, as well as minimizing concentrated flow. This can be accomplished by applying a combination of Runoff Reduction Techniques, standard Stormwater Management Practices (SMPs) with RRv capacity, and good operation and maintenance.

3.3.2 NYSDEC Requirements for Redevelopment

Section 3.2 of the Design Manual indicates, "Although encouraged, meeting the RRv criteria is not required for redevelopment activities that meet the criteria in Chapter 9 of this manual." This project involves the reconstruction of existing impervious area on a site that has inadequate space for controlling stormwater runoff from the reconstructed area which renders implementation of many RR techniques and SMPs infeasible.

Although not required, bioretention areas and tree plantings are proposed for this project and will provide both WQv and RRv at the site.

3.3.3 *Methodology*

In order to reduce the required WQv and meet the RRv criteria, a site specific evaluation must be performed to determine the most practical means of reducing runoff volume by application of a combination of RR techniques and standard SMPs with RRv capacity.

3.3.4 *Application of RR Techniques*

The following Table demonstrates a summary of the RR technique being applied for this project, and both the water quality and runoff reduction volumes they provide. The RR Technique has been designed in accordance with Chapter 5 of the Design Manual. Refer to the contract drawings for practice dimensions, material specifications, and installation details. Practice specific calculations are presented in Appendix C.

Table 5: Summary of RR Techniques being Applied

RR Technique	NYSDEC Design Variant	RRv Capacity	WQv Required (CF)	WQv Reduced/RRv Provided (CF)
Area Reduction Practices				
Tree Planting/ Tree Pit	RR-3	100%	7,320	7,320

3.3.5 *Application of Standard Stormwater Management Practices (SMPs) with RRv Capacity*

The following Table demonstrates a summary of the standard SMP(s) with RRv capacity that have been incorporated into the stormwater management plan for this project. The standard SMP(s) with RRv capacity have been designed in accordance with Chapter 6 of the Design Manual. Refer to the contract drawings for practice dimensions, material specifications, and installation details. Practice specific calculations are presented in Appendix C.

Table 6: Summary of Standard SMPs with RRv Capacity being Applied

Standard SMP with RRv Capacity	Design Variant	Pretreatment Volume Required (% of WQv)	Pretreatment Volume Provided (CF)	RRv Capacity	WQv Required (CF)	WQv Reduced /RRv Provided (CF)	WQv Treated[1] (CF)	Total WQv Provided[2] (CF)
Bioretention 1 (with underdrain)	F-5	25	2,427.5	40%	9,710	3,884	5,826	9,710
Bioretention 2 (with underdrain)	F-5	25	2,972.5	40%	11,890	4,756	7,134	11,890
Standard SMP with RRv Capacity Totals					**21,600**	**8,640**	**12,960**	**21,600**

Footnotes:
[1]*WQv Treated = WQV Required - RRv Provided*
[2]*Total WQv Provided = WQV Treated + RRv Provided*

3.3.6 *RRv Performance Summary*

A summary of the RRv provided is presented in the following table:

Table 7: RRv Summary

WQv Required (CF)	RRv Provided WQv Reduced (CF)	% RRv Provided/ WQv Reduced
20,600	15,960	77.5

As indicated in the above table, the RRv provided is not greater than or equal to the RRv required for the project site. A good faith effort has been made to reduce runoff to the greatest extent practical. However, the project site has a history of groundwater contamination and infiltration practices are not a recommended use, which prevents reduction of the total WQv. As such, Table F of Appendix C provides a project specific evaluation for each RR technique and standard SMP with RRv capacity, demonstrating why these practices are infeasible.

3.4 STEP 4 – Calculate the Minimum RRv Required

Projects that cannot achieve 100% of the runoff reduction requirement due to site limitations, shall provide a minimum runoff reduction volume as calculated by the following equation:

$$RRv_{min} = \frac{[(P)(R_V*)(Aic)(S)]}{12}$$

Where:

RRv_{min}	=	Runoff Reduction Volume (in acre-feet)
P	=	90% Rainfall Event Number
Aic	=	Total area of new impervious cover (acres)
Rv*	=	0.05+0.009(I), where I is 100% impervious
S	=	Hydrologic Soil Group (HSG) Specific Reduction Factor where: HSG A = 0.55 HSG C = 0.30 HSG B = 0.40 HSG D = 0.20

Based upon the soil survey data, the site consists of soils having a hydrologic soil type of A. As such, a specific reduction factor of 0.55 has been applied. Calculation of the required minimum RRv is presented in Table G of Appendix C.

Table 8: Minimum RRv Summary

Minimum RRv Required (CF)	RRv Provided/ WQv Reduced (CF)	% of Minimum RRv Provided
11,330	15,960	100

As indicated in the above table, the RRv provided is greater than the minimum RRv required for the project site. Therefore, the runoff reduction volume criteria has been met for the project and the design can proceed to Step 5.

3.5 STEP 5 – Apply Standard SMPs to Address Remaining Water Quality Volume

If the entire Water Quality Volume is not treated through implementation of RR techniques and standard SMPs with RRv capacity, then the design must achieve the remaining WQv through the standard SMPs listed in Table 3.3 of the Design Manual or the Alternative Practices outlined in Section 9.4 of the Design Manual.

Table 9: Summary of WQv Provided

Step 2 WQv Required (CF)	Step 3 WQv Reduction by RR Techniques & Standard SMPs w/ RRv Capacity (CF)[1]	Step 5 Reduced WQv to be Treated by Standard SMPs or Alternative Practices (CF)
102,830	28,920	73,910

Footnotes:
[1]*Step 3: WQv Reduction = RRv Provided + WQv Treated by Standard SMP with RRv Capacity*
[2]*Step 5: Reduced WQv to be Treated = WQv Required – WQv Reduced*

Based upon the results listed in the above Table, the entire WQv has not been treated by application of RR techniques and standard SMPs with RRv capacity. As such, the standard SMPs or the Alternative Practices (without RRv capacity) described in the following sections, have been incorporated into the stormwater management plan for this project, to meet the WQv objective.

3.5.1 Hydrodynamic Separators

Hydrodynamic separators accelerate the separation of floating and settling pollutants from stormwater through the use of a vortex. These pre-fabricated devices come in the form of an underground manhole or vault. The devices have no moving parts and are typically fabricated from concrete and marine grade aluminum.

During operation, stormwater runoff enters the unit tangentially to promote a gentle swirling motion in a treatment chamber. As stormwater circles within the chamber, settable solids fall into a sump and are retained. Buoyant debris, oil, and grease rise to the surface and are separated from the water as it flows under a baffle wall. Finally, treated water exits the treatment chamber through a flow control orifice located behind the baffle wall.

During low-flow conditions all runoff is diverted into the treatment chamber by a flow partition. At higher flow rates, a portion of the runoff spills over the flow partition and is diverted around the treatment chamber to prevent re-suspension and washout of previously trapped pollutants. Water that spills over the partition flows into a head equalization chamber above the treatment chamber outlet. As the head equalization chamber fills, the head differential driving flow through the treatment chamber collapses. The result is that flow rates in the treatment chamber remain relatively constant even as total flow rates increase substantially. This configuration further reduces the potential for re-suspension or washout.

According to Chapter 9 of the Design Manual, hydrodynamic separators of the type proposed for this project have been approved for use as a primary treatment system on redevelopment projects. Table D of Appendix C summarizes the treatment volume provided by the proposed hydrodynamic separators.

3.6 STEP 6 - Apply Volume and Peak Rate Control

This report presents the pre-development and post-development features and conditions associated with the rate of surface water runoff within the study area. For both cases, the drainage patterns, drainage structures, soil types, and ground cover types are considered in this study.

3.6.1 NYSDEC Requirements for New Development

Chapter 4 of the Design Manual requires that projects meet three separate stormwater quantity criteria:

1. The Channel Protection (CPv) requirement is designed to protect stream channels from erosion. This is accomplished by providing 24 hours of extended detention for the 1-year, 24-hour storm event. The Manual defines the CPv detention time as the center of mass detention time through each stormwater management practice.

2. The Overbank Flood Control (Qp) requirement is designed to prevent an increase in the frequency and magnitude of flow events that exceed the bank-full capacity of a channel, and therefore must spill over into the floodplain. This is accomplished by providing detention storage to ensure that, at each analysis point, the post-development 10-year 24-hour peak discharge rate does not exceed the corresponding pre-development rate.

3. The Extreme Flood Control (Qf) requirement is designed to prevent the increased risk of flood damage from large storm events, to maintain the boundaries of the pre-development 100-year floodplain, and to protect the physical integrity of stormwater management practices. This is accomplished by providing detention storage to ensure that, at each analysis point, the post-development 100-year 24-hour peak discharge rate does not exceed the corresponding pre-development rate.

3.6.2 Methodology

In order to demonstrate that the NYSDEC detention requirements are being met, the Design Manual requires that a hydrologic and hydraulic analysis of the pre- and post-development conditions be performed using the Natural Resources Conservation Service Technical Release 20 (TR-20) and Technical Release 55 (TR-55) methodologies. HydroCAD, developed by HydroCAD Software Solutions LLC of Tamworth, New Hampshire, is a Computer-Aided-Design (CAD) program for analyzing the hydrologic and hydraulic characteristics of a given watershed and associated stormwater management facilities. HydroCAD uses the TR-20 algorithms and TR-55 methods to create and route runoff hydrographs.

HydroCAD has the capability of computing hydrographs (which represent discharge rates characteristic of specified watershed conditions, precipitation, and geologic factors) combining hydrographs and routing flows though pipes, streams and ponds. HydroCAD can also calculate the center of mass detention time for various hydraulic features. Documentation for HydroCAD can be found on their website: http://www.hydrocad.net/.

For this analysis, the watershed and drainage system was broken down into a network consisting of three types of components as described below:

1. Subcatchment: A relatively homogeneous area of land, which produces a volume and rate of runoff unique to that area.
2. Reach: Uniform streams, channels, or pipes that convey stormwater from one point to another.

3. Pond: Natural or man-made impoundment, which temporarily stores stormwater runoff and empties in a manner determined by its geometry and the hydraulic structure located at its outlets.

Subcatchments, reaches, and ponds are represented by hexagons, squares, and triangles, respectively, on the watershed routing diagrams provided with the computations included in Appendix D and Appendix E.

The analysis of hydrologic and hydraulic conditions and proposed stormwater management facilities, servicing the study area, was performed by dividing the tributary watershed into relatively homogeneous subcatchments. The separation of the watershed into subcatchments was dictated by watershed conditions, methods of collection, conveyance, and points of discharge. Watershed characteristics for each subcatchment were then assessed from United States Geological Service (USGS) 7.5-minute topographic maps, aerial photographs, a topographical survey, soil surveys, site investigations, and land use maps.

Proposed stormwater management practices were designed and evaluated in accordance with the Design Manual and local regulatory requirements. A local IDF file was imported, and specific mass curves were generated, in HydroCAD to evaluate the pre- and post-development stormwater runoff characteristics for various 24-hour storm events identified in the following Table.

Table 10: Design Events

Facility	24-hour Storm Event
Storm Sewer	10-year
Stormwater Management Practice(s)	1-year
	10-year
	100-year
Flood Conditions	100-year

3.6.3 Performance Summary

A comparison of the total required and provided CPv for the 1-year 24-hour storm event is shown in the following table:

Table 11: CPv Summary

Required CPv	Provided CPv
58.23 cf	66.92 cf

For each of the stormwater management facilities that provide detention, the following Table presents the center of mass detention time for the 1-year 24-hour storm event.

Table 12: Center of Mass Detention Time for the 1-year, 24-hour Storm

SWM Practice ID	Center of Mass Detention Time for the 1-year Storm (hours)		Diameter of the Extended Detention Orifice (inches)	
	Required	Provided	Minimum allowable to achieve the required center of mass detention time	Provided[2]
DET-1	24	12.5	2.72	3.0
DET-2	24	2.8	1.25	3.0
DET-3	24	7.6	2.35	3.0
DET-4	24	1.3	1.21	3.0

A comparison of the pre- and post-development watershed conditions was performed for all analysis points and storm events evaluated herein. For all analysis points and design storms, this comparison demonstrates that the peak rate of runoff will not be increased. Therefore, the project will not have a significant adverse impact on the adjacent or downstream properties or receiving water courses.

The results of the computer modeling used to analyze the pre- and post-development watersheds are presented in Appendix D and Appendix E, respectively. The following Table summarizes the results of this analysis.

Table 13: Summary of Pre- and Post-Development Peak Discharge Rates

Pre- vs. Post-Development Discharge Rate (cfs)				
Analysis Point (AP)	10-year 24-hour storm event		100-year 24-hour storm event	
	Pre	Post	Pre	Post
1	151.55	151.55	306.17	296.48
3	0.54	0.81	4.71	4.93
Total	152.09	152.36	310.88	301.41

4.0 CONSTRUCTION SEQUENCE

This project has not received written approval from the Town of Ulster allowing the disturbance of more than five acres of land at any one time. Therefore, if the Contractor's construction sequence requires the disturbance of more than five acres at any one time, written approval must be obtained from NYSDEC prior to disturbing more than five acres at once.

The "Erosion and Sediment Control Plan" in the accompanying drawings identifies the major construction activities that are the subject of this SWPPP. The order (or sequence) in which the major activities are expected to begin is presented on the accompanying drawings, though each activity will not necessarily be completed before the next begins. In addition, these activities could occur in a different order if necessary to maintain adequate erosion and sediment control. If this is the case, the contractor shall notify the Owner's/Operator's Engineer overseeing the implementation of the SWPPP.

[2] *24-hour center of mass detention time is not required at sites where the resulting diameter of the extended detention orifice is too small to prevent clogging.*

The Contractor will be responsible for implementing the erosion and sediment control measures identified on the plans. The Contractor may designate these tasks to certain subcontractors as they see fit, but the ultimate responsibility for implementing these controls and ensuring their proper function remains with the Contractor.

Refer to the accompanying plans for details and specifications regarding the construction sequencing schedule.

5.0 CONSTRUCTION-PHASE POLLUTION CONTROL

The SWPPP and accompanying plans identify the temporary and permanent erosion and sediment control measures that have been incorporated into the design of this project. These measures will be implemented during construction, to minimize soil erosion and control sediment transport off-site, and after construction, to control the quality and quantity of stormwater runoff from the developed site.

Erosion control measures, designed to minimize soil loss, and sediment control measures, intended to retain eroded soil and prevent it from reaching water bodies or adjoining properties, have been developed in accordance with the following documents:

- NYSDEC SPDES General Permit for Stormwater Discharges From Construction Activity, Permit No. GP-0-20-001 (effective January 29, 2020 through January 28, 2025)
- New York State Standards and Specifications for Erosion and Sediment Control, NYSDEC (November 2016)
- Chapter 88 Stormwater Management and Erosion and Sediment Control of the Code of the Town of Ulster, dated April 02, 2009.

The SWPPP and accompanying plans outline the construction scheduling for implementing the erosion and sediment control measures. These documents include limitations on the duration of soil exposure, criteria and specifications for placement and installation of the erosion and sediment control measures, a maintenance schedule, and specifications for the implementation of erosion and sediment control practices and procedures.

Temporary and permanent erosion and sediment control measures that shall be applied during construction generally include:

1. Minimizing soil erosion and sedimentation by stabilization of disturbed areas and by removing sediment from construction site discharges.
2. Preservation of existing vegetation to the greatest extent practical. Following the completion of construction activities in any portion of the site, permanent vegetation shall be established on all exposed soils.
3. Site preparation activities to minimize the area and duration of soil disruption.
4. Establishment of permanent traffic corridors to ensure that “routes of convenience” are avoided.

5.1 Temporary Erosion and Sediment Control Measures

The temporary erosion and sediment control measures described in the following sections are included as part of the construction documents.

5.1.1 Stabilized Construction Access

Prior to construction, stabilized construction access(es) will be installed, per accompanying plans, to reduce the tracking of sediment onto public roadways.

Construction traffic must enter and exit the site at the stabilized construction access(es). The intent is to trap dust and mud that would otherwise be carried off-site by construction traffic.

The access(es) shall be maintained in a condition, which will control tracking of sediment onto public rights-of-way or streets. When necessary, additional aggregate will be placed atop the filter fabric to assure the minimum thickness is maintained. All sediment and/or soil spilled, dropped, or washed onto public rights-of-way must be removed immediately. Periodic inspection and needed maintenance shall be provided after each substantial rainfall event.

5.1.2 Dust Control

Water trucks shall be used as needed during construction to reduce dust generated on-site. Dust control must be provided by the Contractor(s) to a degree that is acceptable to the Owner, and in compliance with the applicable local and state dust control requirements.

5.1.3 Temporary Soil Stockpile

Materials, such as topsoil, will be temporarily stockpiled (if necessary) on the site during the construction process. Stockpiles shall be located in an area away from storm drainage, water bodies and/or courses, and will be properly protected from erosion by a surrounding silt fence barrier.

5.1.4 Silt Fencing

Prior to the initiation of and during construction activities, a geotextile filter fabric (or silt fence) will be established downgradient of all disturbed areas. These barriers may extend into non-impact areas to provide adequate protection of adjacent lands.

Clearing and grubbing will be performed only as necessary for the installation of the sediment control barrier. To facilitate effectiveness of the silt fencing, daily inspections and inspections immediately after significant storm events will be performed by the Contractor(s). Maintenance of the fence will be performed as needed.

5.1.5 Temporary Seeding

For areas undergoing clearing, grading, and disturbance as part of construction activities, where work has temporarily ceased, temporary soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the soil disturbance activity has temporarily ceased.

5.1.1 Manufactured Insert Inlet Protection

Install insert inlet protection beneath the grate of all catch basins, to prevent sediment from entering the catch basins and storm sewer system. Remove sediment accumulation and repair or replace insert as necessary to ensure proper function.

5.1.2 Dewatering Operations

Dewatering will be used to intercept sediment-laden stormwater or pumped groundwater and allow it to settle out of the pumped discharge prior to being discharged from the site. Water from dewatering operations shall be treated to eliminate the discharge of sediment and other pollutants. Water resulting from dewatering operations shall be directed to temporary sediment traps or dewatering devices. Temporary sediment traps and dewatering bags will be provided, installed, and maintained at downgradient locations to control sediment deposits to downstream surfaces.

5.2 Permanent Erosion and Sediment Control Measures

The permanent erosion and sediment control measures described in the following sections are included as part of the construction documents.

5.2.1 Establishment of Permanent Vegetation

Disturbed areas that will be vegetated must be seeded in accordance with the contract documents. The type of seed, mulch, and maintenance measures as described in the contract documents shall also be followed.

Permanent soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the soil disturbance activity has permanently ceased.

Final site stabilization is achieved when all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of 80 percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

5.2.2 Rock Outlet Protection

Rock outlet protection shall be installed at the locations as indicated and detailed on the accompanying plans. The installation of rock outlet protection will reduce the velocity and energy of water, such that the flow will not erode downstream surfaces.

5.3 Other Pollutant Controls

Part I.B.1.e of GP-0-20-001 prohibits discharges from construction material wastewater, pollutants used in vehicle and equipment operation and maintenance, vehicle and equipment washing and toxic or hazardous substances.

The following table identifies materials and/or chemicals commonly used and/or stored on construction sites and should be addressed in the site-specific spill prevention and response plan:

Table 14: Common Construction Pollutants

Material/Chemical	Physical Description	Stormwater Pollutants	Location*
Pesticides (insecticides, fungicides, herbicides, rodenticides)	Various colored to colorless liquid, powder, pellets, or grains	Chlorinated hydrocarbons, organophosphates, carbamates, arsenic	Herbicides used for noxious weed control
Fertilizer	Liquid or solid grains	Nitrogen, phosphorous	Newly seeded areas
Cleaning solvents	Colorless, blue, or yellow-green liquid	Perchloroethylene, methylene chloride, trichloroethylene, petroleum distillates	No equipment cleaning allowed in project limits
Asphalt	Black solid	Oil, petroleum distillates	Streets and roofing
Concrete	White solid/grey liquid	Limestone, sand, pH, chromium	Curb and gutter, building construction
Curing compounds	Creamy white liquid	Naphtha	Curb and gutter
Hydraulic oil/fluids	Brown oily petroleum hydrocarbon	Mineral oil	Leaks or broken hoses from equipment
Gasoline	Colorless, pale brown or pink petroleum hydrocarbon	Benzene, ethyl benzene, toluene, xylene, MTBE	Secondary containment / staging area
Diesel Fuel	Clear, blue-green to yellow liquid	Petroleum distillate, oil & grease, naphthalene, xylenes	Secondary containment / staging area
Kerosene	Pale yellow liquid petroleum hydrocarbon	Coal oil, petroleum distillates	Secondary containment / staging area
Antifreeze/coolant	Clear green/yellow liquid	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)	Leaks or broken hoses from equipment
Sanitary toilets	Various colored liquid	Bacteria, parasites, and viruses	Staging area
Construction materials			
Granular fill	Various colored solids	Sediment	Stockpile / fill areas
Subbase course	Gray/brown solid	Sediment, dust	Stockpile
Topsoil	Brown solid	Sediment	Stockpile
Mulch	Various colored solid	Sediment, debris	Staging area
Seed	Brown/yellow solid	Nutrients, debris	Staging area
HDPE Storm Pipe	Black solid		Staging area
SDR-35, SDR-21 PVC Pipe	Various colored solid		Staging area
Metals Frames and Grates	Gray solid		Staging area
Joint Sealant	Light gray viscous solid	Polyurethane	Staging area

*(Area where material/chemical is used on-site)

5.4 Construction Housekeeping Practices

During the construction phase, the Contractor(s) will implement the following measures:

5.4.1 Sediment Sweeping/Vacuuming

Any sediment that is tracked by construction vehicles or erosion onto adjacent public or private impervious surfaces must be swept or vacuumed, utilizing self-propelled and/or walk-behind equipment, and removed on a daily basis. Kick brooms and sweeper attachments are not an acceptable means of sweeping. Sweeping or vacuuming should not take place while tracked sediment is wet. If tracked sediment is compacted, the sediment must be scraped loose prior to sweeping or vacuuming.

5.4.2 Material Stockpiles

Material resulting from clearing and grubbing operations that will be stockpiled on-site, must be adequately protected with downgradient erosion and sediment controls.

5.4.3 Equipment Cleaning and Maintenance

The Contractor(s) will designate areas for equipment cleaning, maintenance, and repair. The Contractor(s) and subcontractor(s) will utilize those areas. The areas will be protected by a temporary perimeter berm.

5.4.4 Detergents

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

5.4.5 Spill Prevention and Response

A Spill Prevention and Response Plan shall be developed, for the pollutants identified in Section 5.3, for the site by the Contractor(s) that addresses the following:

1. Reducing chance of spills
2. Stopping the source of spills
3. Containing and cleaning up spills
4. Disposing of materials contaminated by spills
5. Training personnel responsible for spill prevention/response
6. Material handling procedures
7. Material storage requirements

The plan shall detail the steps required in the event of an accidental spill and shall identify contact names and phone numbers of people and agencies that must be notified.

The plan shall include Safety Data Sheets (SDS) for all materials to be stored on-site. All workers on-site will be required to be trained on safe handling and spill prevention procedures for all materials used during construction. Regular tailgate safety meetings shall be held and all workers that are expected on the site during the week shall be required to attend.

5.4.6 Concrete Washout Areas

A temporary concrete washout area shall be provided for every project where concrete will be poured or otherwise formed on-site and shall consist of an excavated or above-ground lined construction pit where concrete trucks or equipment can be washed out after their loads have been discharged. Waste generated from concrete wash water that shall not be allowed to flow into drainage ways, inlets, receiving waters, highway right-of-way, or any location other than the designated concrete washout area(s). Proper signage shall be placed adjacent to the facility to designate the “Concrete Washout Area”. Locate the facility a minimum of 100-feet from drainage swales, storm drain inlets, wetlands, streams, and other surface waters. Prevent surface water from entering the washout area.

The hardened residue from the concrete wash areas will be disposed of in the same manner as other non-hazardous construction waste materials. Maintenance of the washout area shall include removal of hardened material when 75% of the storage capacity is filled, and a minimum freeboard of 12 inches shall be maintained. The Contractor will be responsible for seeing that these procedures are followed. The project may require the use of multiple concrete washout areas based on the frequency of concrete pours.

5.4.7 Material Storage

Construction materials shall be stored in a dedicated staging area. The staging area shall be located in an area that prevents negative impacts of construction materials on stormwater quality.

Chemicals, paints, solvents, fertilizers, and other toxic material must be stored in waterproof containers. Except during application, the contents must be kept in trucks or within storage facilities. Runoff containing such material must be collected, removed from the site, treated, and disposed of at an approved solid waste or chemical disposal facility.

6.0 INSPECTIONS, MAINTENANCE, AND REPORTING

6.1 Inspection and Maintenance Requirements

6.1.1 Pre-Construction Inspection and Certification

Prior to the commencement of construction, the Qualified Inspector/Qualified Professional shall conduct an assessment of the site and certify that the appropriate erosion and sediment control measures have been adequately installed and implemented. The Contractor shall contact the Qualified Inspector/Qualified Professional once the erosion and sediment control measures have been installed.

6.1.2 Construction Phase Inspections and Maintenance

A Qualified Inspector/Qualified Professional, as defined in Appendix A of the General Permit GP-0-20-001, shall conduct regular site inspections between the time this SWPPP is implemented and final site stabilization. Site inspections shall occur at an interval of at least once every seven (7) calendar days.

The purpose of site inspections is to assess performance of pollutant controls. Based on these inspections, the Qualified Inspector/Qualified Professional will decide whether it is necessary to modify this SWPPP, add or relocate sediment barriers, or whatever else may be needed in order to prevent pollutants from leaving the site via stormwater runoff. The general contractor has the duty to cause pollutant control measures to be repaired, modified, maintained, supplemented, or whatever else is necessary in order to achieve effective pollutant control.

Examples of particular items to evaluate during site inspections are listed below. This list is not intended to be comprehensive. During each inspection the inspector must evaluate overall pollutant control system performance as well as particular details of individual system components. Additional factors should be considered as appropriate to the circumstances.

1. Locations where vehicles enter and exit the site must be inspected for evidence of off-site sediment tracking. A stabilized construction access will be constructed where vehicles enter and exit. This access will be maintained or supplemented as necessary to prevent sediment from leaving the site on vehicles.
2. Sediment barriers must be inspected and, if necessary, they must be enlarged or cleaned in order to provide additional capacity. All material from behind sediment barriers will be stockpiled on the up slope side. Additional sediment barriers must be constructed as needed.
3. Inspections will evaluate disturbed areas and areas used for storing materials that are exposed to rainfall for evidence of, or the potential for, pollutants entering the drainage system. If necessary, the materials must be covered or original covers must be repaired or supplemented. Also, protective berms must be constructed, if needed, in order to contain runoff from material storage areas.
4. Grassed areas will be inspected to confirm that a healthy stand of grass is maintained. The site has achieved final stabilization once all areas are covered with building foundation or pavement, or have a stand of grass with at least 80 percent density. The density of 80 percent or greater must be maintained to be considered as stabilized. Areas must be watered, fertilized, and reseeded as needed to achieve this goal.
5. All discharge points must be inspected to determine whether erosion control measures are effective in preventing significant impacts to receiving waters.

The inspection reports must be completed entirely and additional remarks should be included if needed to fully describe a situation. An important aspect of the inspection report is the description of additional measures that need to be taken to enhance plan effectiveness. The inspection report must identify whether the site was in compliance with the SWPPP at the time of inspection and specifically identify all incidents of non-compliance.

Within one (1) business day of the completion of an inspection, the *Qualified Inspector/Qualified Professional* shall notify the Owner/Operator and appropriate contractor or subcontractor of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one (1) business day of the notification and shall complete the corrective actions in a reasonable time frame.

In addition to the inspections performed by the *Qualified Inspector/Qualified Professional*, the Contractor shall perform routine inspections that include a visual check of all erosion and sediment control measures. All inspections and maintenance shall be performed in accordance with the inspection and maintenance schedule provided on the accompanying plans. Sediment removed from erosion and sediment control measures will be exported from the site, stockpiled for later use, or used immediately for general non-structural fill.

It is the responsibility of the general contractor to assure the adequacy of site pollutant discharge controls. Actual physical site conditions or contractor practices could make it necessary to install more structural controls than are shown on the accompanying plans. (For example, localized concentrations of runoff could make it necessary to install additional sediment barriers, sediment traps, etc.) Assessing the need for additional controls and implementing them or adjusting existing controls will be a continuing aspect of this SWPPP until the site achieves final stabilization.

6.1.3 Temporary Suspension of Construction Activities

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 frequency of Qualified Inspector/Qualified Professional inspections can be reduced to once every 30 calendar days. Prior to reducing the frequency of inspections, the Owner/Operator shall notify the NYSDEC Region 3 stormwater contact person and the Town of Ulster in writing.

6.1.4 Partial Project Completion

For construction sites where soil disturbance activities have been shut down with partial project completion, 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 inspections by the Qualified Inspector/Qualified Professional can stop. Prior to the shutdown, the Owner/Operator shall notify the NYSDEC Region 3 stormwater contact person and the Town of Ulster in writing.

If soil disturbance activities have not resumed within two years from the date of shutdown, a Notice of Termination (NOT) shall be properly completed and submitted to the NYSDEC.

6.1.5 Post-Construction Inspections and Maintenance

Inspections and maintenance of final stabilization measures and post-construction stormwater management practices shall be performed in accordance with Appendix G, once all disturbed areas are stabilized and all stormwater management systems are in place and operable.

6.2 Reporting Requirements

6.2.1 Inspection Reports

Pursuant to Part IV.C of GP-0-20-001, inspection reports shall be prepared for the duration of construction, as outlined herein, and shall be signed by the *Qualified Inspector* or *Qualified Professional*. A sample inspection form is provided in Appendix F.

At a minimum, each inspection report shall record the following information:

1. Date and time of inspection.
2. Name and title of person(s) performing inspection.
3. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection.
4. 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.
5. 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.
6. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance.
7. 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.

8. 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.
9. Indication of the 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.
10. 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).
11. Identification and status of all corrective actions that were required by previous inspection.
12. Color photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *Qualified Inspector/Qualified Professional* 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/Qualified Professional* 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/Qualified Professional* shall attach the 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.

6.2.2 Site Log Book

Pursuant to Part II.D.2 of GP-0-20-001, the Owner/Operator shall retain a copy of the General Permit, NOI, NOI Acknowledgment Letter, MS4 SWPPP Acceptance Form (if applicable), inspection reports, contractor and subcontractor certification forms, and all documentation necessary to demonstrate eligibility under the permit, at the construction site from commencement of construction activity until the date that all areas of disturbance have achieved final stabilization and the Notice of Termination has been submitted to the NYSDEC.

The Site Log Book shall be maintained on-site in a secure location (i.e. job trailer, on-site construction office, or mailbox with lock) and must be accessible during normal business hours to an individual performing a compliance inspection.

6.2.3 Post Construction Records and Archiving

Following construction, the Owner/Operator shall retain copies of the SWPPP, the complete construction Site Log Book, and records of all data used to complete the NOI to be covered by this permit, for a period of at least five years from the date that the site is finally stabilized. This period may be extended by the NYSDEC, at its sole discretion, at any time upon written notification.

Records shall be maintained of all post construction inspections and maintenance work performed in accordance with the requirements outlined in Appendix G.

7.0 SWPPP IMPLEMENTATION RESPONSIBILITIES

A summary of the responsibilities and obligations of all parties involved with compliance with the NYSDEC SPDES General Permit GP-0-20-00 conditions is outlined in the subsequent sections. For a complete listing of the definitions, responsibilities, and obligations, refer to the SPDES General Permit GP-0-20-001 presented in Appendix J.

7.1 Owner's/Operator's Responsibilities

1. Ensure that control measures are selected, designed, installed, implemented and maintained to minimize the discharge of pollutants and prevent a violation of the water quality standards, meeting the non-numeric effluent limitations in Part I.B.1.(a)-(f) of the SPDES General Permit and in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016.

2. Ensure that practices are selected, designed, installed, and maintained to meet the performance criteria in the Design Manual. Practices must be designed to meet the applicable sizing criteria in Part I.C.2.a., b., c. or d. of GP-0-20-001.

3. Retain the services of a "Qualified Inspector" or "Qualified Professional" as defined under Section 2.1, to provide the services outlined in Section 2.5 "Qualified Inspector's/Qualified Professional's Responsibilities."

4. Retain the services of a "Qualified Professional," as defined under Section 2.1, to provide the services outlined in Section 2.3 "Owner's/Operator's Engineers Responsibilities."

5. Have an authorized corporate officer sign the Owner/Operator Certification Form to accompany the eNOI. A copy of the completed NOI is included in Appendix B.

6. Submit the electronic version of the NOI (eNOI) along with the MS4 SWPPP acceptance form using the NYSDEC's website (http://www.dec.ny.gov/chemical/43133.html).

7. Pay the required initial and annual fees upon receipt of invoices from NYSDEC. These invoices are generally issued in the fall of each year. The initial fee is calculated as $110.00 per acre disturbed plus $675.00 per acre of net increase in impervious cover, and the annual fee is $110.00.

8. Prior to the commencement of construction activity, identify the contractor(s) and subcontractor(s) that will be responsible for implementing the erosion and sediment control measures and stormwater management practices described in this SWPPP. Have each of these contractors and subcontractors identify at least one "Trained Contractor", as defined under Section 2.1 that will be responsible for the implementation of the SWPPP. Ensure that the Contractor has at least one "Trained Contractor" on site on a daily basis when soil disturbance activities are being performed.

9. Schedule a pre-construction meeting which shall include the Town of Ulster representative, Owner's/Operator's Engineer, Qualified Inspector, Contractor, and their sub-contractors to discuss responsibilities as they relate to the implementation of this SWPPP.

10. Retain the services of an independent certified materials testing and inspection firm operating under the direction of a licensed Professional Engineer to perform regular tests, inspections, and certifications of the construction materials used in the construction of all post-construction stormwater management practices.

11. Retain the services of a NYS licensed land surveyor to perform an as-built topographic survey of the completed post-construction stormwater management facilities.

12. Require the Contractor to fully implement the SWPPP prepared for the site by the Owner/Operator's Engineer to 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 NYSDEC.

13. Forward a copy of the NOI Acknowledgement Letter received from the regulatory agency to the Owner's/Operator's Engineer for project records, and to the Contractor for display at the construction site.

14. Maintain a copy of the General Permit (GP-0-20-001), NOI, NOI Acknowledgement Letter, SWPPP, MS4 SWPPP Acceptance Form, inspection reports, Spill Prevention, Countermeasures, Cleanup ("SPCC") Plan, and all documentation in accordance with Part I.F.8.a.-d of GP-0-20-001 necessary to demonstrate eligibility with the permit at the construction site, until all disturbed areas have achieved final stabilization and the NOT has been submitted to the NYSDEC. Place documents in a secure location that must be accessible during normal business hours to an individual performing a compliance inspection.

15. Prior to submitting a Notice of Termination, ensure for post-construction stormwater management practice(s) that are privately owned, the Owner/Operator has a deed restriction in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

16. After the Town's final inspection of the installed drainage facilities, the Owner/Operator shall submit to the Town's Stormwater Management Officer and GIS Coordinator an as-built drawing of the drainage facilities along with the GPS reference data on all outfalls and permanent drainage structures.

17. Submit a Notice of Termination (NOT) form (see Appendix B) within 48 hours of receipt of the Owner's/Operator's Engineer's certification of final site stabilization to the following:

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

    Town of Ulster
    1 Town Hall Drive
    Lake Katrine, NY 12449

18. Request and receive all SWPPP records from the Owner's/Operator's Engineer and archive those records for a minimum of five (5) years after the NOT is filed.

19. Implement the Post-Construction Inspections and Maintenance procedures outlined in Appendix G.

20. The NOI, SWPPP, and inspection reports required by GP-0-20-001 are public documents that the Owner/Operator must make available for review and copying by any person within five (5) business days of the Owner/Operator receiving a written request by any such person to review the NOI, SWPPP, or inspection reports. Copying of documents will be done at the requester's expense.

21. The Owner/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/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 project 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; and

c) To address issues or deficiencies identified during an inspection by the "Qualified Inspector," the Department, or other Regulatory Authority.

d) To document the final construction conditions.

22. 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.

    a) 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 the 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.

    b) 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.

7.2 Owner's/Operator's Engineer's Responsibilities

1. Prepare the SWPPP using good engineering practices, best management practices, and in compliance with all federal, state, and local regulatory requirements.

2. Prepare the electronic Notice of Intent (eNOI) (see Appendix B) and sign the "SWPPP Preparer Certification Form." Forward the Owner/Operator Certification Form to the Owner/Operator for signature.

3. Provide copies of the SWPPP to the Town of Ulster once all signatures and attachments are complete.

4. Enter Contractor's information in Section 2.5 "SWPPP Participants" once a Contractor is selected by the Owner/Operator.

5. Participate in a pre-construction meeting which shall include the Town of Ulster representative, Owner/Operator, Qualified Inspector, Contractor, and all subcontractors to discuss responsibilities as they relate to the implementation of this SWPPP.

6. Update the SWPPP each time there is a significant modification to the pollution prevention measures or a change of the principal Contractor working on the project who may disturb site soil.

7.3 Contractor's Responsibilities

1. Sign the SWPPP Contractor's Certification Form contained within Appendix B and forward to the Owner's/Operator's Engineer for inclusion in the Site Log Book.

2. Identify at least one Trained Contractor that will be responsible for implementation of this SWPPP. Ensure that at least one Trained Contractor is on site on a daily basis when soil disturbance activities are being performed. The Trained Contractor shall 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 conditions 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.

3. Provide the names and addresses of all subcontractors working on the project site. Require all subcontractors who will be involved with construction activities that will result in soil disturbance to identify at least one Trained Contractor that will be on site on a daily basis when soil disturbance activities are being performed; and to sign a copy of the Subcontractor's Certification Form contained within Appendix B, then forward to the Owner's/Operator's Engineer for inclusion into the Site Log Book. This information must be retained as part of the Site Log Book.

4. Maintain a Spill Prevention and Response Plan in accordance with requirements outlined in Section 5 of this SWPPP. This plan shall be provided to the Owner's/Operator's Engineer for inclusion in the Site Log Book, prior to mobilization on-site.

5. Participate in a pre-construction meeting which shall include the Town of Ulster representative, Owner/Operator, Owner's/Operator's Engineer, Qualified Inspector, and all subcontractors to discuss responsibilities as they relate to the implementation of this SWPPP.

6. If Contractor plans on utilizing adjacent properties for material, waste, borrow, or equipment storage areas, or if Contractor plans to engage in industrial activity other than construction (such as operating asphalt and/or concrete plants) at the site, Contractor shall submit appropriate documentation to the Owner's/Operator's Engineer so that the SWPPP can be modified accordingly.

7. Implement site stabilization, erosion and sediment control measures, and other requirements of the SWPPP.

8. In accordance with the requirements in the most current version of the NYS Standards and Specifications for Erosion and Sediment Control, conduct inspections of erosion and sediment control measures installed at the site to ensure that they remain in effective operating condition at all times. Prepare and retain written documentation of inspections as well as of all repairs/maintenance activities performed. This information must be retained as part of the Site Log Book.

9. Begin implementing corrective actions within one (1) business day of receipt of notification by the Qualified Inspector/Qualified Professional that deficiencies exist with the erosion and sediment control measures employed at the site. Corrective actions shall be completed within a reasonable time frame.

10. Maintain a record of the date(s) and location(s) that soil restoration is performed in accordance with the accompanying plans and NYSDEC Division of Water's publication "Deep-Ripping and Decompaction," dated April 2008. A copy of this is publication is provided in Appendix H. The record that is to be maintained shall be a copy of the overall site grading plan delineating the area(s) and date(s) that the soil was restored.

11. Upon completion of all construction at the site, the contractor responsible for overall SWPPP Compliance shall sign the certification on their Contractor Certification Form indicating that: a.) all temporary erosion and sediment control measures have been removed from the site, b.) the on-site soils disturbed by construction activity have been restored in accordance with the SWPPP and the NYSDEC Division of Water's publication "Deep-Ripping and Decompaction," and c.) all permanent stormwater management practices required by the SWPPP have been installed in accordance with the contract documents.

7.4 Qualified Inspector's/Qualified Professional's Responsibilities

1. Participate in a pre-construction meeting with the Town of Ulster representative, Owner/Operator, Owner/Operator's Engineer, Contractor, and their subcontractors to discuss responsibilities as they relate to the implementation of this SWPPP.

2. Conduct an initial assessment of the site prior to the commencement of construction and certify in an inspection report that the appropriate erosion and sediment control measures described within this SWPPP have been adequately installed and implemented to ensure overall preparedness of the site.

3. Provide on-site inspections to determine compliance with the SWPPP. Site inspections shall occur at an interval of at least once every seven calendar days. A written inspection report shall be provided to the Owner/Operator and general contractor within one business day of the completion of the inspection, with any deficiencies identified. A sample inspection form is provided in Appendix F.

4. Prepare an inspection report subsequent to each and every inspection that shall include/address the items listed in Part IV.C.4.a-k of GP-0-20-001. Sign all inspection reports and maintain on site with the SWPPP.

5. Notify the owner/operator and appropriate contractor or subcontractor of any corrective actions that need to be taken.

6. Prepare a construction Site Log Book to be used as a record of all inspection reports generated throughout the duration of construction. Ensure that the construction Site Log Book is maintained and kept up-to-date throughout the duration of construction.

7. Review the Contractor's SWPPP records on a periodic basis to ensure compliance with the requirements for daily reports, soil restoration, inspections, and maintenance logs.

8. Based on the as-built survey and material testing certifications performed by others, the Qualified Professional shall perform evaluations of the completed stormwater management practices to determine whether they were constructed in accordance with this SWPPP.

9. The Qualified Professional shall conduct a final site assessment and prepare a certification letter to the Owner/Operator indicating that, upon review of the material testing and inspection reports prepared by the firm retained by the Owner/Operator, review of the completed topographic

survey, and evaluation of the completed stormwater management facilities, the stormwater management facilities have been constructed substantially in accordance with the contract documents and should function as designed.

10. Prepare the Notice of Termination (NOT). The Qualified Professional shall sign the NOT Certifications VI (Final Stabilization) and VII (Post-construction Stormwater Management Practices), and forward the NOT to the Owner/Operator for signature on Certification VIII (Owner/Operator Certification).

11. Transfer the SWPPP documents, along with all NOI's, permit certificates, NOT's, construction Site Log Book, and written records required by the General Permit to the Owner/Operator for archiving.

7.5 SWPPP Participants

1. Owner's/Operator's Engineer [3]: Walter Kubow, PE
   LaBella Associates, DPC
   4 British American Boulevard
   Latham, NY 12110
   Phone: (518) 439-8235

2. Owner/Operator [4]: iPark 87, LLC
   485 West Putnam Ave
   Greenwich, CT 06830
   Phone: (203) 661-0055

3. Contractor[5,6]:
   Name and Title: ______________________
   Company Name: ______________________
   Mailing Address: ______________________
   ____
   Phone: ______________________
   Fax: ______________________

---

[3] *Refer to Appendix B for the SWPPP Preparer Certification Form.*
[4] *Refer to Appendix B for the Owner/Operator Certification Form.*
[5] *Refer to Appendix B for Contractor and Subcontractor Certification Form.*
[6] *Contractor's information to be entered once the Contractor has been selected.*

APPENDIX A: FIGURES

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518-439-8235

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ISSUED FOR: SWPPP FIGURE - NOT FOR CONSTRUCTION

DRAWING NAME: **SITE LOCATION MAP**

DRAWN BY:	DATE:	PROJECT NO.:
HEB	8/28/2023	2222588.01

PROJECT NAME: **iPARK 87 - EAST CAMPUS**
300 ENTERPRISE DRIVE, TOWN OF ULSTER NY 12401

DRAWING NUMBER: **A-1**

Hydrologic Soil Group—Ulster County, New York
(iPark 87)

Map Scale: 1:7,620 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0, 100, 200, 400, 600

Feet: 0, 350, 700, 1400, 2100

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

USDA **Natural Resources Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

4/17/2023
Page 1 of 4

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ISSUED FOR: SWPPP FIGURE - NOT FOR CONSTRUCTION

DRAWING NAME: **HSG SOILS MAP**

DRAWN BY: ZMH

DATE: 8/28/2023

PROJECT NO.: 2222588.01

PROJECT NAME: **iPARK 87 - EAST CAMPUS**
300 ENTERPRISE DRIVE, TOWN OF ULSTER NY 12401

DRAWING NUMBER: **A-2**

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 21, Sep 10, 2022

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

Date(s) aerial images were photographed: Oct 21, 2022—Oct 27, 2022

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.

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ISSUED FOR:	SWPPP FIGURE - NOT FOR CONSTRUCTION
DRAWING NAME:	SOILS LEGEND
DRAWN BY:	ZMH
DATE:	8/28/2023
PROJECT NO.:	2222588.01
PROJECT NAME:	iPARK 87 - EAST CAMPUS 300 ENTERPRISE DRIVE, TOWN OF ULSTER, NY 12401
DRAWING NUMBER:	A-2

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Lm	Lamson fine sandy loam	A/D	3.1	2.1%
Pt	Pompton fine sandy loam	B/D	10.4	7.0%
RvA	Riverhead fine sandy loam, 0 to 3 percent slopes	A	134.4	90.1%
RvB	Riverhead fine sandy loam, 3 to 8 percent slopes	A	1.2	0.8%
Totals for Area of Interest			**149.1**	**100.0%**

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ISSUED FOR: SWPPP FIGURE - NOT FOR CONSTRUCTION

DRAWING NAME: SOILS TABLE

DRAWN BY: ZMH
DATE: 8/28/2023
PROJECT NO.: 2222588.01

PROJECT NAME: iPARK 87 - EAST CAMPUS
300 ENTERPRISE DRIVE, TOWN OF ULSTER NY 12401

DRAWING NUMBER: A-2

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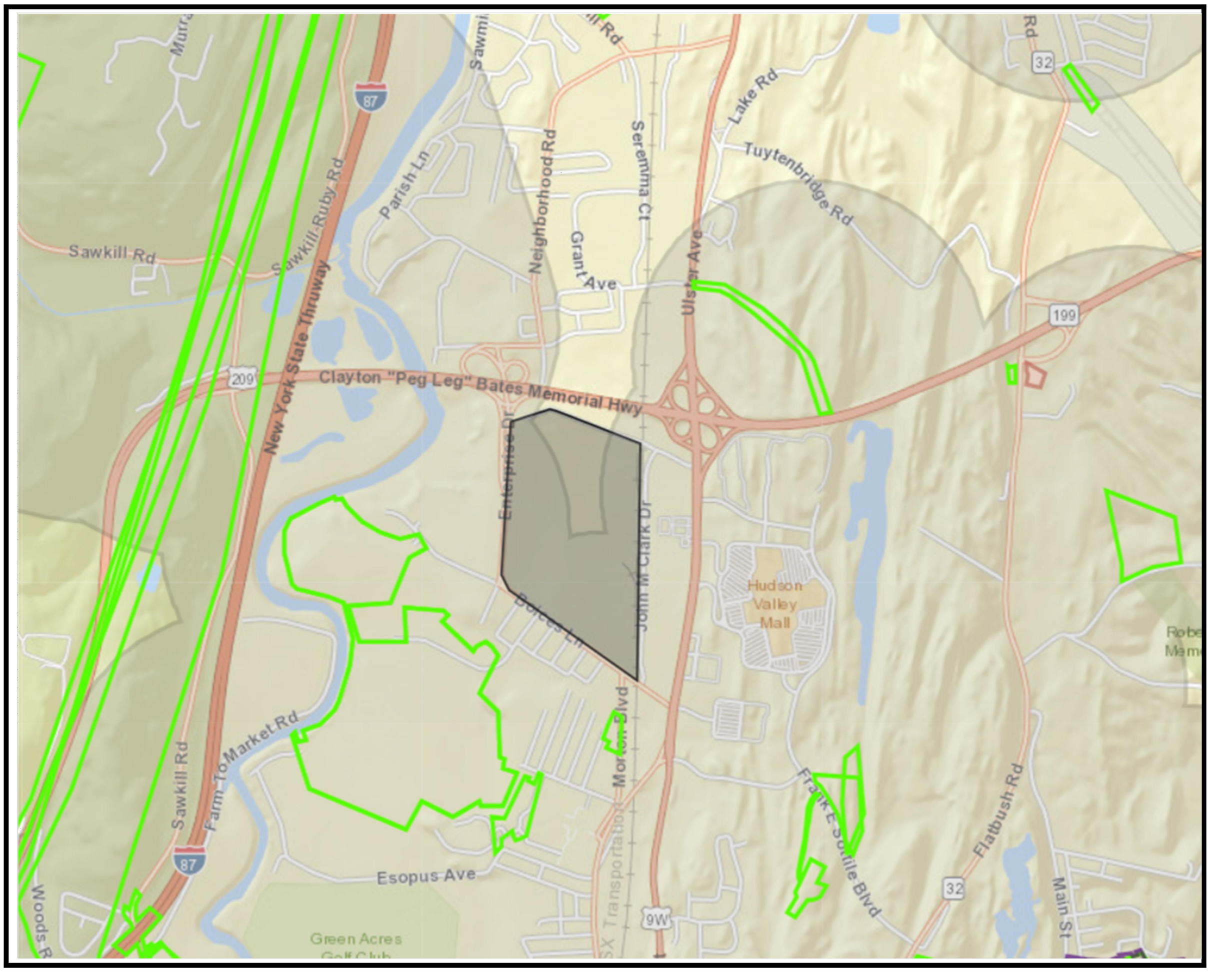

Consultation Projects (View)

Survey Archaeology Areas (View)

Survey Building Areas (View)

LPC Historic Districts

Archeologically Sensitive Areas

National Register Building Sites (View)

USN Building Districts (View)

LPC Landmarks

USN Building Points (View)

- Eligible
- Listed
- Not Eligible
- Not Eligible - Demolished
- Undetermined

Cemeteries

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ISSUED FOR: SWPPP FIGURE - NOT FOR CONSTRUCTION

DRAWING NAME: HISTORIC PLACES SCREENING MAP

DRAWN BY: ZMH

DATE: 8/28/2023

PROJECT NO.: 2222588.01

PROJECT NAME: iPARK 87 - EAST CAMPUS

300 ENTERPRISE DRIVE, TOWN OF ULSTER NY 12401

DRAWING NUMBER: A-3

REQUEST FOR STATE HISTORIC PRESERVATION ACT REVIEW

This form is being submitted to NYS Office of Parks, Recreation and Historic Preservation to request consultation on historic properties or archeological resources or both in accordance with the Letter of Resolution between NYS Department of Environmental Conservation and the NYS OPRHP regarding compliance with PRHPL §14.09 for the SPDES General Permit For Stormwater Discharges From Construction Activity (GP-0-20-001).

Important: Complete Form and Return to Both Addresses

New York State Office of Parks, Recreation and Historic Preservation (OPRHP) Field Services Bureau
Peebles Island State Park
Waterford, NY 12188-0189

Copy To:
New York State Department of Environmental Conservation
Agency Historic Preservation Officer (APO)
Division of Lands and Forests
625 Broadway
Albany, NY 12233-4255

Name of Owner/Operator of Proposed Construction Activity ____________________ Date ____________________
Telephone ______________ Email ____________________
Project Name ____________________
Project Location ____________________
City/Town/Village ____________________ County ____________________

CONSULTATION WITH OPRHP CRIS WEB SITE AT http://cris.parks.ny.gov or the DEC EAF Mapper http://www.dec.ny.gov/eafmapper indicates the Project Site:

- ○ Project is located within an archeologically sensitive area as indicated on sensitivity map.
- ○ Project is located immediately adjacent to or contains an historic property.
- ○ Other ____

PLEASE ADVISE ON:

- ○ Need for Survey/Scope of Survey Needed
- ○ Significance of Identified Unevaluated Property
- ○ Impact on Significant Cultural Resources
- ○ Other ____________________
- ○ Adequacy of Survey to Date
- ○ Significance of Identified Archeological Resources
- ○ Project Alternatives (As Described)
- ○ Need for Mitigation

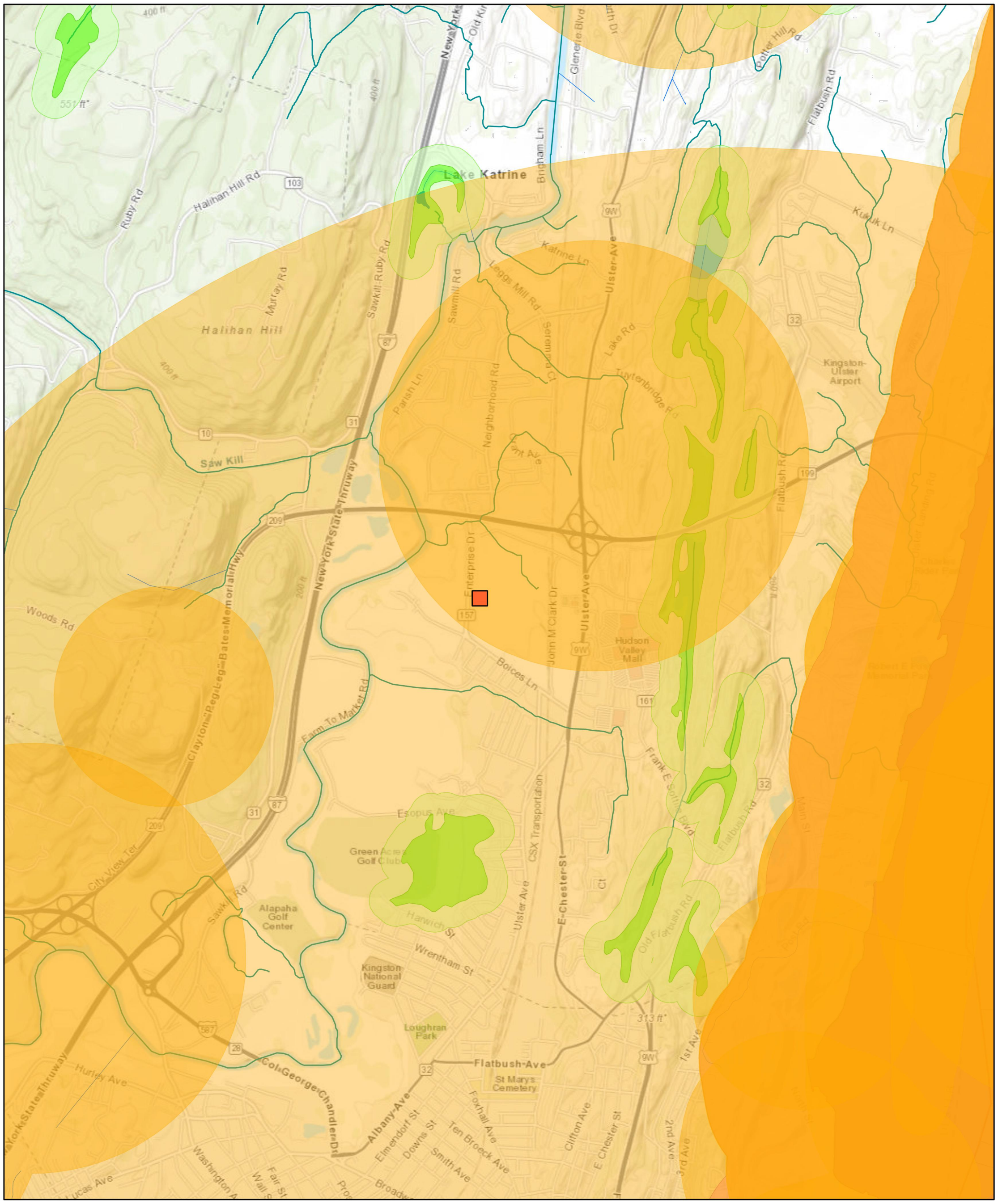
<u>Supporting Documentation Attached</u>

- ○ Project Description
- ○ Maps
- ○ Archaeological Studies
- ○ Agreement reached with OPRHP through the State Environmental Quality Review Act
- ○ Other documentation that impacts to Historic properties or archaeological resources, or both have been addressed.
- ○ Other. Please describe. ____

OPRHP PROJECT NUMBER (Assigned by OPRHP): PR# ____________________

[1] Buildings, structures or objects that are greater than 50 years of age that have not been evaluated for eligibility for listing on the State or National Registers of Historic Places.

Enviornmental Resource Mapper



August 28, 2023

1:36,112

0 0.3 0.6 1.2 mi

0 0.5 1 2 km

Esri Canada, Esri, HERE, Garmin, INCREMENT P, USGS, METI/ NASA, EPA, USDA

NYS Department of Environmental Conservation
Not a legal document

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DRAWING NAME:	DRAWN BY:	DATE:	PROJECT NO.:
ENVIRONMENTAL RESOURCE MAP	ZMH	8/28/2023	2222588.01

PROJECT NAME:
iPARK 87 - EAST CAMPUS
300 ENTERPRISE DRIVE, TOWN OF ULSTER NY 12401

DRAWING NUMBER:
A-4

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 18. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC−3, #9202
1315 East−West Highway
Silver Spring, MD 20910−3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713−3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from digital orthophotography provided by the NY Office of Cyber Security & Critical Infrastructure Coordination from photography dated April 2004.

This map reflects more detailed and up−to−date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data*) may reflect stream channel distances that differ from what is shown on this map.

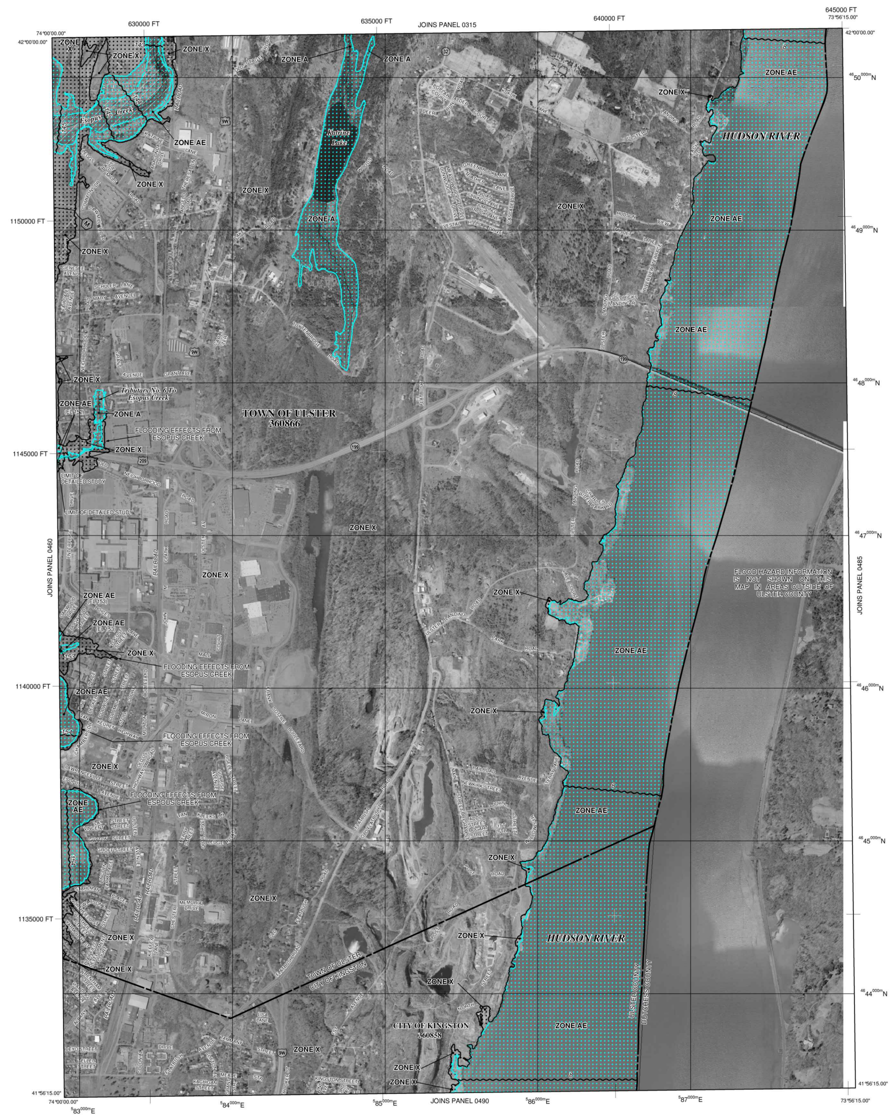
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de−annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1−800−358−9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report*, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1−800−358−9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1−877−FEMA MAP** (1−877−336−2627) or visit the FEMA website at http://www.fema.gov/.

This digital FIRM was produced through a unique cooperative partnership between the New York State Department of Environmental Conservation (NYSDEC) and FEMA. As part of the effort, NYSDEC has joined in a Cooperative Technical Partnership agreement to produce and maintain FEMA's digital FIRM.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.
ZONE AE Base Flood Elevations determined.
ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

~~~~ 513 ~~~~ Base Flood Elevation line and value; elevation in feet*
(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

(A)———(A) Cross section line
(23)- - - - -(23) Transect line
97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4275000mN 1000-meter Universal Transverse Mercator grid values, zone 18
6000000 FT 5000-foot grid ticks: New York State Plane coordinate system, east zone (FIPSZONE 3101), Transverse Mercator
DX5510 × Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 25, 2009
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1−800−638−6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0480E

FIRM
FLOOD INSURANCE RATE MAP

ULSTER COUNTY,
NEW YORK
(ALL JURISDICTIONS)

PANEL 480 OF 910
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KINGSTON, CITY OF	360858	0480	E
ULSTER, TOWN OF	360866	0480	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
36111C0480E

EFFECTIVE DATE
SEPTEMBER 25, 2009

Federal Emergency Management Agency

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Latham, NY 12110
518-439-8235

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DRAWING NAME: **FEMA FIRM MAP**			
ISSUED FOR: SWPPP FIGURE - NOT FOR CONSTRUCTION			
DRAWN BY: ZMH	DATE: 8/28/2023	PROJECT NO.: 2222588.01	
PROJECT NAME: **iPARK 87 - EAST CAMPUS** 300 ENTERPRISE DRIVE, TOWN OF ULSTER, NY 12401		DRAWING NUMBER: **A-5**	

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STORM WATER LEGEND

- WATERSHED BOUNDARY
- TIME OF CONCENTRATION / FLOW PATH
- SUBCATCHMENT #
- REACH

1
FIG. A-6

PRE-DEVELOPMENT WATERSHED DELINEATION MAP

SCALE: 1" = 200'

N

0 200 400 600

ORIGINAL SCALE 1"=200'

LaBella
Powered by partnership.

4 British American Boulevard
Latham, NY 12110
518-439-8235

labellapc.com

NOT FOR CONSTRUCTION

CLIENT NAME:

iPARK 87, LLC
485 WEST PUTNAM AVENUE
GREENWICH, CT 06830

PROJECT NAME:

iPARK 87 - EAST CAMPUS
300 ENTERPRISE DRIVE
ULSTER, NY 12401

NO:	DATE:	DESCRIPTION:
Revisions		

PROJECT NUMBER: 2222588.01

DRAWN BY: HEB

REVIEWED BY: WJK

ISSUED FOR: SWPPP FIGURE- NOT FOR CONSTRUCTION

DATE: 11/27/23

DRAWING NAME:

PRE-DEVELOPMENT WATERSHED DELINEATION MAP

DRAWING NUMBER:

FIG. A-6

11/27/2023 12:11:41 PM

1
FIG. A-7

POST-DEVELOPMENT WATERSHED DELINEATION MAP

SCALE: 1" = 200'

N

0 200 400 600

ORIGINAL SCALE 1"=200'

LaBella
Powered by partnership.

4 British American Boulevard
Latham, NY 12110
518-439-8235

labellapc.com

NOT FOR CONSTRUCTION

CERTIFICATE OF AUTHORIZATION NUMBER:
PROFESSIONAL ENGINEERING: 018281
LAND SURVEYING: 017976
GEOLOGICAL: 018750

CLIENT NAME:

iPARK 87, LLC
485 WEST PUTNAM AVENUE
GREENWICH, CT 06830

PROJECT NAME:

iPARK 87 - EAST CAMPUS
300 ENTERPRISE DRIVE
ULSTER, NY 12401

NO:	DATE:	DESCRIPTION:
Revisions		

PROJECT NUMBER: 2222588.01

DRAWN BY: HEB

REVIEWED BY: WJK

ISSUED FOR: SWPPP FIGURE- NOT FOR CONSTRUCTION

DATE: 11/27/23

DRAWING NAME:

POST-DEVELOPMENT WATERSHED DELINEATION MAP

DRAWING NUMBER:

FIG. A-7

APPENDIX B:
FORMS

Notice of Intent (NOI)
MS4 SWPPP Acceptance Form
SWPPP Preparer Certification Form
Owner/Operator Certification Form
Contractor and Subcontractor Certification Forms
Notice of Termination (NOT)

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NOI for coverage under Stormwater General Permit for Construction Activity

version 1.37

(Submission #: HPZ-FEW6-8JNSX, version 1)

Details

Originally Started By	Haley Bigando
Alternate Identifier	iPark 87 - East Campus
Submission ID	HPZ-FEW6-8JNSX
Submission Reason	New
Status	Draft

Form Input

Owner/Operator Information

Owner/Operator Name (Company/Private Owner/Municipality/Agency/Institution, etc.)
iPark 87 LLC

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

Owner/Operator Contact Person First Name
George

Owner/Operator Mailing Address
485 West Putnam Avenue

City
Greenwich

State
CT

Zip
06830

Phone
2036610055

Email
gdistefano@nationalresources.com

Federal Tax ID
NONE PROVIDED

If the owner/operator is an organization, provide the Federal Tax ID number, or Employer Identification Number (EIN), in the format xx-xxxxxxx. If the owner/operator is an individual and not an organization, enter "Not Applicable" or "N/A" and do not provide the individual's social security number.

Project Location

Project/Site Name
iPark 87 - East Campus

Street Address (Not P.O. Box)
300 Enterprise Drive

Side of Street
East

City/Town/Village (THAT ISSUES BUILDING PERMIT)
Town of Ulster

State
NY

Zip
12401

DEC Region
3

The DEC Region must be provided. Please use the NYSDEC Stormwater Interactive Map (https://gisservices.dec.ny.gov/gis/stormwater/) to confirm which DEC Region this site is located in. To view the DEC Regions, click on "Other Useful Reference Layers" on the left side of the map, then click on "DEC Administrative Boundary." Zoom out as needed to see the Region boundaries.

For projects that span multiple Regions, please select a primary Region and then provide the additional Regions as a note in Question 39.

County
ULSTER

Name of Nearest Cross Street
Boices Lane

Distance to Nearest Cross Street (Feet)
0

Project In Relation to Cross Street
North

Tax Map Numbers Section-Block-Parcel
48.7-1-29.270

Tax Map Numbers
NONE PROVIDED

If the project does not have tax map numbers (e.g. linear projects), enter “Not Applicable” or "N/A".

1. Coordinates

Provide the Geographic Coordinates for the project site. The two methods are:
- Navigate to the project location on the map (below) and click to place a marker and obtain the XY coordinates.
- The "Find Me" button will provide the lat/long for the person filling out this form. Then pan the map to the correct location and click the map to place a marker and obtain the XY coordinates.

Navigate to your location and click on the map to get the X,Y coordinates
41.965910887778804,-73.99452237881432

Project Details

2. What is the nature of this project?
Redevelopment with increase in impervious area

For the purposes of this eNOI, “New Construction” refers to any project that does not involve the disturbance of existing impervious area (i.e. 0 acres). If existing impervious area will be disturbed on the project site, it is considered redevelopment with either increase in impervious area or no increase in impervious area.

3. Select the predominant land use for both pre and post development conditions.

Pre-Development Existing Landuse
Industrial

Post-Development Future Land Use
Other: Mixed-use, multifamily residential, commercial, industrial

3a. If Single Family Subdivision was selected in question 3, enter the number of subdivision lots.
NONE PROVIDED

---

4. In accordance with the larger common plan of development or sale, enter the total project site acreage, the acreage to be disturbed and the future impervious area (acreage)within the disturbed area.

*** ROUND TO THE NEAREST TENTH OF AN ACRE. ***

Total Site Area (acres)
137.5

Total Area to be Disturbed (acres)
47.2

Existing Impervious Area to be Disturbed (acres)
19.8

Future Impervious Area Within Disturbed Area (acres)
23.8

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

---

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

A (%)
90.9

B (%)
0

C (%)
0

D (%)
9.1

7. Is this a phased project?
No

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

Start Date
04/01/2024

End Date
11/01/2028

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

Drainage ditches and storm sewer systems are not considered surface waterbodies. Please identify the surface waterbody that they discharge to. If the nearest surface waterbody is unnamed, provide a description of the waterbody, such as, “Unnamed tributary to Niagara River.”

9a. Type of waterbody identified in question 9?
Stream/Creek Off Site

Other Waterbody Type Off Site Description
NONE PROVIDED

9b. If "wetland" was selected in 9A, how was the wetland identified?
NONE PROVIDED

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

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

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters?
No

Please use the DEC Stormwater Interactive Map (https://gisservices.dec.ny.gov/gis/stormwater/) to confirm if this site is located in one of the watersheds of an AA or AA-S classified water. To view the watershed areas, click on “Permit Related Layers” on the left side of the map, then click on “Class AA AAS Watersheds.”

If No, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as D (provided the map unit name is inclusive of slopes greater than 25%), E or F on the USDA Soil Survey?
NONE PROVIDED

If Yes, what is the acreage to be disturbed?
NONE PROVIDED

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

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)?
Yes

16. What is the name of the municipality/entity that owns the separate storm sewer system?
iPark 87 LLC

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

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

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

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

Required SWPPP Components

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

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

If you answered No in question 22, skip question 23 and the Post-construction Criteria and Post-construction SMP Identification sections.

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

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:
Professional Engineer (P.E.)

SWPPP Preparer
LaBella Associates

Contact Name (Last, First)
Kubow, Walter

Mailing Address
4 British American Boulevard

City
Latham

State
NY

Zip
12110

Phone
5184398235

Email
wkubow@labellapc.com

Download SWPPP Preparer Certification Form
Please take the following steps to prepare and upload your preparer certification form:

1) Click on the link below to download a blank certification form
2) The certified SWPPP preparer should sign this form
3) Scan the signed form
4) Upload the scanned document
Download SWPPP Preparer Certification Form

Please upload the SWPPP Preparer Certification
> NONE PROVIDED
> **Comment**
> NONE PROVIDED

Erosion & Sediment Control Criteria

25. Has a construction sequence schedule for the planned management practices been prepared?
Yes

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

Temporary Structural
Dust Control
Silt Fence
Stabilized Construction Entrance
Storm Drain Inlet Protection

Biotechnical
None

Vegetative Measures
Mulching
Seeding
Sodding
Topsoiling

Permanent Structural
Land Grading
Rock Outlet Protection

Other
NONE PROVIDED

Post-Construction Criteria

*** 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.
Reduction of Clearing and Grading
Locating Development in Less Sensitive Areas

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).

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout). (Acre-feet)
2.361

29. Post-construction SMP Identification
Use the Post-construction SMP Identification section to identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity that were used to reduce the Total WQv Required (#28).

Identify the SMPs to be used by providing 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 the Post-Construction SMP Identification section 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.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29. (acre-feet)
0.366

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28)?
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)] (acre-feet)
0.260

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

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; therefore, NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. SMPs
Use the Post-construction SMP Identification section to identify the Standard SMPs and, if applicable, the Alternative SMPs to be used to treat the remaining total WQv (=Total WQv Required in #28 - Total RRv Provided in #30).

Also, provide the total impervious area that contributes runoff to each practice selected.

NOTE: Use the Post-construction SMP Identification section 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. (acre-feet)
1.995

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 - 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).
2.361

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

If Yes, go to question 36.

If No, sizing criteria has not been met; therefore, NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

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

CPv Required (acre-feet)
58.23

CPv Provided (acre-feet)
66.92

36a. The need to provide channel protection has been waived because:
NONE PROVIDED

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

Overbank Flood Control Criteria (Qp)

Pre-Development (CFS)
152.09

Post-Development (CFS)
152.36

Total Extreme Flood Control Criteria (Qf)

Pre-Development (CFS)
310.88

Post-Development (CFS)
301.41

The post-development rate is higher than the pre-development rate. Please review the responses to Question 37 to ensure the correct values have been provided.

37a. The need to meet the Qp and Qf criteria has been waived because:
NONE PROVIDED

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed?
Yes

If Yes, Identify the entity responsible for the long term Operation and Maintenance
iPark 87 LLC

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.
NONE PROVIDED

Post-Construction SMP Identification

Runoff Reduction (RR) Techniques, Standard Stormwater Management Practices (SMPs) and Alternative SMPs
Identify the Post-construction SMPs to be used by providing 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.

RR Techniques (Area Reduction)

Round to the nearest tenth

Total Contributing Acres for Conservation of Natural Area (RR-1)
NONE PROVIDED

Total Contributing Impervious Acres for Conservation of Natural Area (RR-1)
NONE PROVIDED

Total Contributing Acres for Sheetflow to Riparian Buffers/Filter Strips (RR-2)
NONE PROVIDED

Total Contributing Impervious Acres for Sheetflow to Riparian Buffers/Filter Strips (RR-2)
NONE PROVIDED

Total Contributing Acres for Tree Planting/Tree Pit (RR-3)
1.4

Total Contributing Impervious Acres for Tree Planting/Tree Pit (RR-3)
1.4

Total Contributing Acres for Disconnection of Rooftop Runoff (RR-4)
NONE PROVIDED

RR Techniques (Volume Reduction)

Total Contributing Impervious Acres for Disconnection of Rooftop Runoff (RR-4)
NONE PROVIDED

Total Contributing Impervious Acres for Vegetated Swale (RR-5)
NONE PROVIDED

Total Contributing Impervious Acres for Rain Garden (RR-6)
NONE PROVIDED

Total Contributing Impervious Acres for Stormwater Planter (RR-7)
NONE PROVIDED

Total Contributing Impervious Acres for Rain Barrel/Cistern (RR-8)
NONE PROVIDED

Total Contributing Impervious Acres for Porous Pavement (RR-9)
NONE PROVIDED

Total Contributing Impervious Acres for Green Roof (RR-10)
NONE PROVIDED

Standard SMPs with RRv Capacity

Total Contributing Impervious Acres for Infiltration Trench (I-1)
NONE PROVIDED

Total Contributing Impervious Acres for Infiltration Basin (I-2)
NONE PROVIDED

Total Contributing Impervious Acres for Dry Well (I-3)
NONE PROVIDED

Total Contributing Impervious Acres for Underground Infiltration System (I-4)
NONE PROVIDED

Total Contributing Impervious Acres for Bioretention (F-5)
4.0

Total Contributing Impervious Acres for Dry Swale (O-1)
NONE PROVIDED

Standard SMPs

Total Contributing Impervious Acres for Micropool Extended Detention (P-1)
NONE PROVIDED

Total Contributing Impervious Acres for Wet Pond (P-2)
NONE PROVIDED

Total Contributing Impervious Acres for Wet Extended Detention (P-3)
NONE PROVIDED

Total Contributing Impervious Acres for Multiple Pond System (P-4)
NONE PROVIDED

Total Contributing Impervious Acres for Pocket Pond (P-5)
NONE PROVIDED

Total Contributing Impervious Acres for Surface Sand Filter (F-1)
NONE PROVIDED

Total Contributing Impervious Acres for Underground Sand Filter (F-2)
NONE PROVIDED

Total Contributing Impervious Acres for Perimeter Sand Filter (F-3)
NONE PROVIDED

Total Contributing Impervious Acres for Organic Filter (F-4)
NONE PROVIDED

Total Contributing Impervious Acres for Shallow Wetland (W-1)
NONE PROVIDED

Total Contributing Impervious Acres for Extended Detention Wetland (W-2)
NONE PROVIDED

Total Contributing Impervious Acres for Pond/Wetland System (W-3)
NONE PROVIDED

Total Contributing Impervious Acres for Pocket Wetland (W-4)
NONE PROVIDED

Total Contributing Impervious Acres for Wet Swale (O-2)
NONE PROVIDED

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

Total Contributing Impervious Area for Hydrodynamic
14.3

Total Contributing Impervious Area for Wet Vault
NONE PROVIDED

Total Contributing Impervious Area for Media Filter
NONE PROVIDED

"Other" Alternative SMP?
NONE PROVIDED

Total Contributing Impervious Area for "Other"
NONE PROVIDED

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

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.

Manufacturer of Alternative SMP
Contech Engineered Solutions

Name of Alternative SMP
CS-8

Other Permits

40. Identify other DEC permits, existing and new, that are required for this project/facility.
None

If SPDES Multi-Sector GP, then give permit ID
NONE PROVIDED

If Other, then identify
NONE PROVIDED

41. Does this project require a US Army Corps of Engineers Wetland Permit?
No

If "Yes," then indicate Size of Impact, in acres, to the nearest tenth
NONE PROVIDED

42. 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.
NONE PROVIDED

MS4 SWPPP Acceptance

43. Is this project subject to the requirements of a regulated, traditional land use control MS4?
Yes - Please attach the MS4 Acceptance form below

If No, skip question 44

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

Please note that per Part VII.H.4. of GP-0-20-001, the MS4 SWPPP Acceptance Form must be signed by a principal executive officer or ranking elected official of the MS4, or a duly authorized representative of that person.

MS4 SWPPP Acceptance Form Download
Download form from the link below. Complete, sign, and upload.
MS4 SWPPP Acceptance Form

MS4 Acceptance Form Upload
> NONE PROVIDED
> **Comment**
> NONE PROVIDED

Owner/Operator Certification

Owner/Operator Certification Form Download
Download the certification form by clicking the link below. Complete, sign, scan, and upload the form.
Owner/Operator Certification Form (PDF, 45KB)

Upload Owner/Operator Certification Form
> NONE PROVIDED
> **Comment**
> NONE PROVIDED

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

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

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

I. Project Owner/Operator Information	
1. Owner/Operator Name:	iPark 87 LLC
2. Contact Person:	George Distefano
3. Street Address:	485 West Putnam Avenue
4. City/State/Zip:	Greenwich, CT 06830
II. Project Site Information	
5. Project/Site Name:	iPark 87 - East Campus
6. Street Address:	300 Enterprise Drive
7. City/State/Zip:	Town of Ulster, NY 12401
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:	
12. MS4 SPDES Permit Identification Number: NYR20A	
13. Contact Person:	
14. Street Address:	
15. City/State/Zip:	
16. Telephone Number:	

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

(NYS DEC - MS4 SWPPP Acceptance Form - January 2015)

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

SWPPP Preparer Certification Form

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

Project Site Information

Project/Site Name

iPark 87 - East Campus

Owner/Operator Information

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

LaBella Associates

Certification Statement – SWPPP Preparer

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

First name	MI	Last Name
Walter	J	Kubow

Signature

Date

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Owner/Operator Certification Form

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

Project/Site Name: ____

eNOI Submission Number: ____

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

Certification Statement - Owner/Operator

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

Owner/Operator First Name M.I. Last Name

____

Signature

____

Date

Stormwater Pollution Prevention Plan
Contractor Certification Statement
(Responsible for overall SWPPP Compliance)

iPark 87 – East Campus
300 Enterprise Drive, Town of Ulster, Ulster County, New York

This is to certify that the following contracting firm will be responsible for installing, constructing, repairing, inspecting and/or maintaining the erosion and sediment control practices and post-construction stormwater management control practices required by the SWPPP.

Contracting Firm Information

Name: ______________________________

Address: ______________________________

Telephone & Fax: ______________________________

Trained Contractor(s) [1] **Responsible for SWPPP Implementation (**Provide name, title, and date of last training)

____

____

Prior to commencement of construction activity, the following certification shall be issued:

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

Printed Name: ______________________________

Title/Position: ______________________________

Signature: ____________________ Date: ____________________

Upon completion of construction activities, the following certification shall be issued, prior to issuance of the NOT:

I hereby certify that that all permanent stormwater management practices required by the SWPPP have been installed in accordance with the contract documents. I further certify that all temporary erosion and sediment control measures have been removed from the site, and that the on-site soils disturbed by construction activity have been restored in accordance with the SWPPP and the NYSDEC Division of Water's publication "Deep-Ripping and Decompaction".

Printed Name: ______________________________

Title/Position: ______________________________

Signature: ____________________ Date: ____________________

[1] "Trained Contractor" means an employee from a contracting (construction) company 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 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" will be responsible for the day to day implementation of the SWPPP.

[2] Signatory Requirements:

a. For a corporation, this form shall be signed by (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principle 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, this form shall be signed by a general partner or the proprietor, respectively.
c. For a municipality, State, Federal, or other public agency, this form 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).

Stormwater Pollution Prevention Plan
Subcontractor Certification Statement
(whose work involves soil disturbance)

iPark 87 – East Campus
300 Enterprise Drive, Town of Ulster, Ulster County, New York

Each Subcontractor whose work will involve soil disturbance of any kind is required to complete and sign this Certification Statement before commencing any construction activity at the site. This completed Certification Statement(s) shall be maintained at the construction site in the Site Log Book.

Subcontracting Firm Information

Name: ______________________________

Address: ______________________________

____

Telephone & Fax: ______________________________

Trained Contractor(s) [2] Responsible for SWPPP Implementation (Provide name, title, and date of last training)

____

____

Prior to commencement of construction activities, the following certification shall be issued:

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

Printed Name: ______________________________

Title/Position: ______________________________

Signature: ____________________ Date: ____________________

[2] "Trained Contractor" means an employee from a contracting (construction) company 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 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" will be responsible for the day to day implementation of the SWPPP.

[2] Signatory Requirements:

a. For a corporation, this form shall be signed by (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principle 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, this form shall be signed by a general partner or the proprietor, respectively.
c. For a municipality, State, Federal, or other public agency, this form 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).

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

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

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

I. Owner or Operator Information

1. Owner/Operator Name:	
2. Street Address:	
3. City/State/Zip:	
4. Contact Person:	4a.Telephone:
4b. Contact Person E-Mail:	

II. Project Site Information

5. Project/Site Name:

6. Street Address:

7. City/Zip:

8. County:

III. Reason for Termination

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

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

9c. □ Other (Explain on Page 2)

IV. Final Site Information:

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

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

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

____

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

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

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

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

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

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

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

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

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

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

V. Additional Information/Explanation:

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

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

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

Printed Name:	
Title/Position:	
Signature:	Date:

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

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

(NYS DEC Notice of Termination - January 2015)

APPENDIX C:
PROJECT EVALUATION AND DESIGN CALCULATIONS

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Appendix C - Table A
Step 1 - Evaluation of Green Infrastructure Planning Measures

Group	Practice	Description	Applicable	Project Specific Evaluation
Preservation of Natural Resources	Preservation of Undisturbed Areas	Delineate and place into permanent conservation undisturbed forests, native vegetated areas, riparian corridors, wetlands, and natural terrain.	N/A	The existing site has previously been disturbed and does not contain undisturbed forests, riparian corridors, wetlands, and natural terrain. Therefore, preservation of undisturbed areas is not applicable.
	Preservation of Buffers	Define, delineate and preserve naturally vegetated buffers along perennial streams, rivers, shorelines and wetlands.	N/A	There are no perennial streams, rivers, shorelines, or wetlands on or adjacent to the project site. As such, this green planning measure does not apply.
	Reduction of Clearing and Grading	Limit clearing and grading to the minimum amount needed for roads, driveways, foundations, utilities and stormwater management facilities.	Yes	As a Redevelopment Project, the majority of the land in question had been previously cleared or graded for construction of the existing buildings, roadways, etc. Site clearing and grading required for redevelopment will be minor in nature. The limits of all proposed clearing will be demarcated in the field with orange construction fencing, prior to construction, to prevent unnecessary removal of trees.
	Locating Development in Less Sensitive Areas	Avoid sensitive resource areas such as floodplains, steep slopes, erodible soils, wetlands, mature forests and critical habitats by locating development to fit the terrain in areas that will create the least impact.	Yes	The site layout has been designed to avoid sensitive remediation areas to the greatest extent practical. The layout has been located in operable unit 4 of the site management plan which allows for ground floor residential occupancy.
	Open Space Design	Use clustering, conservation design or open space design to reduce impervious cover, preserve more open space and protect water resources.	N/A	Open space design is not applicable to the proposed use
	Soil Restoration	Restore the original properties and porosity of the soil by deep till and amendment with compost to reduce the generation of runoff and enhance the runoff reduction performance of practices such as downspout disconnections, grass channels, filter strips, and tree clusters.	Yes	Full soil restoration is proposed for all areas of disturbance that will not become hardscape. All areas will be stabilized with seed & mulch, and landscaped areas will be provided.

Reduction of Impervious Cover	Roadway Reduction	Minimize roadway widths and lengths to reduce site impervious area	No	Reducing the roadway width is not feasible for the intended use.
	Sidewalk Reduction	Minimize sidewalk lengths and widths to reduce site impervious area	No	Reducing the sidewalk width is not feasible for the intended use.
	Driveway Reduction	Minimize driveway lengths and widths to reduce site impervious area	N/A	No new driveways are proposed as part of this project.
	Cul-de-sac Reduction	Minimize the number of cul-de-sacs and incorporate landscaped areas to reduce their impervious cover.	N/A	No cul-de-sacs are proposed as part of this project.
	Building Footprint Reduction	Reduce the impervious footprint of residences and commercial buildings by using alternate or taller buildings while maintaining the same floor to area ratio.	No	All new building areas have been allocated to efficiently implement the intended use.
	Parking Reduction	Reduce imperviousness on parking lots by eliminating unneeded spaces, providing compact car spaces and efficient parking lanes, minimizing stall dimensions, using porous pavement surfaces in overflow parking areas, and using multi-storied parking decks where appropriate.	Yes	Based upon the Applicant's experience at similarly sized facilities, and in an effort to reduce impervious area, the Applicant has applied for a waiver from the Planning Board reduce the required number of parking spaces for each use.

Appendix C - Table B
Step 2 - Determine Water Quality Treatment Volume (WQv)

Section 4.2 of the NYSDEC Stormwater Management Design Manual describes the Water Quality Volume equation as:

WQv = (P x Rv x A) / 12

where: WQv = Water Quality Volume (acre-feet)
P = 90% Rainfall Event Number (inches) (interpolated from Design
Rv = 0.05 + 0.009 (I)
I = Impervious Cover (%) within the drainage area contributing to the SMP
A = Drainage area (acres) contributing to the SMP

The following table presents the WQv calculations for each of the proposed stormwater management practices (SMPs).

SMP or Watershed ID	P	A	Impervious Cover	I	Rv	100% New Development WQv		**75% Redevelopment*	
	(inches)	(acres)	(acres)	(%)		(af)	(cf)	*(af)*	*(cf)*
New Impervious	1.50	3.981	3.981	100	0.95	0.473	20,600		
Existing Impervious	1.50	42.566	19.799	47	0.47	2.517	109,640	*1.888*	*82,230*

* According to Section 9.2.1.B.II, redevelopment activities can achieve the water quality treatment objective by treating 25% of the WQv from the disturbed, impervious area by implementation of a standard SMP or green infrastructure technique. 100% treatment is still required for any increase in impervious on the site.

Appendix C - Table C
Step 2 - Determine Water Quality Treatment Volume (WQv)

Section 4.2 of the NYSDEC Stormwater Management Design Manual describes the Water Quality Volume equation as:

WQv = (P x Rv x A) / 12

where: WQv = Water Quality Volume (acre-feet)
P = 90% Rainfall Event Number (inches) (interpolated from Design Manual Fig 4.1)
Rv = 0.05 + 0.009 (I)
I = Impervious Cover (%) within the drainage area contributing to the SMP
A = Drainage area (acres) contributing to the SMP

The following table presents the WQv calculations for each of the proposed stormwater management practices (SMPs).

SMP ID	P	A	Impervious Cover	I	Rv	WQv	
	(inches)	(acres)	(acres)	(%)		(af)	(cf)
Required WQv	-	-	-	-	-	0.473	20,600
Area Reduction RR Techniques							
Tree Planting/Pit	1.50	1.419	1.419	100	0.95	0.168	7,320
Reduced WQv Required							
Required WQv				-	-	0.473	20,600
Area Red. WQv				-	-	0.168	7,320
Reduced WQv Required				-	-	0.305	13,290

Appendix C - Table D

Step 2 - Determine Water Quality Treatment Volume (WQv)

Section 4.2 of the NYSDEC Stormwater Management Design Manual describes the Water Quality Volume equation as:

WQv = (P x Rv x A) / 12

where: WQv = Water Quality Volume (acre-feet)
P = 90% Rainfall Event Number (inches) (interpolated from Design Manual Fig 4.1)
Rv = 0.05 + 0.009 (I)
I = Impervious Cover (%) within the drainage area contributing to the SMP
A = Drainage area (acres) contributing to the SMP

The following table presents the WQv calculations for each of the proposed stormwater management practices (SMPs).

SMP ID	P	A	Impervious Cover	I	Rv	WQv	
	(inches)	(acres)	(acres)	(%)		(af)	(cf)
BIO-2	1.50	4.622	2.186	47	0.47	0.273	11,890
Hydro-2	1.50	8.080	6.365	79	0.76	0.769	33,500
BIO-1	1.50	3.080	1.826	59	0.58	0.223	9,710
Hydro-1	1.50	5.913	5.071	86	0.82	0.606	26,400
Hydro-3	1.50	3.852	2.908	76	0.73	0.351	15,290

Appendix C - Table E
Water Quality Peak Flow (Qp) Calculation Worksheet

Appendix B.2 of the NYSDEC Stormwater Management Design Manual presents instructions for calculating the Water Quality Peak Flow.

Qp = qu * A * WQv

where: P = 90% Rainfall Event Number (inches) (interpolated from Design Manual Fig 4.1)
A = Drainage area (square miles) contributing to the SMP
WQv = Water Quality Volume (inches)

The unit peak discharge qu is obtained from TR-55 Exhibits 4-I through 4-III, depending on the NRCS rainfall distribution type. It is based on the time of concentration (Tc) in hours, the initial abstraction (Ia) in inches, and the precipitation (P) in inches. The initial abstraction (Ia) is obtained from TR-55 Table 4-1, and is based on the equivalent Curve Number for the water quality volume.

The equivalent Curve Number is calculated using the following equation:

CN = 1000 / [10 + 5P + 10Q - 10 * (Q^2 + 1.25QP)^0.5]

where: CN = Equivalent Curve Number
P = 90% Rainfall Event Number (inches)
Q = Water Quality Volume (inches)

The following table presents the Water Quality Peak Flow calculations for each of the proposed stormwater management practices (SMPs).

SMP ID	A (sq miles)	WQv (inches)	Equival. CN	Tc (hours)	Ia (inches)	Ia/P	qu (cfs/sq.mi.-inch)	Qp (cfs)
Hydro-2	0.01	1.14	97	0.1	0.062	0.1	1000	14.4
Hydro-1	0.01	1.23	97	0.1	0.062	0.1	1000	11.4
Hydro-3	0.01	1.1	96	0.1	0.083	0.1	1000	6.6

Appendix C - Table F
Step 3 - Evaluation of Runoff Reduction Techniques and Standard SMPs with RRv Capacity

Design Variant	Practice	Description	Applicable	Project Specific Evaluation/Justification
RR-1	Conservation of Natural Areas	Retain the pre-development hydrologic and water quality characteristics of undisturbed natural areas, stream and wetland buffers by restoring and/or permanently conserving these areas on a site.	N/A	The project site does not contain any significant natural resources. The majority of the site has been previously disturbed.
RR-2	Sheet flow to Riparian Buffers or Filter Strips	Undisturbed natural areas such as forested conservation areas and stream buffers or vegetated filter strips and riparian buffers can be used to treat and control stormwater runoff from portions of development.	N/A	The project site does not contain undisturbed natural areas. The majority of the site has been previously disturbed.
RR-3	Tree Planting/ Tree Pit	Plant or conserve trees to reduce stormwater runoff, increase nutrient uptake, and provide bank stabilization. Trees can be used for applications such as landscaping, stormwater management practice areas, and conservation areas.	Yes	The project proposes the preservation of existing mature trees, as well as the planting of numerous trees throughout the site, in order to reduce stormwater runoff, increase nutrient uptake, and provide bank stabilization. Calculations have been provided in Table.
RR-4	Disconnection of Rooftop Runoff	Direct runoff from residential rooftop areas and upland overland runoff flow to designated pervious areas to reduce runoff volumes and rates.	No	The project site does not have designated pervious areas where rooftop areas can flow overland to.
RR-5	Vegetated Swale	The natural drainage paths, or properly designed vegetated channels, can be used instead of constructing underground storm sewers or concrete open channels to increase time of concentration, reduce the peak discharge, and provide infiltration.	No	The site does not contain sufficient changes in grade to provide vegetated swales.

RR-6	Rain Garden	Manage and treat small volumes of stormwater runoff using a conditioned planting soil bed and planting materials to filter runoff stored within a shallow depression.	No	Due to the limited tributary area to rain gardens (≤ 1,000SF), a bioretention facility will be implemented instead of rain gardens.
RR-7	Stormwater Planter	Small landscaped stormwater treatment devices that can be designed as infiltration or filtering practices. Stormwater planters use soil infiltration and biogeochemical processes to decrease stormwater quantity and improve water quality.	No	A bioretention facility will be implemented instead of stormwater planters.
RR-8	Rain Barrels/ Cisterns	Capture and store stormwater runoff to be used for irrigation systems or filtered and reused for non-contact activities.	No	Rain Barrels/Cisterns are not proposed on-site due to the need for active management/maintenance and initial capital cost.
RR-9	Porous Pavement	Pervious types of pavements that provide an alternative to conventional paved surfaces, designed to infiltrate rainfall through the surface, thereby reducing stormwater runoff from a site and providing some pollutant uptake in the underlying soils.	No	Porous pavement is not proposed as part of this project due to previous groundwater remediation measures onsite, as well as concerns regarding winter maintenance.
RR-10	Green Roof	Capture runoff by a layer of vegetation and soil installed on top of a conventional flat or sloped roof. The rooftop vegetation allows evaporation and evapotranspiration processes to reduce volume and discharge rate of runoff entering conveyance system.	No	A green roof is not proposed on-site due to significant structural, insurance, and maintenance considerations.
	Stream Daylighting	Stream Daylight previously-culverted/piped streams to restore natural habitats, better attenuate runoff by increasing the storage size, promoting infiltration, and help reduce pollutant loads.	N/A	No stream daylighting opportunities are present on this site.

I-1	Infiltration Trench	Excavated, stone-filled trenches designed to capture and temporarily store runoff in the stone reservoir to promote infiltration. Can be constructed as sheet flow to a ground surface depression or piped flow discharged directly into the trench.	No	Infiltration is not proposed due to previous groundwater remediation measures onsite.
I-2	Infiltration Basin	Vegetated excavations designed to capture and infiltrate the WQv. Can be designed off-line to bypass larger flows to downstream flood control facilities or as combined infiltration/flood control facilities by providing temporary detention ponding.	No	Infiltration is not proposed due to previous groundwater remediation measures onsite.
I-3	Dry Wells	Underground structures designed to capture, treat, and infiltrate runoff from small drainage areas (rooftop only) that have low sediment or pollutant loadings. Larger stormwater volumes can be bypassed directly to a flood control facility.	No	Infiltration is not proposed due to previous groundwater remediation measures onsite.
I-4	Underground Infiltration Systems	Underground, proprietary systems designed to capture and infiltrate the WQv, reduce runoff, remove fine sediment and associated pollutants, recharge groundwater, and attenuate peak flows.	No	Infiltration is not proposed due to previous groundwater remediation measures onsite.
F-5	Bioretention	Shallow landscaped depressions where stormwater flows into the practice, ponds at the surface, and gradually filters through the media to remove pollutants. Filtered runoff can either infiltrate into the surrounding soil, or be collected by an underdrain system and discharged to the storm sewer system or directly to receiving waters.	Yes	Bioretention has been applied to this project.
O-1	Dry Swale	Designed to temporarily hold the WQv in a pool or series of pools created by permanent check dams. The soil bed consists of native soils or highly permeable fill material, underlain by an underdrain system. Pollutants are removed through sedimentation, nutrient uptake, and infiltration.	No	The site does not contain sufficient changes in grade to provide dry swales.

Appendix C - Table G

Step 4 - Determine Minimum Runoff Reduction Volume (RRv) Required

Section 4.3 of the NYSDEC Stormwater Management Design Manual describes the equation for minimum Runoff Reduction Volume as:

$$RRv_{min} = (P \times \bar{R}v \times Aic \times S) / 12$$

where: RRv_{min} = Minimum Runoff Reduction Volume Required (acre-feet)
P = 90% Rainfall Event Number (inches) (interpolated from Design Manual Fig
$\bar{R}v$ = 0.05 + 0.009 (I), where I is 100% impervious = 0.95 constant
Aic = Total area of new impervious cover (acres)
S = Hydrologic Soil Group (HSG) Specific Reduction Factor
where:

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

The following table presents the RRv calculations for each of the proposed stormwater management practices (SMPs).

SMP ID	P	Rv*	Specifc Reduction Factor (S)	Impervious Cover (Aic)	RRv	
	(inches)			(acres)	(af)	(cf)
Increase Cover	1.5	0.95	0.55	3.9809458	0.26	11,330

Appendix C - Table H
Practice Specific Sizing Calculation Worksheet

BIORETENTION FILTER (BIO-1)

Determine Required Water Quality Volume

WQv = (P/12) * Rv * A

where: WQv = Water Quality Volume (acre-feet)
P = 90% Rainfall Event Number (inches) (interpolated from Design Manual Fig 4.1)
Rv = 0.05 + 0.009 (I)
I = Impervious Cover (%) within the drainage area contributing to the SWM practice
A = Drainage area (square feet) contributing to the SWM practice

Required WQv = 9,710 CF **Value taken from Appendix C - Table B*

Calculate Required Filter Bed Area

Af=(WQv)*(df)/[(k)*(hf+df)*(tf)]

where: Af = Surface area of filter bed (SF)
WQv = Required Water Quality Volume (CF)
df = Filter bed depth (ft)
k = Coefficient of permeability of filter media (ft/day)
hf = Average height of water above filter bed (ft)
tf = Design filter bed drain time (days)

SMP ID	WQv	df	k	hf	tf	Minimum Af	Provided Af
	(cubic feet)	(feet)	(ft/day)	(feet)	(days)	(sq-ft)	(sq-ft)
BIO-1	9710.0	2.5	0.5	0.5	2.0	8,092	8,149

Calculate Provided Water Quality Volume

Provided WQv = Vf + Vs + Vp

where: Vf = Volume of Filter (CF) = Af * df * n-filter
Vs = Volume of Stone Drainage Course (CF) = Af * ds * n-stone
Vp = Volume of Ponding (CF)

df = 2.5 ft
n-filter = 0.30
ds = 1.33 ft
n-stone = 0.40

Vf = 6112 CF
Vs = 4346 CF
Vp = 4600 CF **Value taken directly from HydroCAD*
Provided WQv = 15,058 CF

Calculate Provided Runoff Reduction Volume

Using Underdrains? Yes
RRv Available = 6023 CF
RRv Applied = 6,023 CF

Appendix C - Table I
Practice Specific Sizing Calculation Worksheet

BIORETENTION FILTER (BIO-2)

Determine Required Water Quality Volume

WQv = (P/12) * Rv * A

where: WQv = Water Quality Volume (acre-feet)
P = 90% Rainfall Event Number (inches) (interpolated from Design Manual Fig 4.1)
Rv = 0.05 + 0.009 (I)
I = Impervious Cover (%) within the drainage area contributing to the SWM practice
A = Drainage area (square feet) contributing to the SWM practice

Required WQv =	11,890 CF

**Value taken from Appendix C - Table B*

Calculate Required Filter Bed Area

Af=(WQv)*(df)/[(k)*(hf+df)*(tf)]

where: Af = Surface area of filter bed (SF)
WQv = Required Water Quality Volume (CF)
df = Filter bed depth (ft)
k = Coefficient of permeability of filter media (ft/day)
hf = Average height of water above filter bed (ft)
tf = Design filter bed drain time (days)

SMP ID	WQv (cubic feet)	df (feet)	k (ft/day)	hf (feet)	tf (days)	Minimum Af (sq-ft)	Provided Af (sq-ft)
BIO-2	11890.0	2.5	0.5	0.5	2.0	9,908	10,038

Calculate Provided Water Quality Volume

Provided WQv = Vf + Vs + Vp

where: Vf = Volume of Filter (CF) = Af * df * n-filter
Vs = Volume of Stone Drainage Course (CF) = Af * ds * n-stone
Vp = Volume of Ponding (CF)

df =	2.5	ft
n-filter =	0.30	
ds =	1.33	ft
n-stone =	0.40	

Vf =	7529	CF
Vs =	5354	CF
Vp =	5408	CF
Provided WQv =	18,290	CF

**Value taken directly from HydroCAD*

Calculate Provided Runoff Reduction Volume

Using Underdrains?	Yes	
RRv Available =	7316	CF
RRv Applied =	7,316	CF

APPENDIX D:
PRE-DEVELOPMENT STORMWATER MODELING

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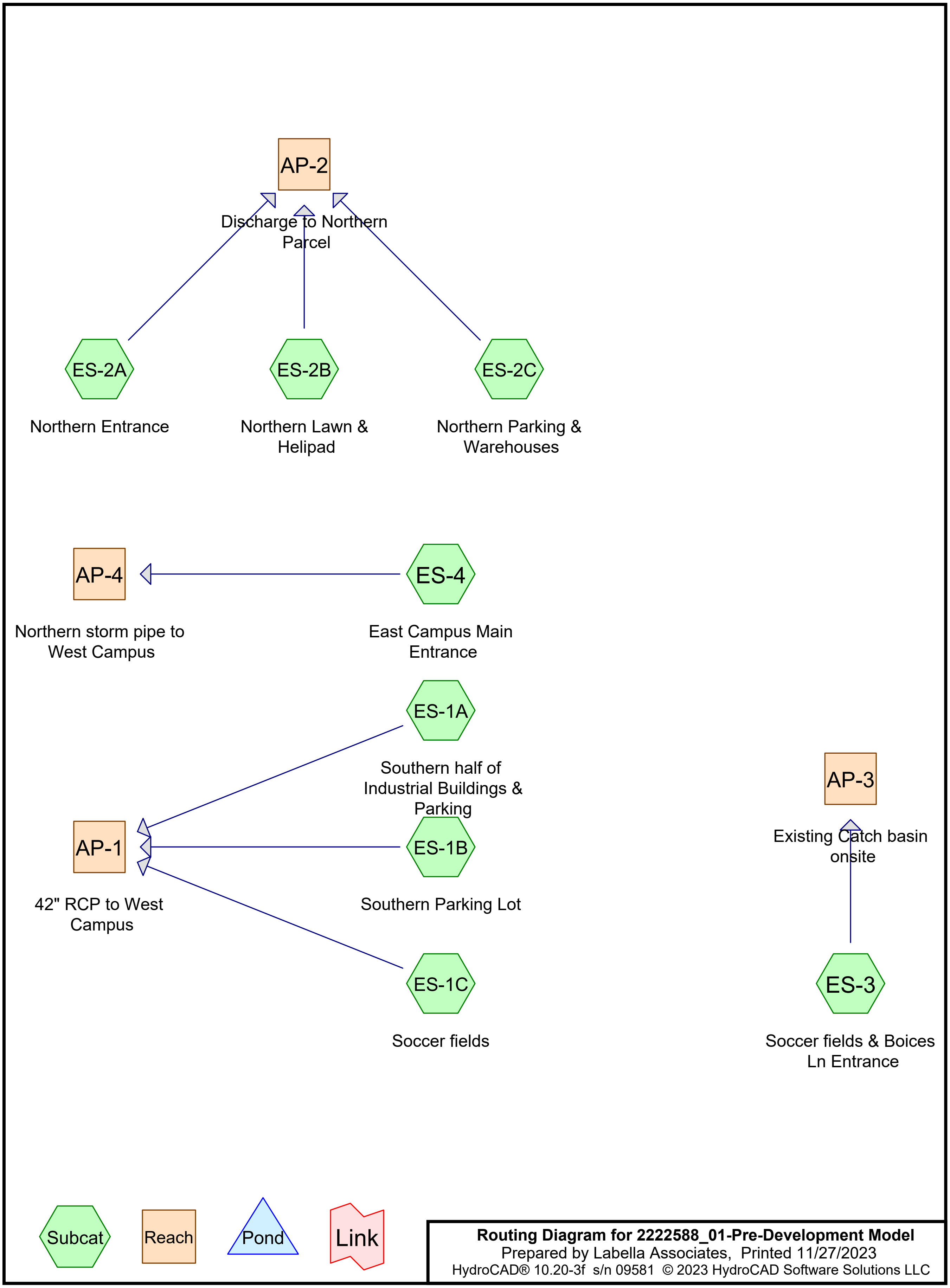
AP-2
Discharge to Northern Parcel
ES-2A
Northern Entrance
ES-2B
Northern Lawn & Helipad
ES-2C
Northern Parking & Warehouses
AP-4
Northern storm pipe to West Campus
ES-4
East Campus Main Entrance
ES-1A
Southern half of Industrial Buildings & Parking
AP-1
42" RCP to West Campus
ES-1B
Southern Parking Lot
ES-1C
Soccer fields
AP-3
Existing Catch basin onsite
ES-3
Soccer fields & Boices Ln Entrance
Subcat
Reach
Pond
Link
Routing Diagram for 2222588_01-Pre-Development Model
Prepared by Labella Associates, Printed 11/27/2023
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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	NY-Ulster 24-hr S1	1-yr	Default	24.00	1	2.60	2
2	10-yr	NY-Ulster 24-hr S1	10-yr	Default	24.00	1	4.70	2
3	100-yr	NY-Ulster 24-hr S1	100-yr	Default	24.00	1	8.33	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
44.510	39	>75% Grass cover, Good, HSG A (ES-1A, ES-1B, ES-1C, ES-2A, ES-2B, ES-2C, ES-3, ES-4)
6.039	80	>75% Grass cover, Good, HSG D (ES-2A, ES-2B, ES-2C, ES-4)
2.182	30	Brush, Good, HSG A (ES-1A, ES-1B, ES-2C)
58.174	98	Paved parking, HSG A (ES-1A, ES-1B, ES-1C, ES-2A, ES-2B, ES-2C, ES-3, ES-4)
4.007	98	Paved parking, HSG D (ES-2A, ES-2B, ES-2C, ES-4)
25.700	98	Roofs, HSG A (ES-1A, ES-1B, ES-2C, ES-4)
0.024	98	Roofs, HSG D (ES-2A, ES-2B)
2.527	32	Woods/grass comb., Good, HSG A (ES-1A, ES-1B, ES-1C, ES-2A, ES-2C, ES-3)
0.295	79	Woods/grass comb., Good, HSG D (ES-2A, ES-2C)
143.457	**77**	**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentES-1A: Southern half of Runoff Area=1,715,935 sf 73.92% Impervious Runoff Depth=1.07"
Tc=6.0 min CN=82 Runoff=53.16 cfs 3.519 af

SubcatchmentES-1B: Southern Parking Runoff Area=933,033 sf 57.02% Impervious Runoff Depth=0.58"
Flow Length=1,976' Tc=13.4 min CN=72 Runoff=9.28 cfs 1.038 af

SubcatchmentES-1C: Soccer fields Runoff Area=399,937 sf 13.08% Impervious Runoff Depth=0.01"
Flow Length=1,333' Tc=63.9 min CN=46 Runoff=0.01 cfs 0.004 af

SubcatchmentES-2A: Northern Entrance Runoff Area=141,498 sf 27.01% Impervious Runoff Depth=1.07"
Flow Length=227' Slope=0.0150 '/' Tc=13.6 min CN=82 Runoff=3.10 cfs 0.290 af

SubcatchmentES-2B: Northern Lawn & Runoff Area=270,919 sf 27.69% Impervious Runoff Depth=0.80"
Flow Length=449' Tc=20.8 min CN=77 Runoff=3.40 cfs 0.417 af

SubcatchmentES-2C: Northern Parking Runoff Area=1,961,346 sf 72.39% Impervious Runoff Depth=1.07"
Tc=6.0 min CN=82 Runoff=60.77 cfs 4.022 af

SubcatchmentES-3: Soccer fields & Runoff Area=222,378 sf 14.66% Impervious Runoff Depth=0.01"
Flow Length=1,051' Tc=35.8 min CN=47 Runoff=0.01 cfs 0.004 af

SubcatchmentES-4: East Campus Main Runoff Area=603,956 sf 68.02% Impervious Runoff Depth=0.96"
Tc=6.0 min CN=80 Runoff=16.42 cfs 1.108 af

Reach AP-1: 42" RCP to West Campus Inflow=58.22 cfs 4.561 af
Outflow=58.22 cfs 4.561 af

Reach AP-2: Discharge to Northern Parcel Inflow=63.98 cfs 4.729 af
Outflow=63.98 cfs 4.729 af

Reach AP-3: Existing Catch basin onsite Inflow=0.01 cfs 0.004 af
Outflow=0.01 cfs 0.004 af

Reach AP-4: Northern storm pipe to West Campus Inflow=16.42 cfs 1.108 af
Outflow=16.42 cfs 1.108 af

Total Runoff Area = 143.457 ac Runoff Volume = 10.402 af Average Runoff Depth = 0.87"
38.72% Pervious = 55.552 ac 61.28% Impervious = 87.905 ac

Summary for Subcatchment ES-1A: Southern half of Industrial Buildings & Parking

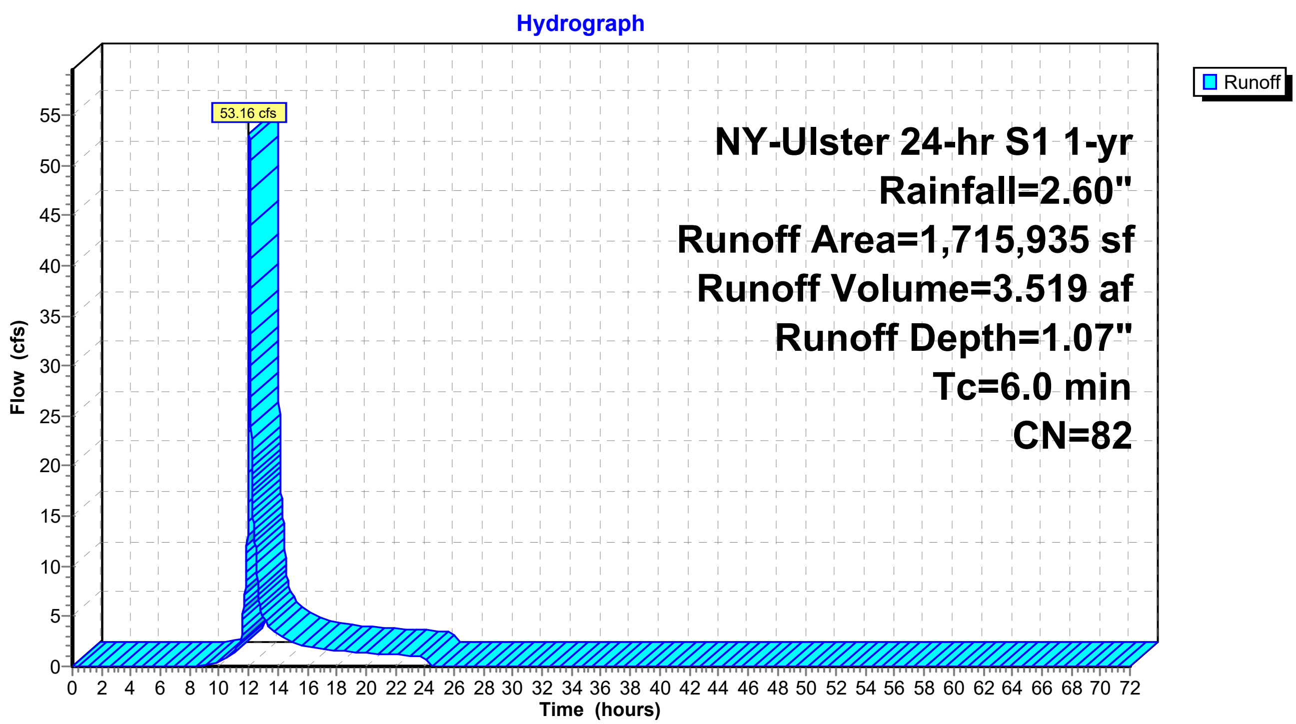
Runoff = 53.16 cfs @ 12.04 hrs, Volume= 3.519 af, Depth= 1.07"
Routed to Reach AP-1 : 42" RCP to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
799,174	98	Paved parking, HSG A
469,173	98	Roofs, HSG A
2,786	32	Woods/grass comb., Good, HSG A
75,110	30	Brush, Good, HSG A
369,692	39	>75% Grass cover, Good, HSG A
1,715,935	82	Weighted Average
447,588		26.08% Pervious Area
1,268,347		73.92% Impervious Area

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

Subcatchment ES-1A: Southern half of Industrial Buildings & Parking



Summary for Subcatchment ES-1B: Southern Parking Lot

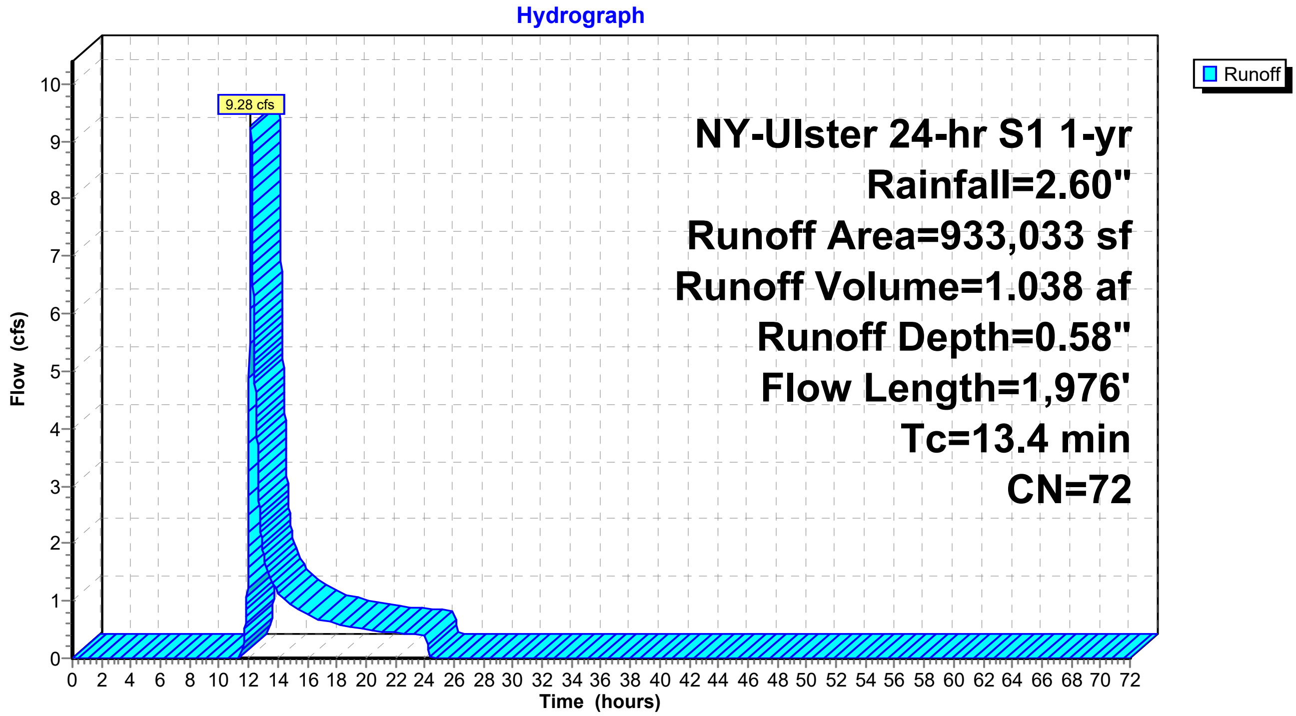
Runoff = 9.28 cfs @ 12.16 hrs, Volume= 1.038 af, Depth= 0.58"
Routed to Reach AP-1 : 42" RCP to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
522,203	98	Paved parking, HSG A
9,823	98	Roofs, HSG A
16,008	32	Woods/grass comb., Good, HSG A
10,203	30	Brush, Good, HSG A
374,796	39	>75% Grass cover, Good, HSG A
933,033	72	Weighted Average
401,007		42.98% Pervious Area
532,026		57.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	429	0.0070	1.51	0.53	**Pipe Channel, 8" CMP** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.025 Corrugated metal
4.0	509	0.0080	2.11	1.66	**Pipe Channel, 12" CMP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
1.2	174	0.0040	2.49	1.95	**Pipe Channel, 12" RCP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.015 Concrete sewer w/manholes & inlets
1.1	197	0.0040	2.89	3.54	**Pipe Channel, 15" RCP** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.015 Concrete sewer w/manholes & inlets
1.3	394	0.0090	4.89	8.64	**Pipe Channel, 18" RCP** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.015 Concrete sewer w/manholes & inlets
1.1	273	0.0020	4.05	38.99	**Pipe Channel, 42" RCP** 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.015 Concrete sewer w/manholes & inlets
13.4	1,976	Total			

Subcatchment ES-1B: Southern Parking Lot



Summary for Subcatchment ES-1C: Soccer fields

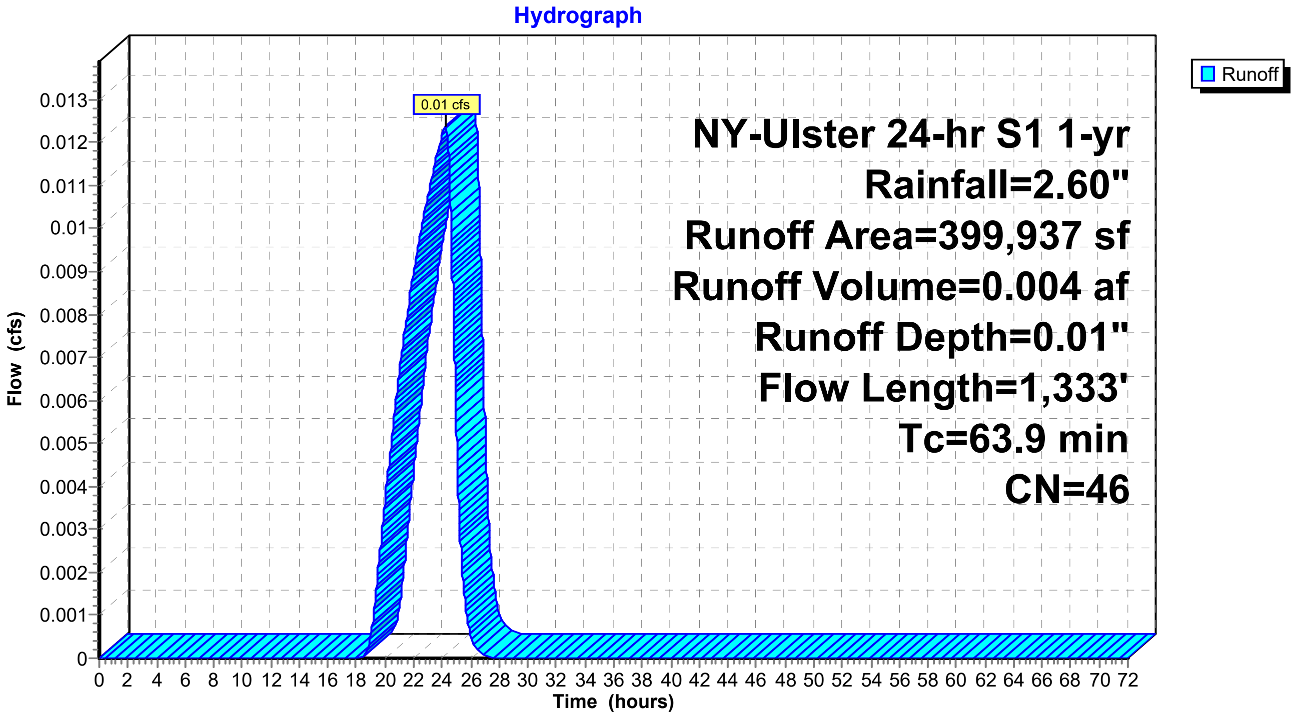
Runoff = 0.01 cfs @ 24.21 hrs, Volume= 0.004 af, Depth= 0.01"
Routed to Reach AP-1 : 42" RCP to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
52,302	98	Paved parking, HSG A
44,735	32	Woods/grass comb., Good, HSG A
302,900	39	>75% Grass cover, Good, HSG A
399,937	46	Weighted Average
347,635		86.92% Pervious Area
52,302		13.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0040	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
7.9	278	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	21	0.0070	1.70		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.3	44	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.3	85	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	16	0.0080	1.82		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	57	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
31.8	732	0.0030	0.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
63.9	1,333	Total			

Subcatchment ES-1C: Soccer fields



Summary for Subcatchment ES-2A: Northern Entrance

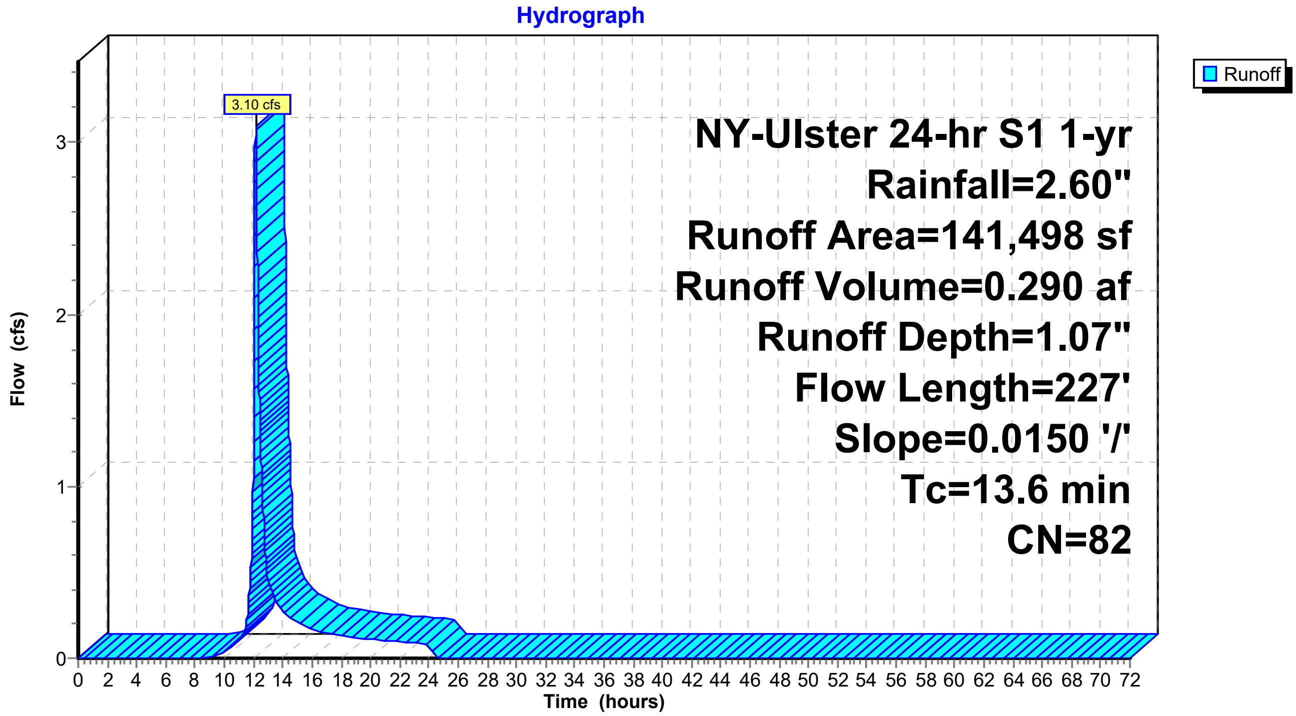
Runoff = 3.10 cfs @ 12.14 hrs, Volume= 0.290 af, Depth= 1.07"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
4,821	98	Paved parking, HSG A
32,718	98	Paved parking, HSG D
682	98	Roofs, HSG D
4,958	32	Woods/grass comb., Good, HSG A
11,275	79	Woods/grass comb., Good, HSG D
4,843	39	>75% Grass cover, Good, HSG A
82,201	80	>75% Grass cover, Good, HSG D
141,498	82	Weighted Average
103,277		72.99% Pervious Area
38,221		27.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0150	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
2.5	127	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.6	227	Total			

Subcatchment ES-2A: Northern Entrance



Summary for Subcatchment ES-2B: Northern Lawn & Helipad

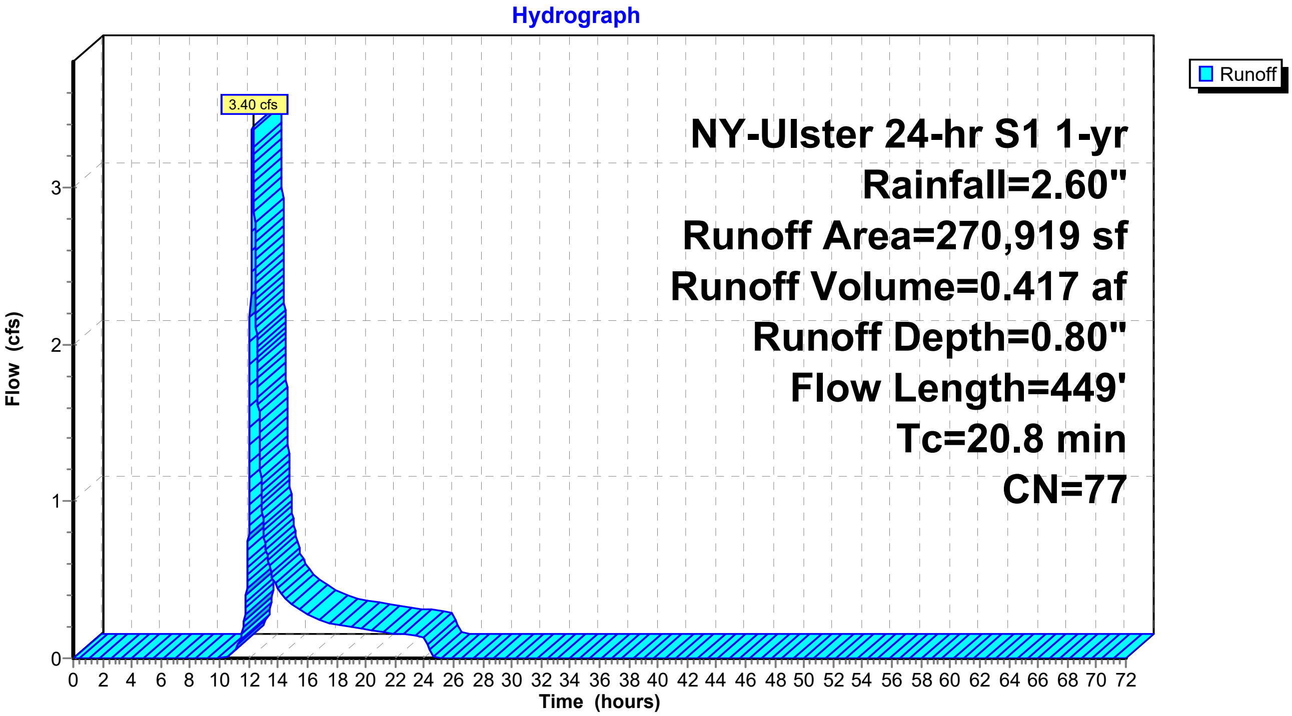
Runoff = 3.40 cfs @ 12.26 hrs, Volume= 0.417 af, Depth= 0.80"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
35,226	98	Paved parking, HSG A
39,420	98	Paved parking, HSG D
374	98	Roofs, HSG D
50,804	39	>75% Grass cover, Good, HSG A
145,095	80	>75% Grass cover, Good, HSG D
270,919	77	Weighted Average
195,899		72.31% Pervious Area
75,020		27.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0080	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
0.1	14	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.4	102	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.1	233	0.0180	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.8	449	Total			

Subcatchment ES-2B: Northern Lawn & Helipad



Summary for Subcatchment ES-2C: Northern Parking & Warehouses

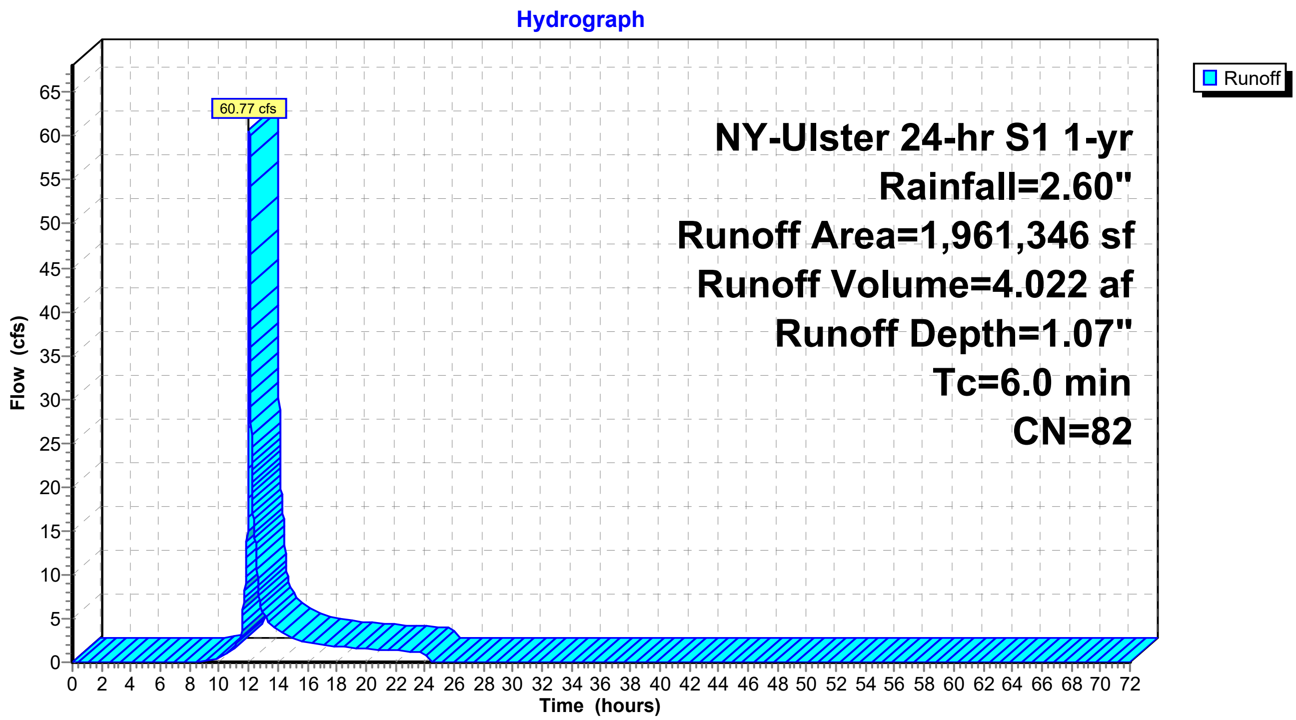
Runoff = 60.77 cfs @ 12.04 hrs, Volume= 4.022 af, Depth= 1.07"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
872,867	98	Paved parking, HSG A
87,604	98	Paved parking, HSG D
459,315	98	Roofs, HSG A
22,924	32	Woods/grass comb., Good, HSG A
1,554	79	Woods/grass comb., Good, HSG D
477,620	39	>75% Grass cover, Good, HSG A
29,747	80	>75% Grass cover, Good, HSG D
9,715	30	Brush, Good, HSG A
1,961,346	82	Weighted Average
541,560		27.61% Pervious Area
1,419,786		72.39% Impervious Area

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

Subcatchment ES-2C: Northern Parking & Warehouses



Summary for Subcatchment ES-3: Soccer fields & Boices Ln Entrance

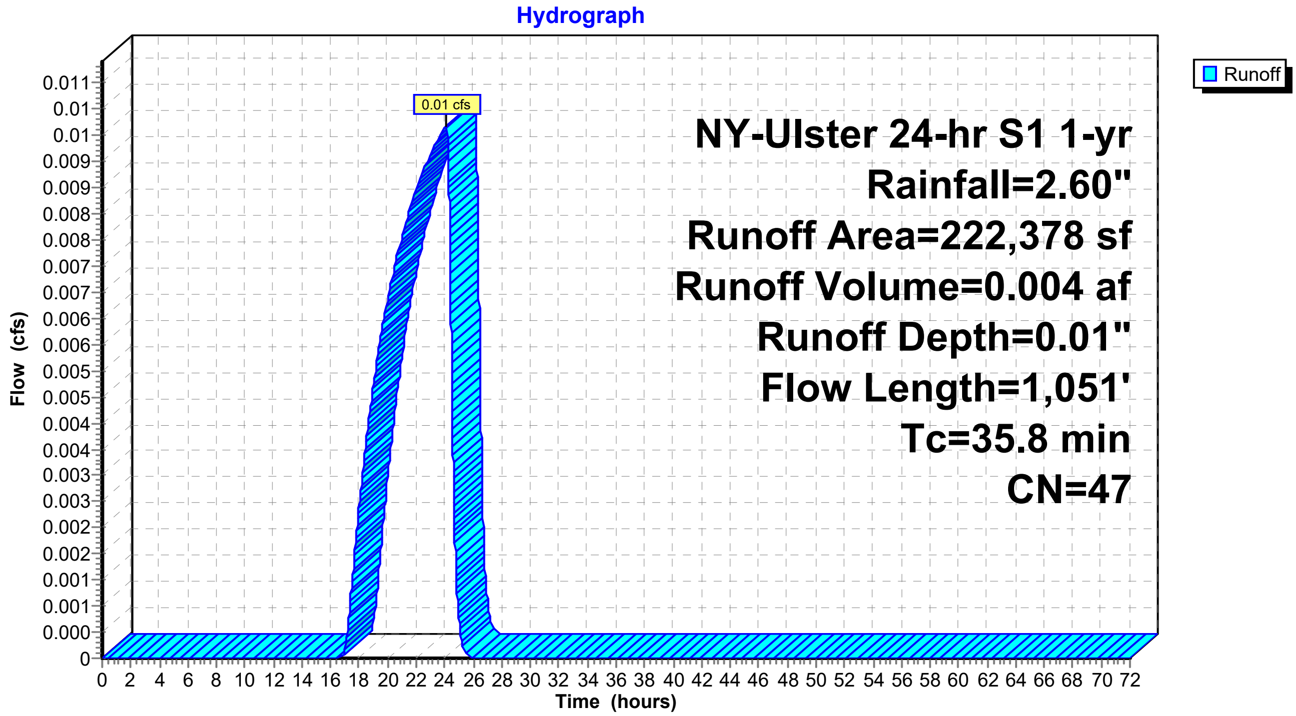
Runoff = 0.01 cfs @ 24.06 hrs, Volume= 0.004 af, Depth= 0.01"
Routed to Reach AP-3 : Existing Catch basin onsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
32,604	98	Paved parking, HSG A
18,656	32	Woods/grass comb., Good, HSG A
171,118	39	>75% Grass cover, Good, HSG A
222,378	47	Weighted Average
189,774		85.34% Pervious Area
32,604		14.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.3	100	0.0026	0.07		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
10.7	376	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.8	575	0.0050	3.47	2.73	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PE, smooth interior
35.8	1,051	Total			

Subcatchment ES-3: Soccer fields & Boices Ln Entrance



Summary for Subcatchment ES-4: East Campus Main Entrance

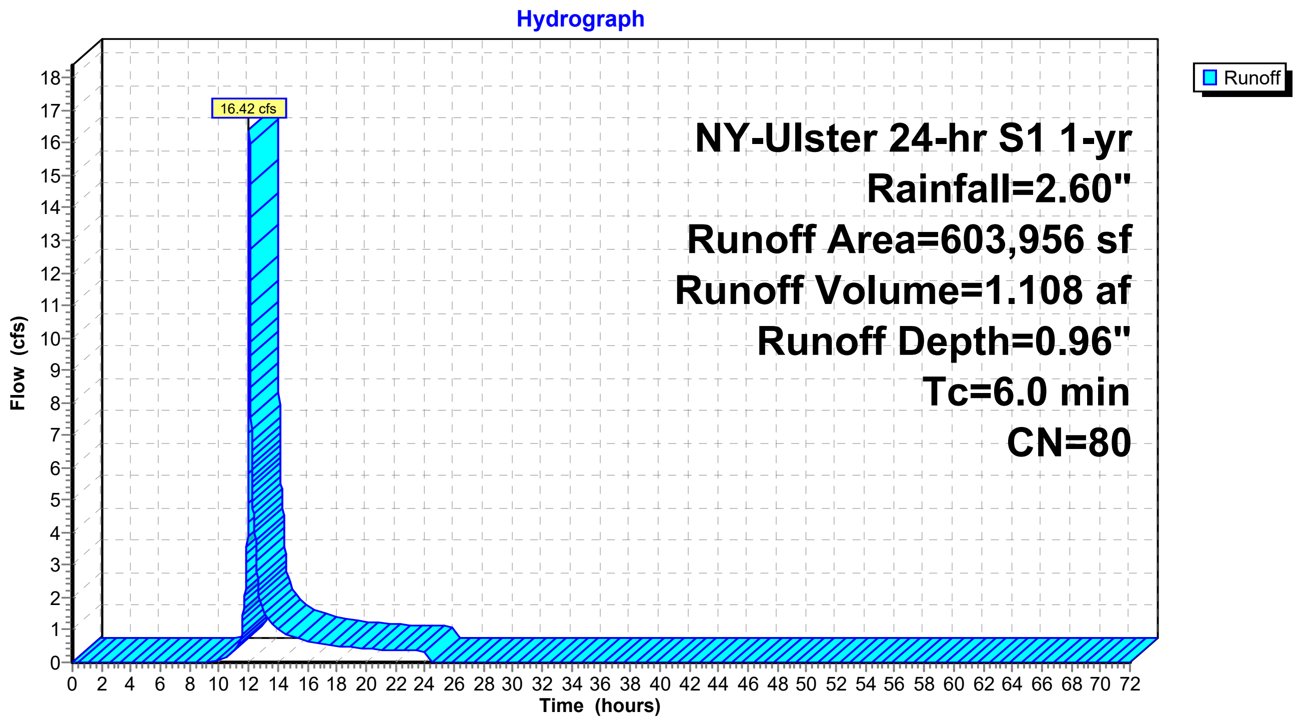
Runoff = 16.42 cfs @ 12.04 hrs, Volume= 1.108 af, Depth= 0.96"
Routed to Reach AP-4 : Northern storm pipe to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
214,844	98	Paved parking, HSG A
14,814	98	Paved parking, HSG D
181,172	98	Roofs, HSG A
187,091	39	>75% Grass cover, Good, HSG A
6,035	80	>75% Grass cover, Good, HSG D
603,956	80	Weighted Average
193,126		31.98% Pervious Area
410,830		68.02% Impervious Area

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

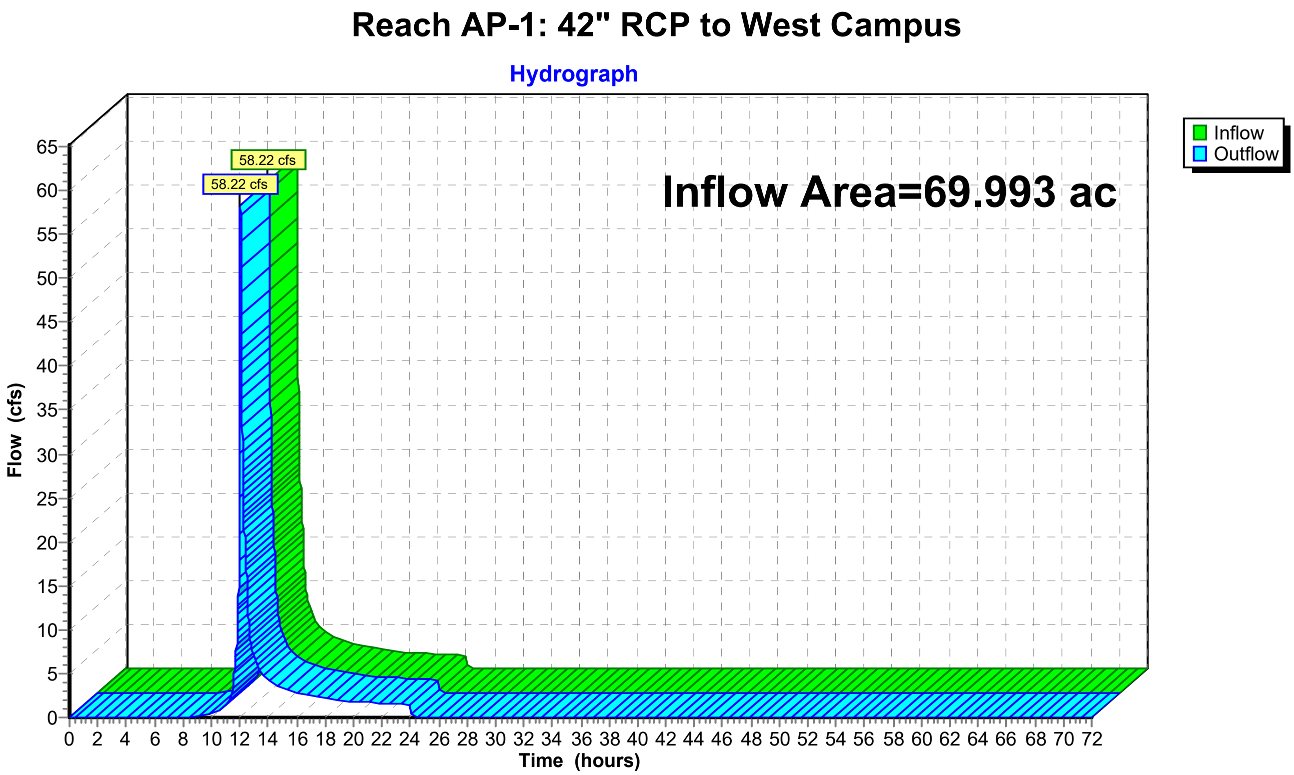
Subcatchment ES-4: East Campus Main Entrance



Summary for Reach AP-1: 42" RCP to West Campus

Inflow Area =	69.993 ac, 60.77% Impervious, Inflow Depth = 0.78"	for 1-yr event	
Inflow =	58.22 cfs @ 12.04 hrs, Volume=	4.561 af	
Outflow =	58.22 cfs @ 12.04 hrs, Volume=	4.561 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

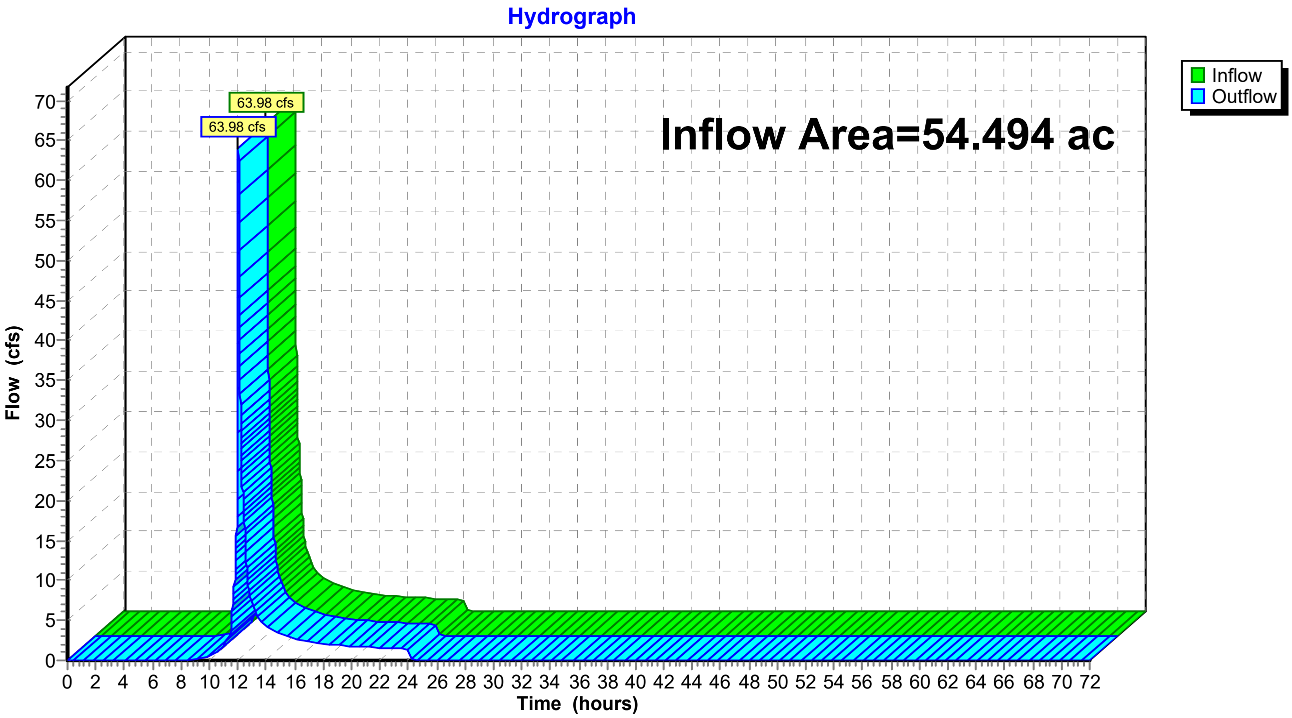


Summary for Reach AP-2: Discharge to Northern Parcel

Inflow Area = 54.494 ac, 64.58% Impervious, Inflow Depth = 1.04" for 1-yr event
Inflow = 63.98 cfs @ 12.04 hrs, Volume= 4.729 af
Outflow = 63.98 cfs @ 12.04 hrs, Volume= 4.729 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-2: Discharge to Northern Parcel

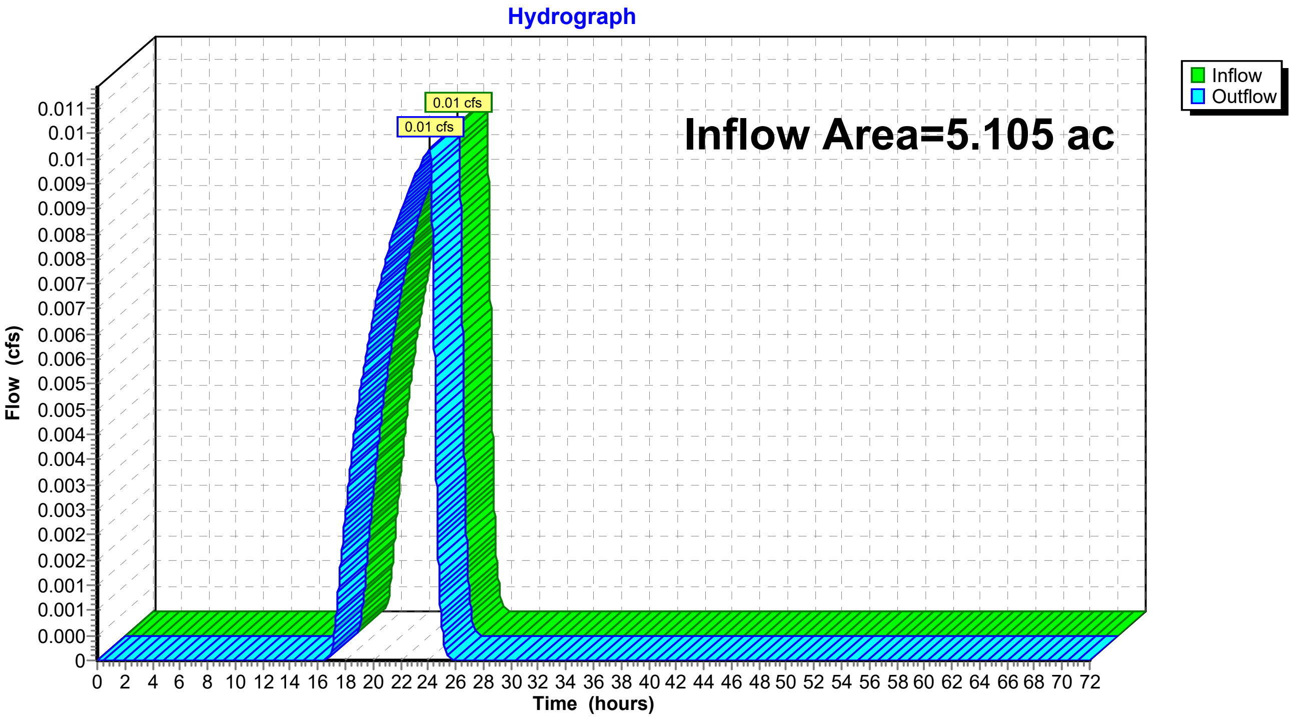


Summary for Reach AP-3: Existing Catch basin onsite

Inflow Area = 5.105 ac, 14.66% Impervious, Inflow Depth = 0.01" for 1-yr event
Inflow = 0.01 cfs @ 24.06 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 24.06 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-3: Existing Catch basin onsite

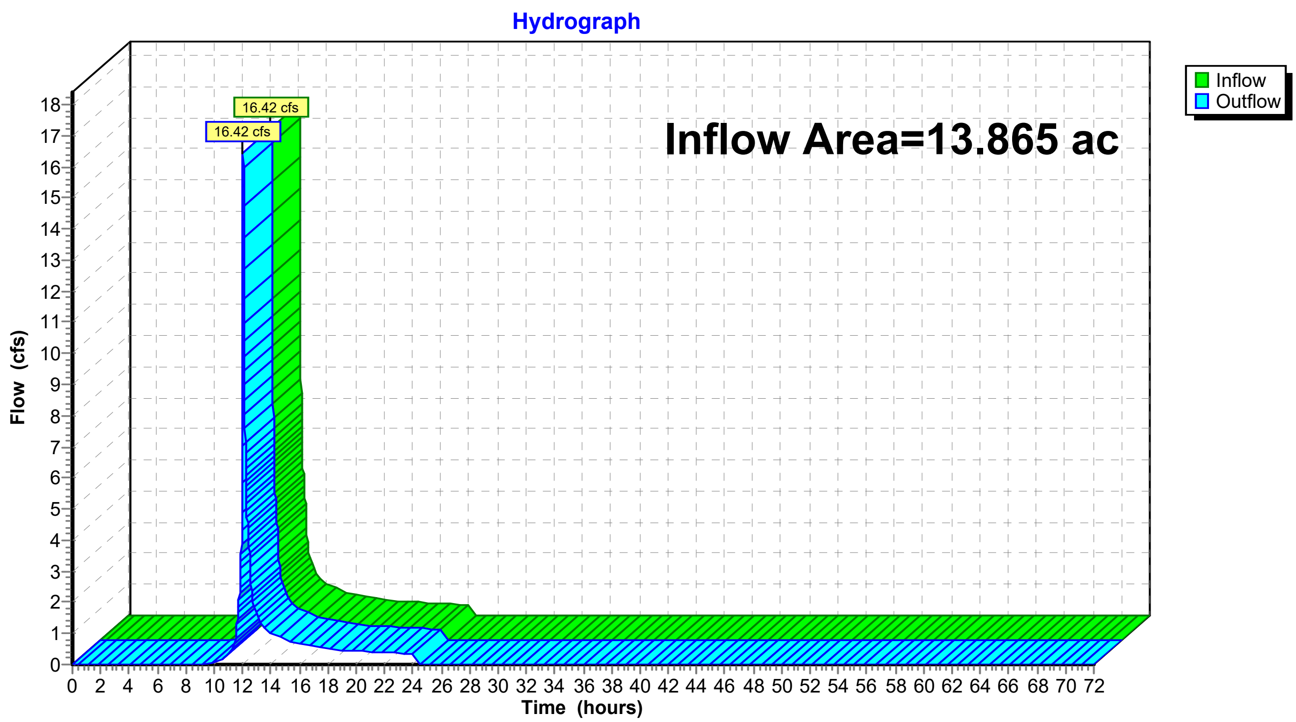


Summary for Reach AP-4: Northern storm pipe to West Campus

Inflow Area =	13.865 ac,	68.02% Impervious, Inflow Depth = 0.96"	for 1-yr event	
Inflow =	16.42 cfs @	12.04 hrs, Volume=	1.108 af	
Outflow =	16.42 cfs @	12.04 hrs, Volume=	1.108 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-4: Northern storm pipe to West Campus



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment ES-1A: Southern half of Runoff Area=1,715,935 sf 73.92% Impervious Runoff Depth=2.81"
Tc=6.0 min CN=82 Runoff=128.63 cfs 9.232 af

Subcatchment ES-1B: Southern Parking Runoff Area=933,033 sf 57.02% Impervious Runoff Depth=1.97"
Flow Length=1,976' Tc=13.4 min CN=72 Runoff=34.87 cfs 3.515 af

Subcatchment ES-1C: Soccer fields Runoff Area=399,937 sf 13.08% Impervious Runoff Depth=0.39"
Flow Length=1,333' Tc=63.9 min CN=46 Runoff=0.64 cfs 0.300 af

Subcatchment ES-2A: Northern Entrance Runoff Area=141,498 sf 27.01% Impervious Runoff Depth=2.81"
Flow Length=227' Slope=0.0150 '/' Tc=13.6 min CN=82 Runoff=7.71 cfs 0.761 af

Subcatchment ES-2B: Northern Lawn & Runoff Area=270,919 sf 27.69% Impervious Runoff Depth=2.37"
Flow Length=449' Tc=20.8 min CN=77 Runoff=10.17 cfs 1.230 af

Subcatchment ES-2C: Northern Parking Runoff Area=1,961,346 sf 72.39% Impervious Runoff Depth=2.81"
Tc=6.0 min CN=82 Runoff=147.03 cfs 10.552 af

Subcatchment ES-3: Soccer fields & Runoff Area=222,378 sf 14.66% Impervious Runoff Depth=0.44"
Flow Length=1,051' Tc=35.8 min CN=47 Runoff=0.54 cfs 0.185 af

Subcatchment ES-4: East Campus Main Runoff Area=603,956 sf 68.02% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=80 Runoff=42.37 cfs 3.042 af

Reach AP-1: 42" RCP to West Campus Inflow=151.55 cfs 13.048 af
Outflow=151.55 cfs 13.048 af

Reach AP-2: Discharge to Northern Parcel Inflow=156.95 cfs 12.544 af
Outflow=156.95 cfs 12.544 af

Reach AP-3: Existing Catch basin onsite Inflow=0.54 cfs 0.185 af
Outflow=0.54 cfs 0.185 af

Reach AP-4: Northern storm pipe to West Campus Inflow=42.37 cfs 3.042 af
Outflow=42.37 cfs 3.042 af

Total Runoff Area = 143.457 ac Runoff Volume = 28.818 af Average Runoff Depth = 2.41"
38.72% Pervious = 55.552 ac 61.28% Impervious = 87.905 ac

Summary for Subcatchment ES-1A: Southern half of Industrial Buildings & Parking

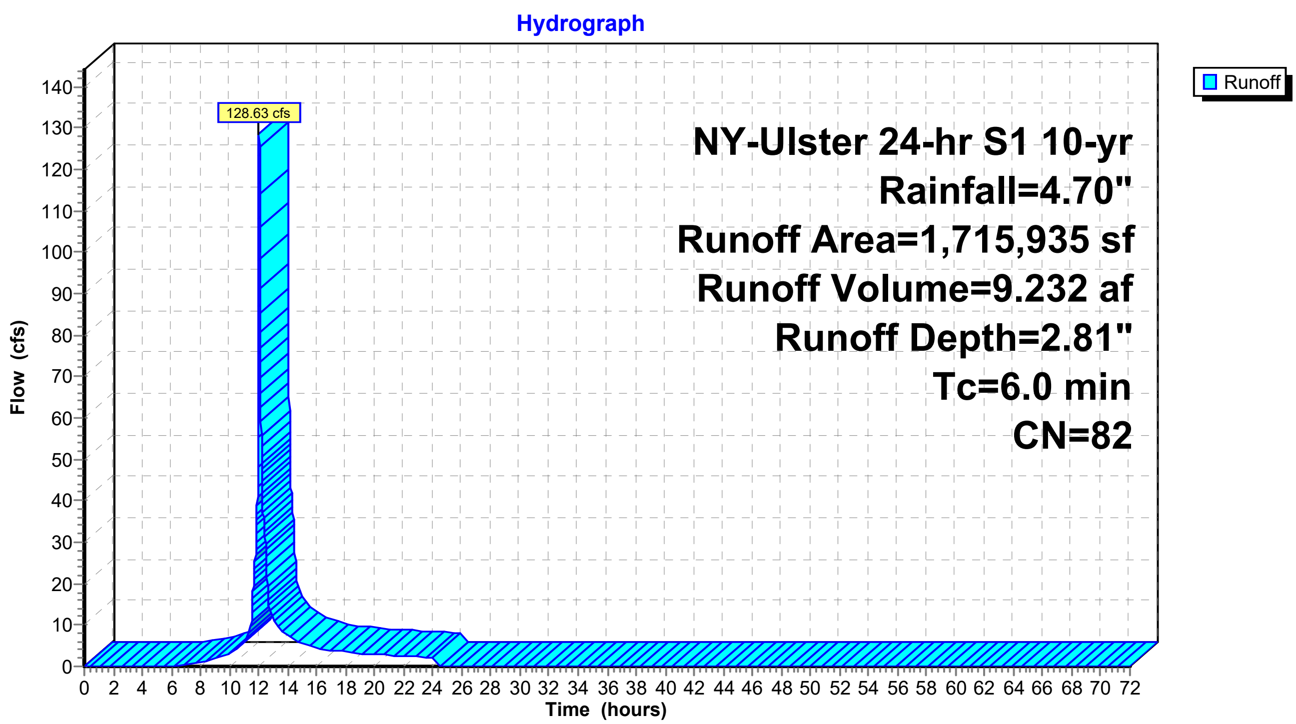
Runoff = 128.63 cfs @ 12.04 hrs, Volume= 9.232 af, Depth= 2.81"
Routed to Reach AP-1 : 42" RCP to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
799,174	98	Paved parking, HSG A
469,173	98	Roofs, HSG A
2,786	32	Woods/grass comb., Good, HSG A
75,110	30	Brush, Good, HSG A
369,692	39	>75% Grass cover, Good, HSG A
1,715,935	82	Weighted Average
447,588		26.08% Pervious Area
1,268,347		73.92% Impervious Area

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

Subcatchment ES-1A: Southern half of Industrial Buildings & Parking



Summary for Subcatchment ES-1B: Southern Parking Lot

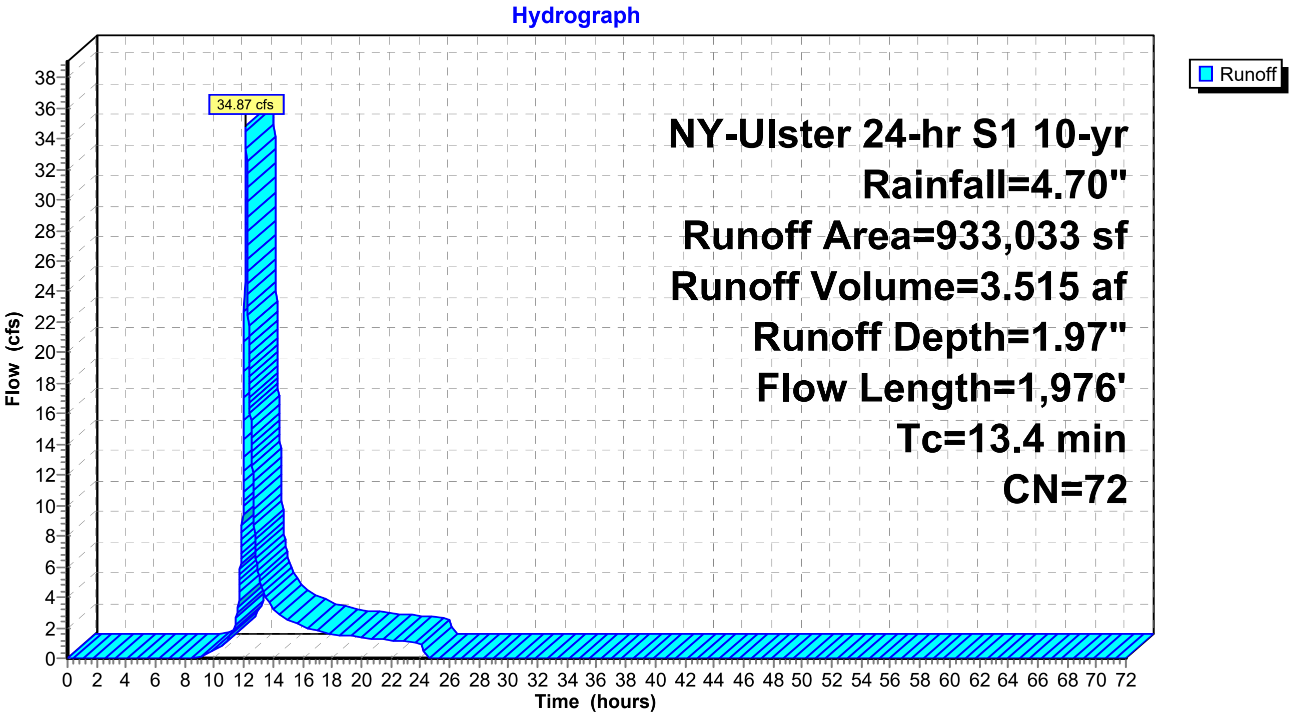
Runoff = 34.87 cfs @ 12.14 hrs, Volume= 3.515 af, Depth= 1.97"
Routed to Reach AP-1 : 42" RCP to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
522,203	98	Paved parking, HSG A
9,823	98	Roofs, HSG A
16,008	32	Woods/grass comb., Good, HSG A
10,203	30	Brush, Good, HSG A
374,796	39	>75% Grass cover, Good, HSG A
933,033	72	Weighted Average
401,007		42.98% Pervious Area
532,026		57.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	429	0.0070	1.51	0.53	**Pipe Channel, 8" CMP** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.025 Corrugated metal
4.0	509	0.0080	2.11	1.66	**Pipe Channel, 12" CMP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
1.2	174	0.0040	2.49	1.95	**Pipe Channel, 12" RCP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.015 Concrete sewer w/manholes & inlets
1.1	197	0.0040	2.89	3.54	**Pipe Channel, 15" RCP** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.015 Concrete sewer w/manholes & inlets
1.3	394	0.0090	4.89	8.64	**Pipe Channel, 18" RCP** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.015 Concrete sewer w/manholes & inlets
1.1	273	0.0020	4.05	38.99	**Pipe Channel, 42" RCP** 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.015 Concrete sewer w/manholes & inlets
13.4	1,976	Total			

Subcatchment ES-1B: Southern Parking Lot



Summary for Subcatchment ES-1C: Soccer fields

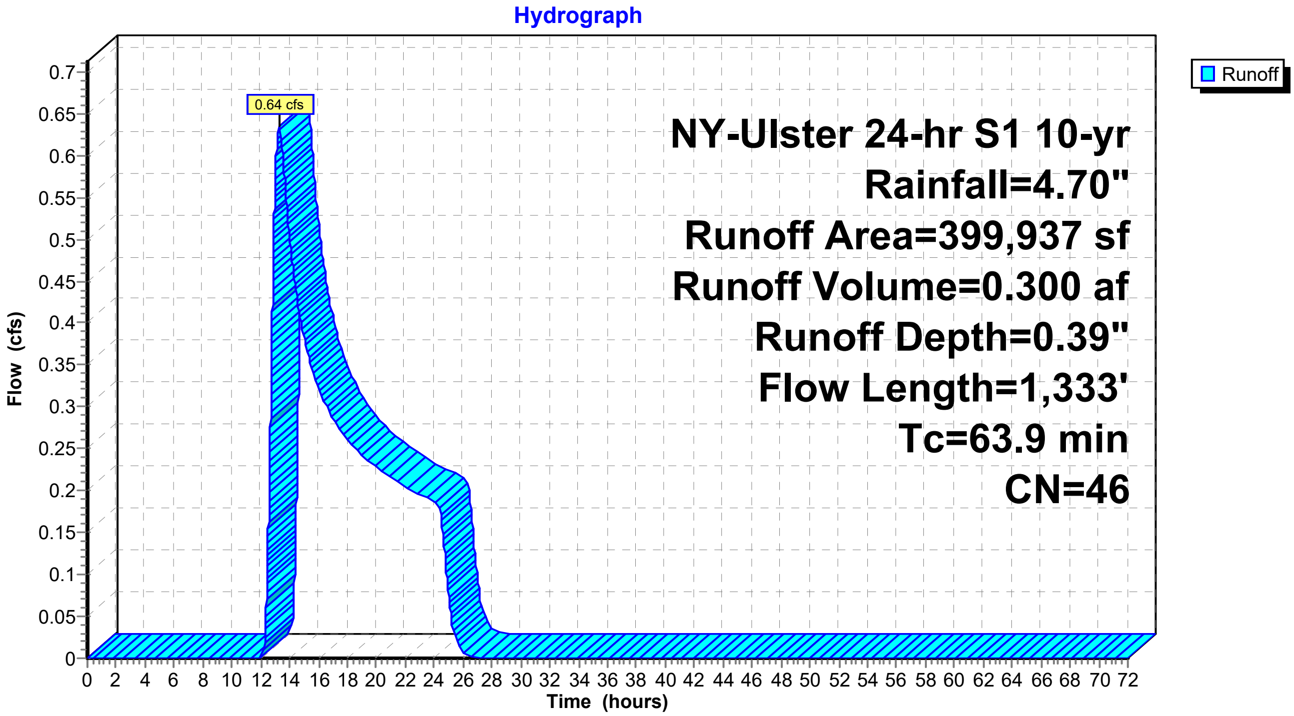
Runoff = 0.64 cfs @ 13.27 hrs, Volume= 0.300 af, Depth= 0.39"
Routed to Reach AP-1 : 42" RCP to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
52,302	98	Paved parking, HSG A
44,735	32	Woods/grass comb., Good, HSG A
302,900	39	>75% Grass cover, Good, HSG A
399,937	46	Weighted Average
347,635		86.92% Pervious Area
52,302		13.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0040	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
7.9	278	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	21	0.0070	1.70		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.3	44	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.3	85	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	16	0.0080	1.82		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	57	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
31.8	732	0.0030	0.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
63.9	1,333	Total			

Subcatchment ES-1C: Soccer fields



Summary for Subcatchment ES-2A: Northern Entrance

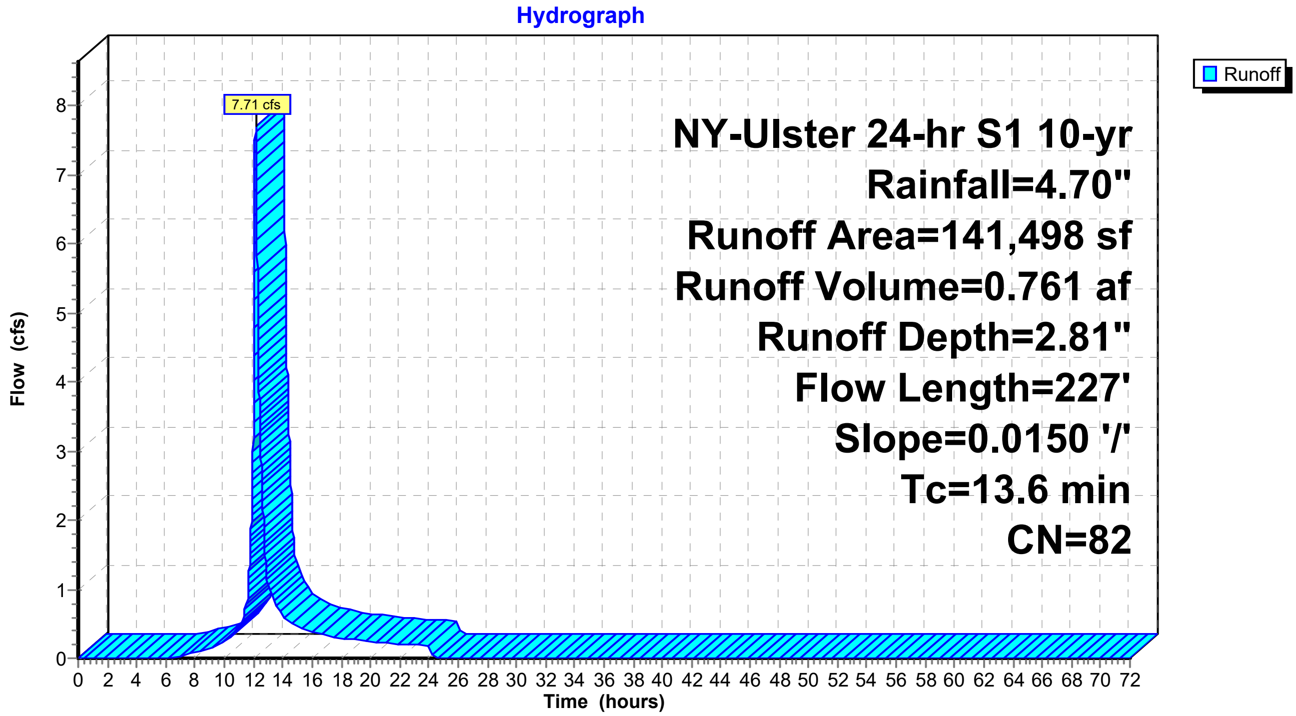
Runoff = 7.71 cfs @ 12.14 hrs, Volume= 0.761 af, Depth= 2.81"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
4,821	98	Paved parking, HSG A
32,718	98	Paved parking, HSG D
682	98	Roofs, HSG D
4,958	32	Woods/grass comb., Good, HSG A
11,275	79	Woods/grass comb., Good, HSG D
4,843	39	>75% Grass cover, Good, HSG A
82,201	80	>75% Grass cover, Good, HSG D
141,498	82	Weighted Average
103,277		72.99% Pervious Area
38,221		27.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0150	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
2.5	127	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.6	227	Total			

Subcatchment ES-2A: Northern Entrance



Summary for Subcatchment ES-2B: Northern Lawn & Helipad

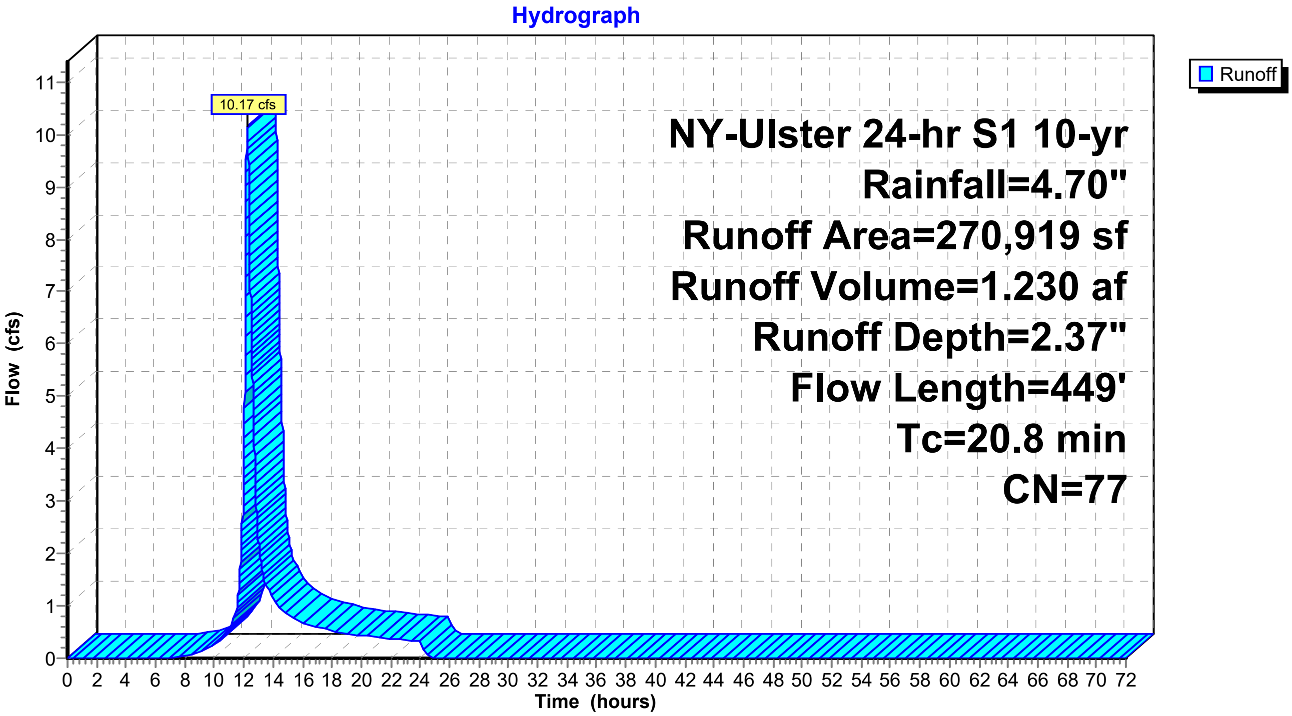
Runoff = 10.17 cfs @ 12.24 hrs, Volume= 1.230 af, Depth= 2.37"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
35,226	98	Paved parking, HSG A
39,420	98	Paved parking, HSG D
374	98	Roofs, HSG D
50,804	39	>75% Grass cover, Good, HSG A
145,095	80	>75% Grass cover, Good, HSG D
270,919	77	Weighted Average
195,899		72.31% Pervious Area
75,020		27.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0080	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
0.1	14	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.4	102	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.1	233	0.0180	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.8	449	Total			

Subcatchment ES-2B: Northern Lawn & Helipad



Summary for Subcatchment ES-2C: Northern Parking & Warehouses

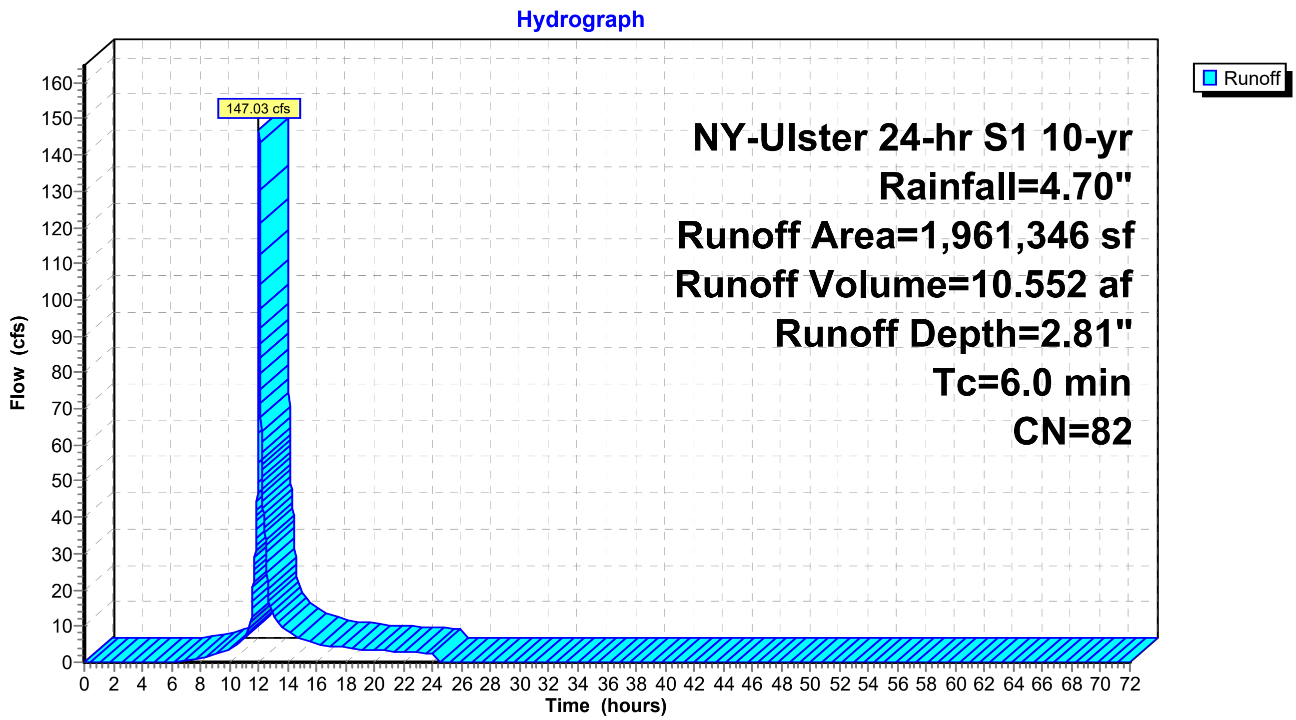
Runoff = 147.03 cfs @ 12.04 hrs, Volume= 10.552 af, Depth= 2.81"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
872,867	98	Paved parking, HSG A
87,604	98	Paved parking, HSG D
459,315	98	Roofs, HSG A
22,924	32	Woods/grass comb., Good, HSG A
1,554	79	Woods/grass comb., Good, HSG D
477,620	39	>75% Grass cover, Good, HSG A
29,747	80	>75% Grass cover, Good, HSG D
9,715	30	Brush, Good, HSG A
1,961,346	82	Weighted Average
541,560		27.61% Pervious Area
1,419,786		72.39% Impervious Area

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

Subcatchment ES-2C: Northern Parking & Warehouses



Summary for Subcatchment ES-3: Soccer fields & Boices Ln Entrance

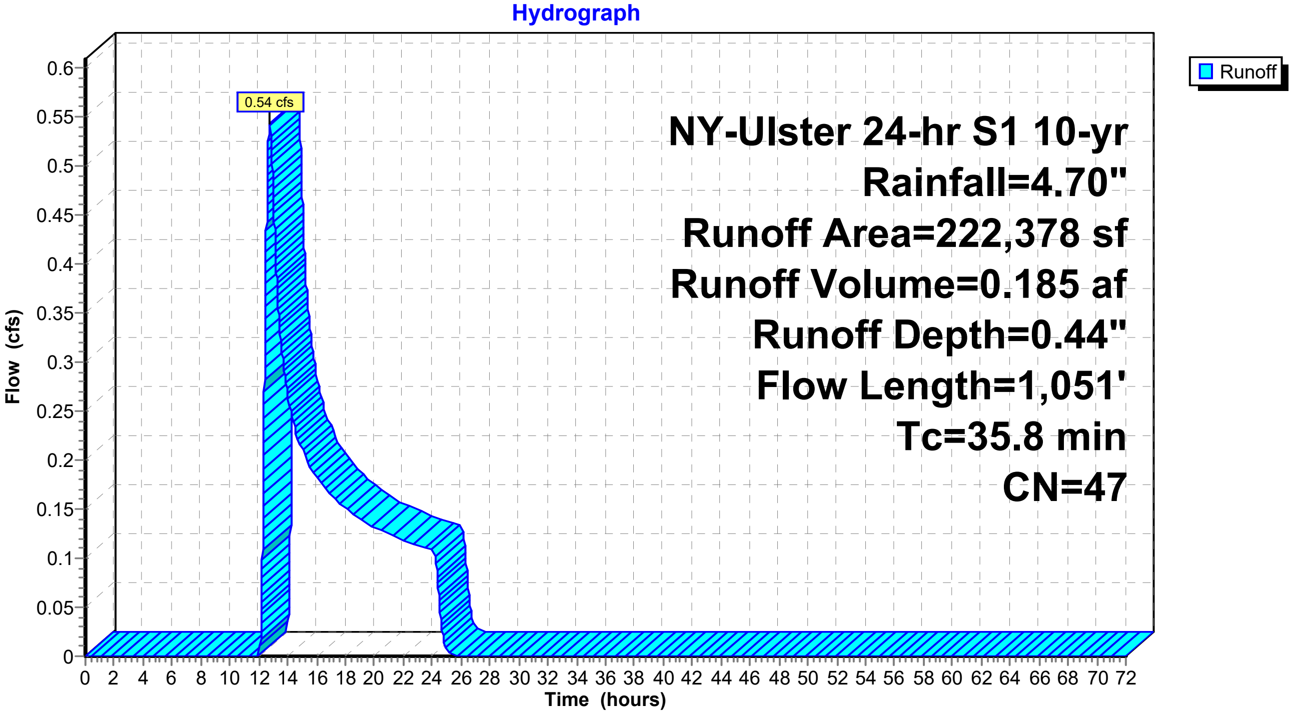
Runoff = 0.54 cfs @ 12.77 hrs, Volume= 0.185 af, Depth= 0.44"
Routed to Reach AP-3 : Existing Catch basin onsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
32,604	98	Paved parking, HSG A
18,656	32	Woods/grass comb., Good, HSG A
171,118	39	>75% Grass cover, Good, HSG A
222,378	47	Weighted Average
189,774		85.34% Pervious Area
32,604		14.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.3	100	0.0026	0.07		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
10.7	376	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.8	575	0.0050	3.47	2.73	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PE, smooth interior
35.8	1,051	Total			

Subcatchment ES-3: Soccer fields & Boices Ln Entrance



Summary for Subcatchment ES-4: East Campus Main Entrance

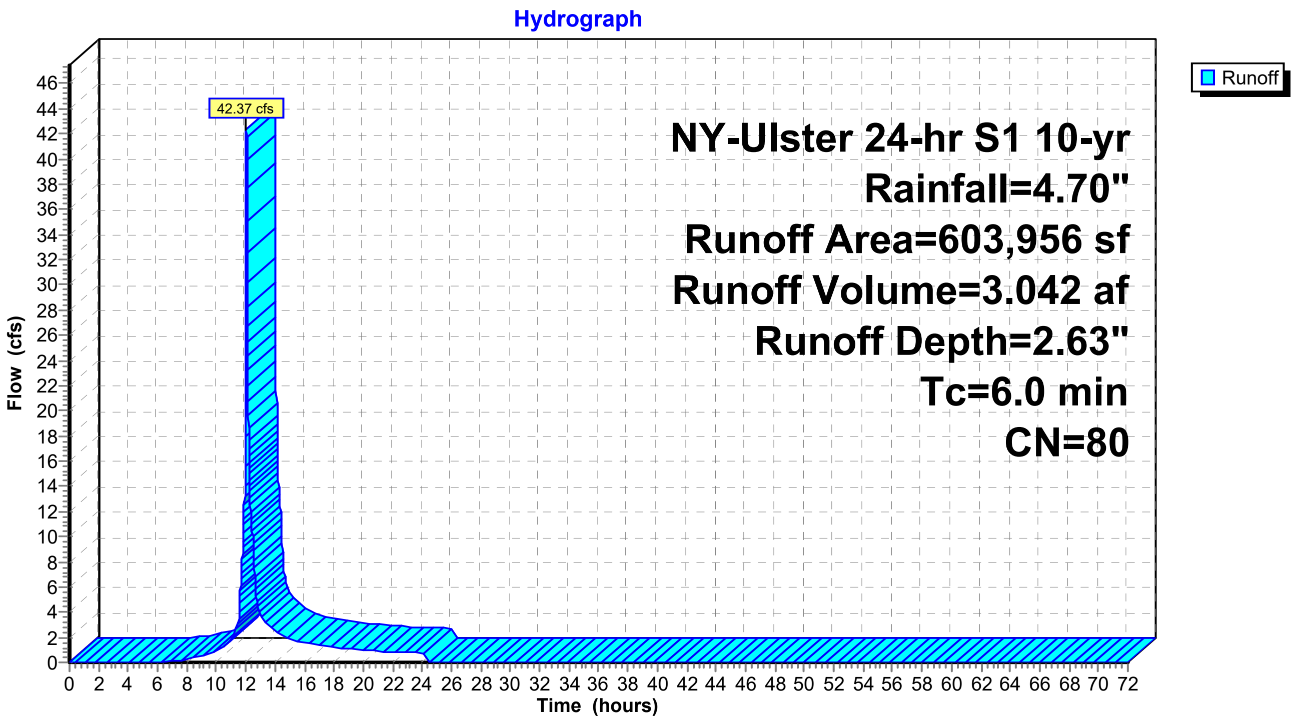
Runoff = 42.37 cfs @ 12.04 hrs, Volume= 3.042 af, Depth= 2.63"
Routed to Reach AP-4 : Northern storm pipe to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
214,844	98	Paved parking, HSG A
14,814	98	Paved parking, HSG D
181,172	98	Roofs, HSG A
187,091	39	>75% Grass cover, Good, HSG A
6,035	80	>75% Grass cover, Good, HSG D
603,956	80	Weighted Average
193,126		31.98% Pervious Area
410,830		68.02% Impervious Area

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

Subcatchment ES-4: East Campus Main Entrance

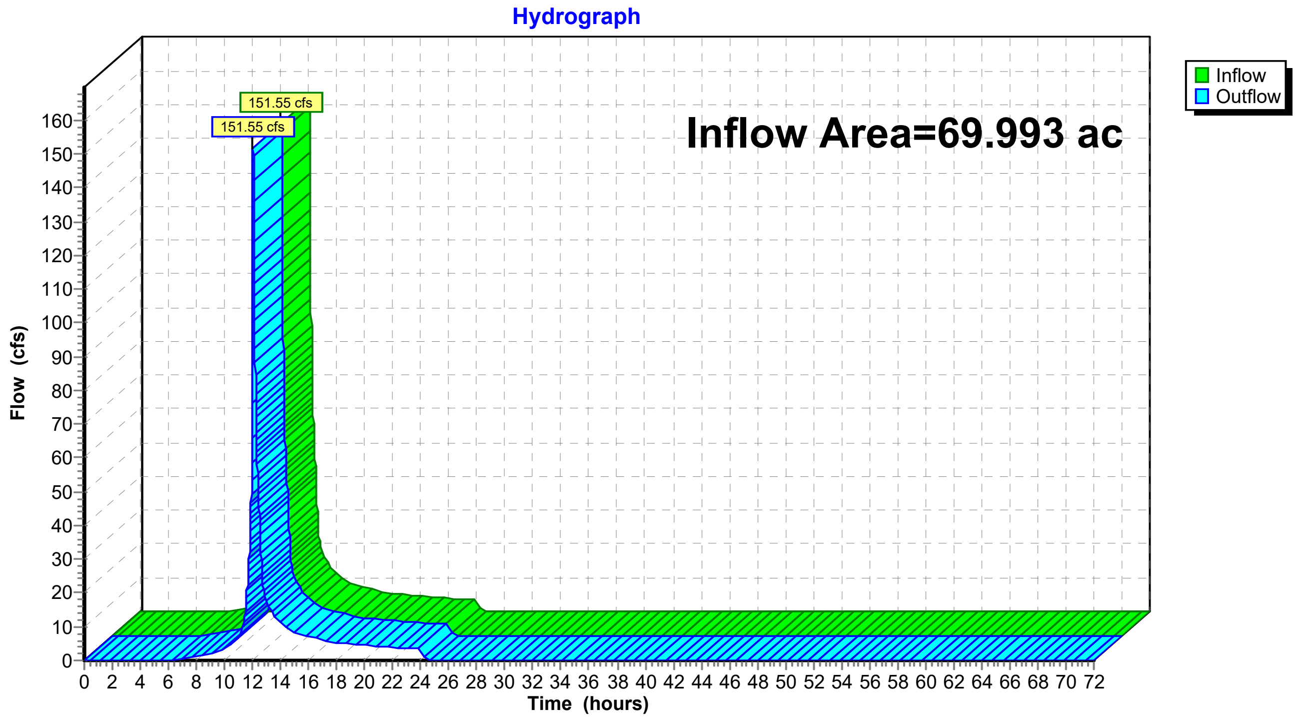


Summary for Reach AP-1: 42" RCP to West Campus

Inflow Area =	69.993 ac,	60.77% Impervious,	Inflow Depth = 2.24"	for 10-yr event
Inflow =	151.55 cfs @	12.04 hrs, Volume=	13.048 af	
Outflow =	151.55 cfs @	12.04 hrs, Volume=	13.048 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-1: 42" RCP to West Campus

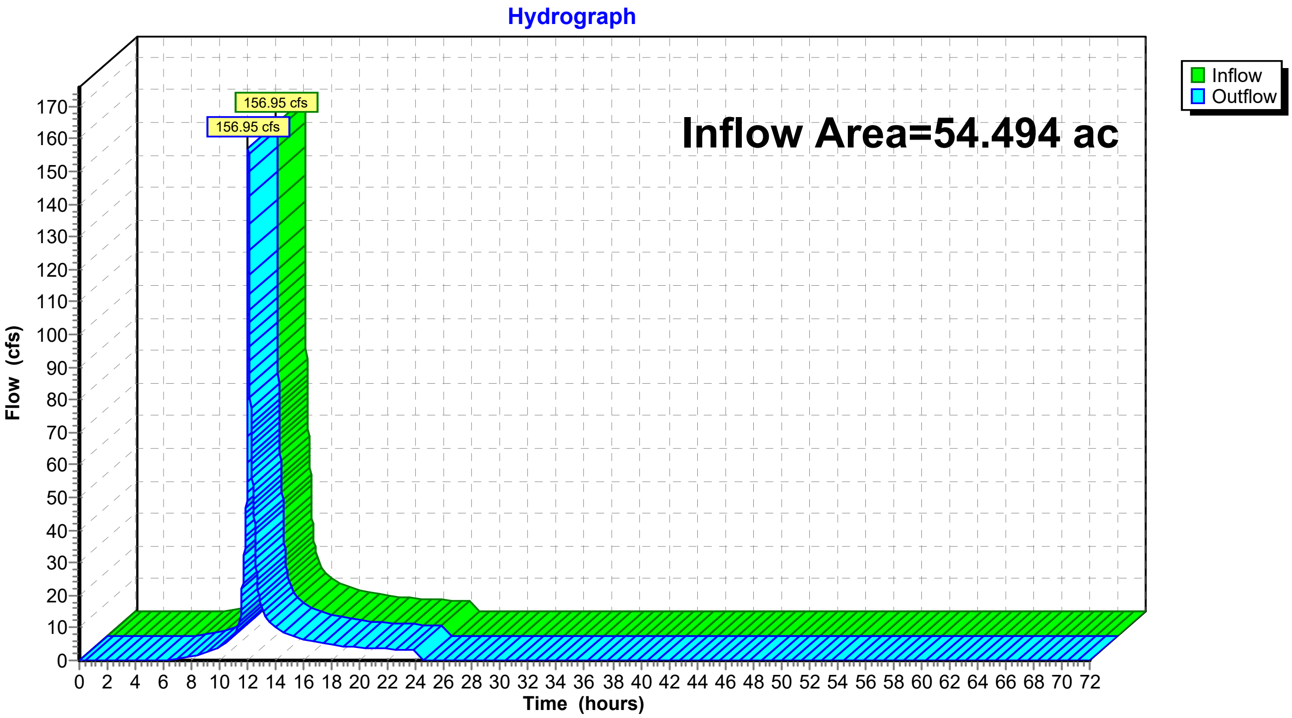


Summary for Reach AP-2: Discharge to Northern Parcel

Inflow Area =	54.494 ac,	64.58% Impervious,	Inflow Depth = 2.76"	for 10-yr event
Inflow =	156.95 cfs @	12.04 hrs, Volume=	12.544 af	
Outflow =	156.95 cfs @	12.04 hrs, Volume=	12.544 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-2: Discharge to Northern Parcel

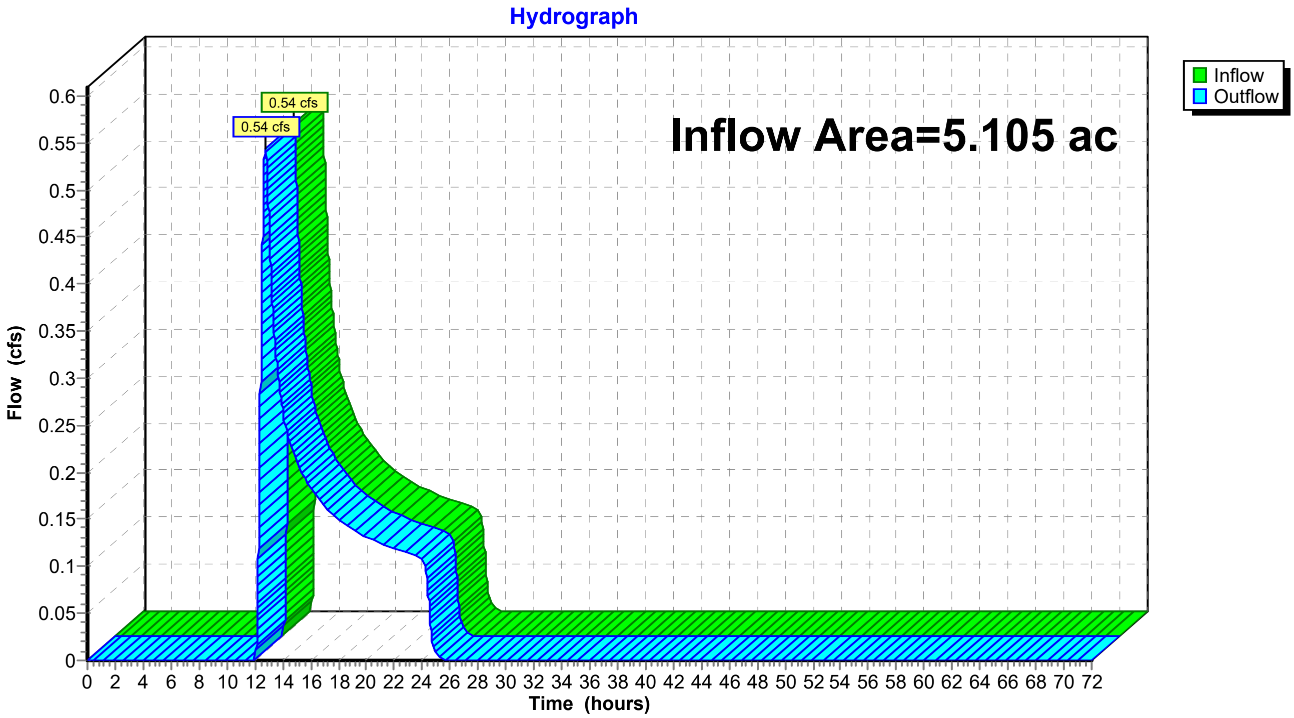


Summary for Reach AP-3: Existing Catch basin onsite

Inflow Area = 5.105 ac, 14.66% Impervious, Inflow Depth = 0.44" for 10-yr event
Inflow = 0.54 cfs @ 12.77 hrs, Volume= 0.185 af
Outflow = 0.54 cfs @ 12.77 hrs, Volume= 0.185 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-3: Existing Catch basin onsite

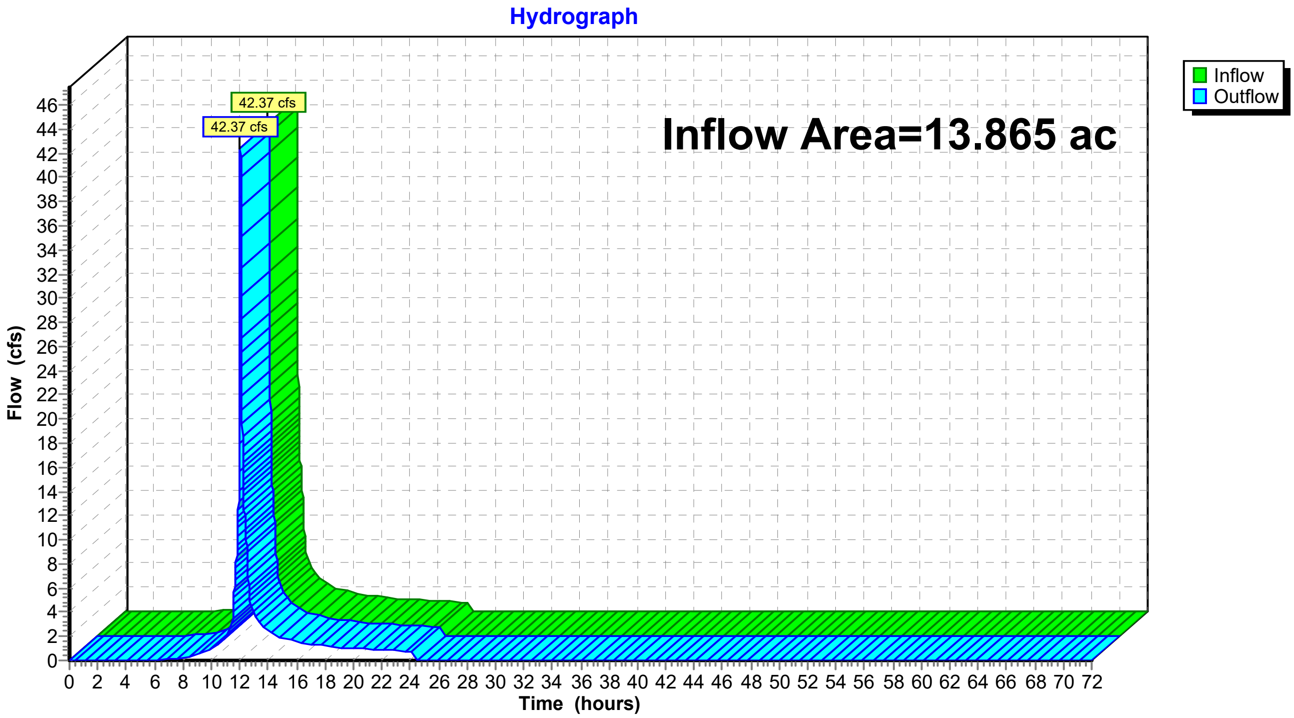


Summary for Reach AP-4: Northern storm pipe to West Campus

Inflow Area =	13.865 ac,	68.02% Impervious,	Inflow Depth = 2.63"	for 10-yr event	
Inflow =	42.37 cfs @	12.04 hrs,	Volume=	3.042 af	
Outflow =	42.37 cfs @	12.04 hrs,	Volume=	3.042 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-4: Northern storm pipe to West Campus



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentES-1A: Southern half of Runoff Area=1,715,935 sf 73.92% Impervious Runoff Depth=6.17"
Tc=6.0 min CN=82 Runoff=247.54 cfs 20.266 af

SubcatchmentES-1B: Southern Parking Runoff Area=933,033 sf 57.02% Impervious Runoff Depth=4.99"
Flow Length=1,976' Tc=13.4 min CN=72 Runoff=82.70 cfs 8.898 af

SubcatchmentES-1C: Soccer fields Runoff Area=399,937 sf 13.08% Impervious Runoff Depth=2.02"
Flow Length=1,333' Tc=63.9 min CN=46 Runoff=5.93 cfs 1.545 af

SubcatchmentES-2A: Northern Entrance Runoff Area=141,498 sf 27.01% Impervious Runoff Depth=6.17"
Flow Length=227' Slope=0.0150 '/' Tc=13.6 min CN=82 Runoff=15.17 cfs 1.671 af

SubcatchmentES-2B: Northern Lawn & Runoff Area=270,919 sf 27.69% Impervious Runoff Depth=5.58"
Flow Length=449' Tc=20.8 min CN=77 Runoff=22.13 cfs 2.891 af

SubcatchmentES-2C: Northern Parking Runoff Area=1,961,346 sf 72.39% Impervious Runoff Depth=6.17"
Tc=6.0 min CN=82 Runoff=282.95 cfs 23.165 af

SubcatchmentES-3: Soccer fields & Runoff Area=222,378 sf 14.66% Impervious Runoff Depth=2.13"
Flow Length=1,051' Tc=35.8 min CN=47 Runoff=4.71 cfs 0.905 af

SubcatchmentES-4: East Campus Main Runoff Area=603,956 sf 68.02% Impervious Runoff Depth=5.94"
Tc=6.0 min CN=80 Runoff=84.30 cfs 6.857 af

Reach AP-1: 42" RCP to West Campus Inflow=306.17 cfs 30.709 af
Outflow=306.17 cfs 30.709 af

Reach AP-2: Discharge to Northern Parcel Inflow=305.16 cfs 27.727 af
Outflow=305.16 cfs 27.727 af

Reach AP-3: Existing Catch basin onsite Inflow=4.71 cfs 0.905 af
Outflow=4.71 cfs 0.905 af

Reach AP-4: Northern storm pipe to West Campus Inflow=84.30 cfs 6.857 af
Outflow=84.30 cfs 6.857 af

Total Runoff Area = 143.457 ac Runoff Volume = 66.198 af Average Runoff Depth = 5.54"
38.72% Pervious = 55.552 ac 61.28% Impervious = 87.905 ac

Summary for Subcatchment ES-1A: Southern half of Industrial Buildings & Parking

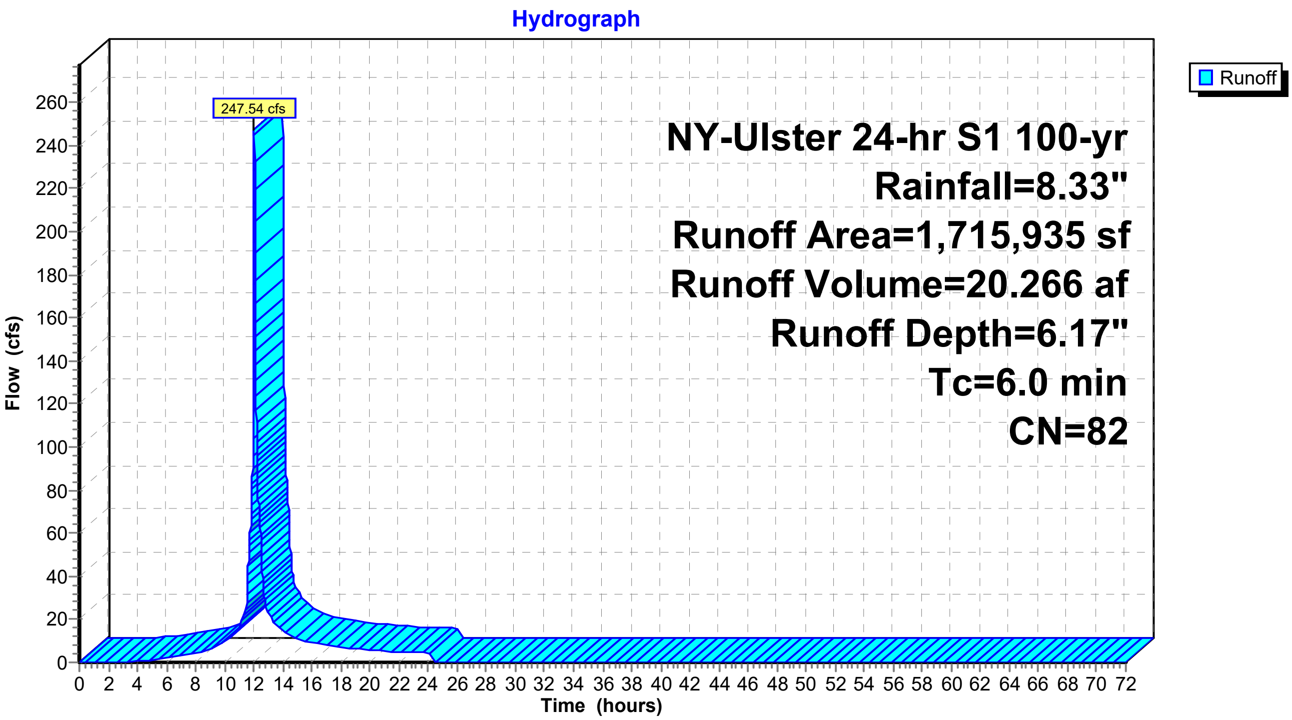
Runoff = 247.54 cfs @ 12.04 hrs, Volume= 20.266 af, Depth= 6.17"
Routed to Reach AP-1 : 42" RCP to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
799,174	98	Paved parking, HSG A
469,173	98	Roofs, HSG A
2,786	32	Woods/grass comb., Good, HSG A
75,110	30	Brush, Good, HSG A
369,692	39	>75% Grass cover, Good, HSG A
1,715,935	82	Weighted Average
447,588		26.08% Pervious Area
1,268,347		73.92% Impervious Area

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

Subcatchment ES-1A: Southern half of Industrial Buildings & Parking



Summary for Subcatchment ES-1B: Southern Parking Lot

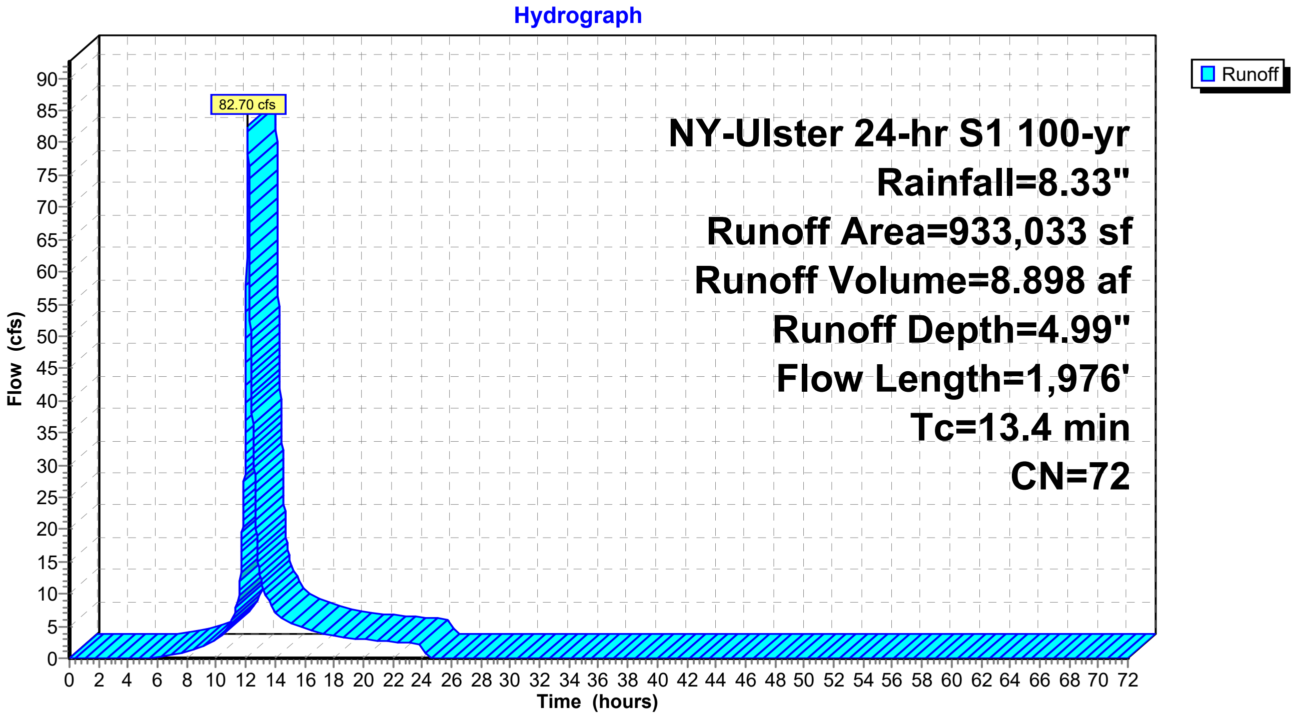
Runoff = 82.70 cfs @ 12.13 hrs, Volume= 8.898 af, Depth= 4.99"
Routed to Reach AP-1 : 42" RCP to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
522,203	98	Paved parking, HSG A
9,823	98	Roofs, HSG A
16,008	32	Woods/grass comb., Good, HSG A
10,203	30	Brush, Good, HSG A
374,796	39	>75% Grass cover, Good, HSG A
933,033	72	Weighted Average
401,007		42.98% Pervious Area
532,026		57.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.7	429	0.0070	1.51	0.53	**Pipe Channel, 8" CMP** 8.0" Round Area= 0.3 sf Perim= 2.1' r= 0.17' n= 0.025 Corrugated metal
4.0	509	0.0080	2.11	1.66	**Pipe Channel, 12" CMP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
1.2	174	0.0040	2.49	1.95	**Pipe Channel, 12" RCP** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.015 Concrete sewer w/manholes & inlets
1.1	197	0.0040	2.89	3.54	**Pipe Channel, 15" RCP** 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.015 Concrete sewer w/manholes & inlets
1.3	394	0.0090	4.89	8.64	**Pipe Channel, 18" RCP** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.015 Concrete sewer w/manholes & inlets
1.1	273	0.0020	4.05	38.99	**Pipe Channel, 42" RCP** 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.015 Concrete sewer w/manholes & inlets
13.4	1,976	Total			

Subcatchment ES-1B: Southern Parking Lot



Summary for Subcatchment ES-1C: Soccer fields

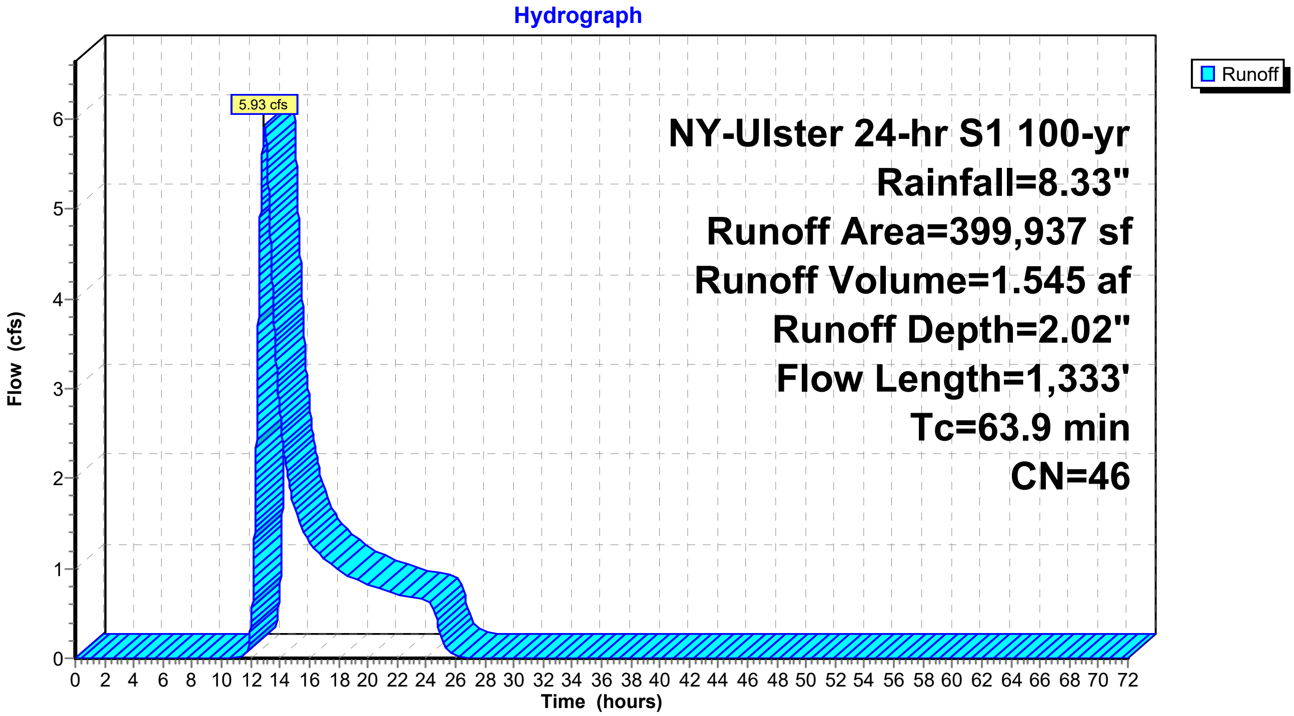
Runoff = 5.93 cfs @ 12.93 hrs, Volume= 1.545 af, Depth= 2.02"
Routed to Reach AP-1 : 42" RCP to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
52,302	98	Paved parking, HSG A
44,735	32	Woods/grass comb., Good, HSG A
302,900	39	>75% Grass cover, Good, HSG A
399,937	46	Weighted Average
347,635		86.92% Pervious Area
52,302		13.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0040	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
7.9	278	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	21	0.0070	1.70		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.3	44	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.3	85	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	16	0.0080	1.82		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.5	57	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
31.8	732	0.0030	0.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
63.9	1,333	Total			

Subcatchment ES-1C: Soccer fields



Summary for Subcatchment ES-2A: Northern Entrance

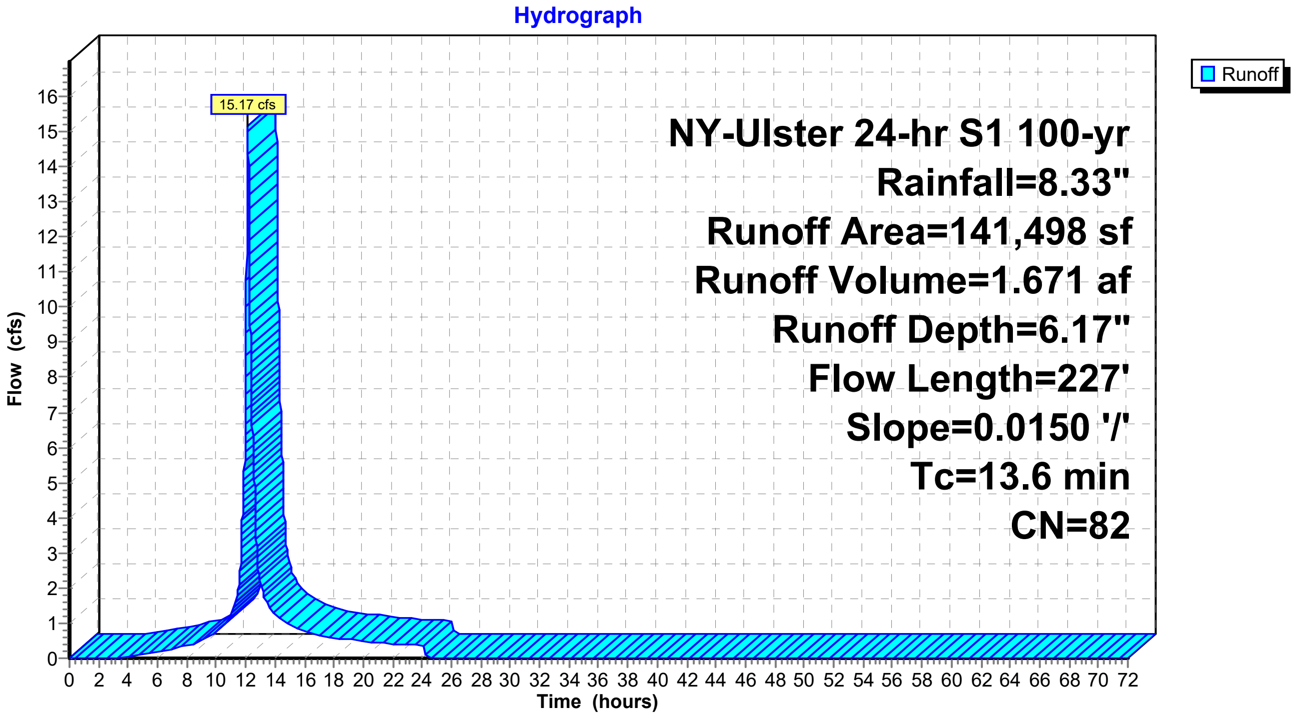
Runoff = 15.17 cfs @ 12.13 hrs, Volume= 1.671 af, Depth= 6.17"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
4,821	98	Paved parking, HSG A
32,718	98	Paved parking, HSG D
682	98	Roofs, HSG D
4,958	32	Woods/grass comb., Good, HSG A
11,275	79	Woods/grass comb., Good, HSG D
4,843	39	>75% Grass cover, Good, HSG A
82,201	80	>75% Grass cover, Good, HSG D
141,498	82	Weighted Average
103,277		72.99% Pervious Area
38,221		27.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0150	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
2.5	127	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.6	227	Total			

Subcatchment ES-2A: Northern Entrance



Summary for Subcatchment ES-2B: Northern Lawn & Helipad

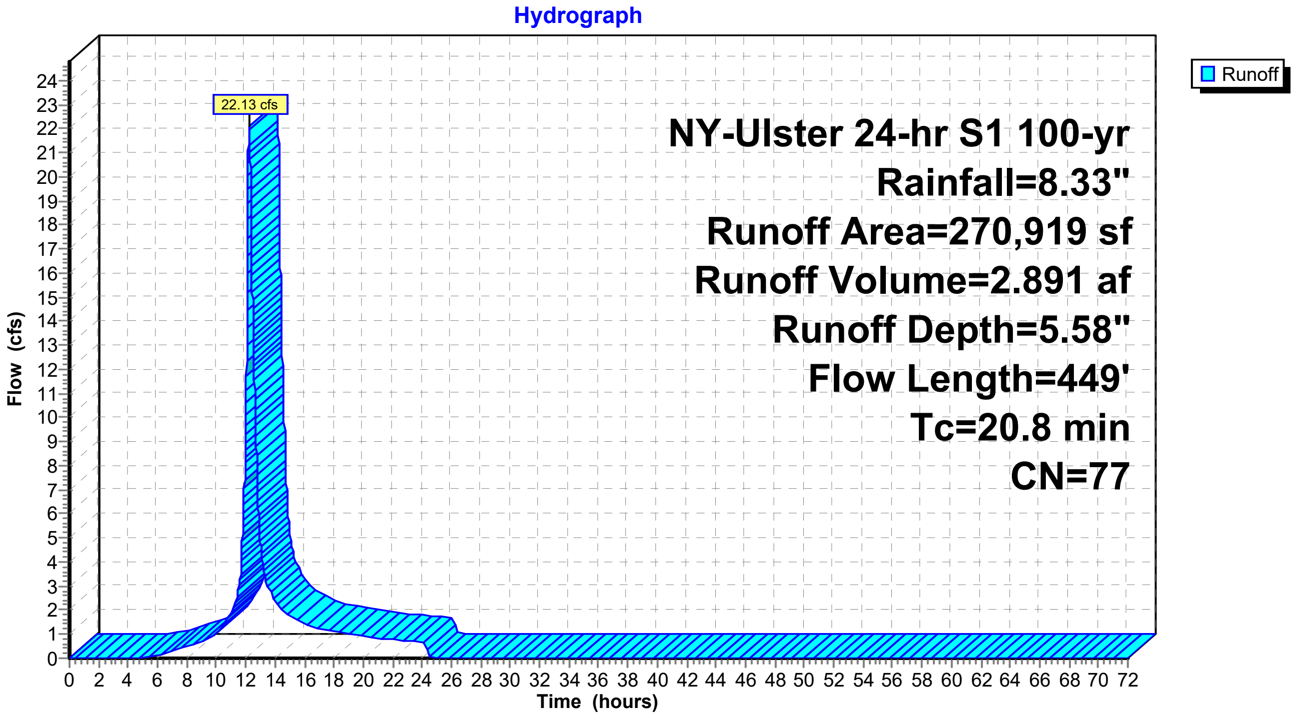
Runoff = 22.13 cfs @ 12.23 hrs, Volume= 2.891 af, Depth= 5.58"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
35,226	98	Paved parking, HSG A
39,420	98	Paved parking, HSG D
374	98	Roofs, HSG D
50,804	39	>75% Grass cover, Good, HSG A
145,095	80	>75% Grass cover, Good, HSG D
270,919	77	Weighted Average
195,899		72.31% Pervious Area
75,020		27.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0080	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
0.1	14	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.4	102	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.1	233	0.0180	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.8	449	Total			

Subcatchment ES-2B: Northern Lawn & Helipad



Summary for Subcatchment ES-2C: Northern Parking & Warehouses

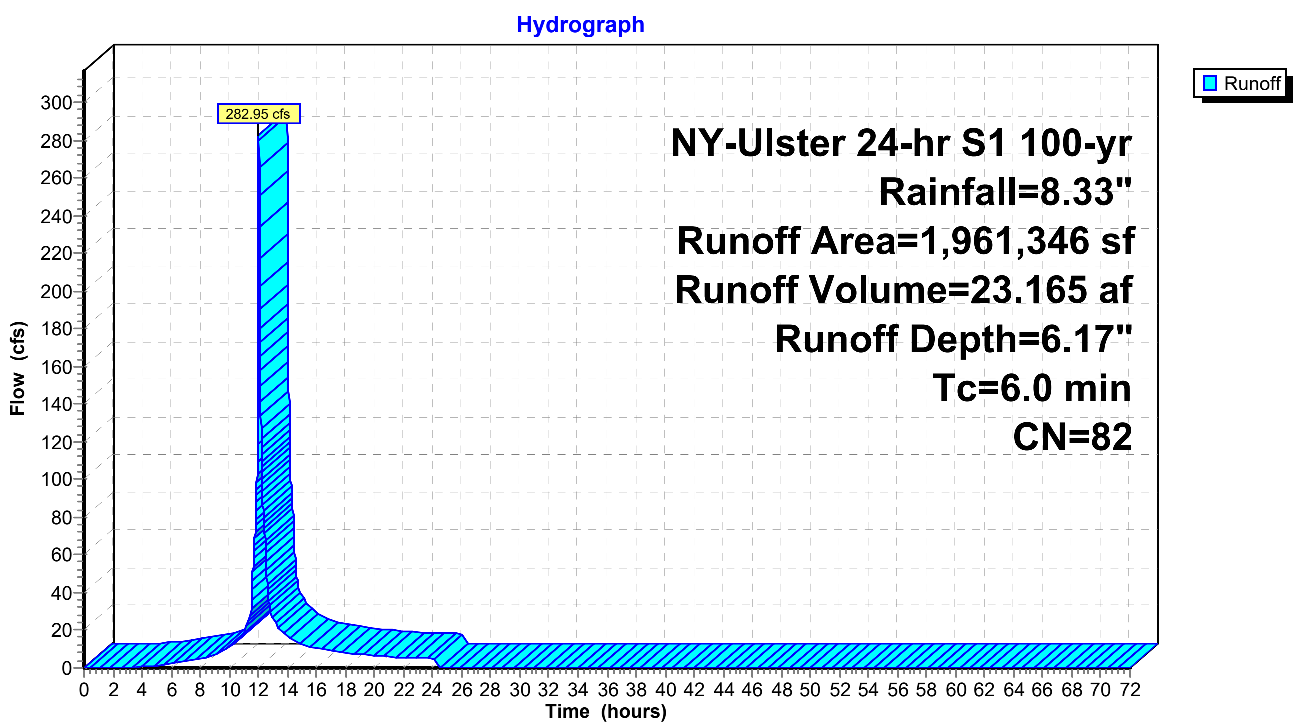
Runoff = 282.95 cfs @ 12.04 hrs, Volume= 23.165 af, Depth= 6.17"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
872,867	98	Paved parking, HSG A
87,604	98	Paved parking, HSG D
459,315	98	Roofs, HSG A
22,924	32	Woods/grass comb., Good, HSG A
1,554	79	Woods/grass comb., Good, HSG D
477,620	39	>75% Grass cover, Good, HSG A
29,747	80	>75% Grass cover, Good, HSG D
9,715	30	Brush, Good, HSG A
1,961,346	82	Weighted Average
541,560		27.61% Pervious Area
1,419,786		72.39% Impervious Area

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

Subcatchment ES-2C: Northern Parking & Warehouses



Summary for Subcatchment ES-3: Soccer fields & Boices Ln Entrance

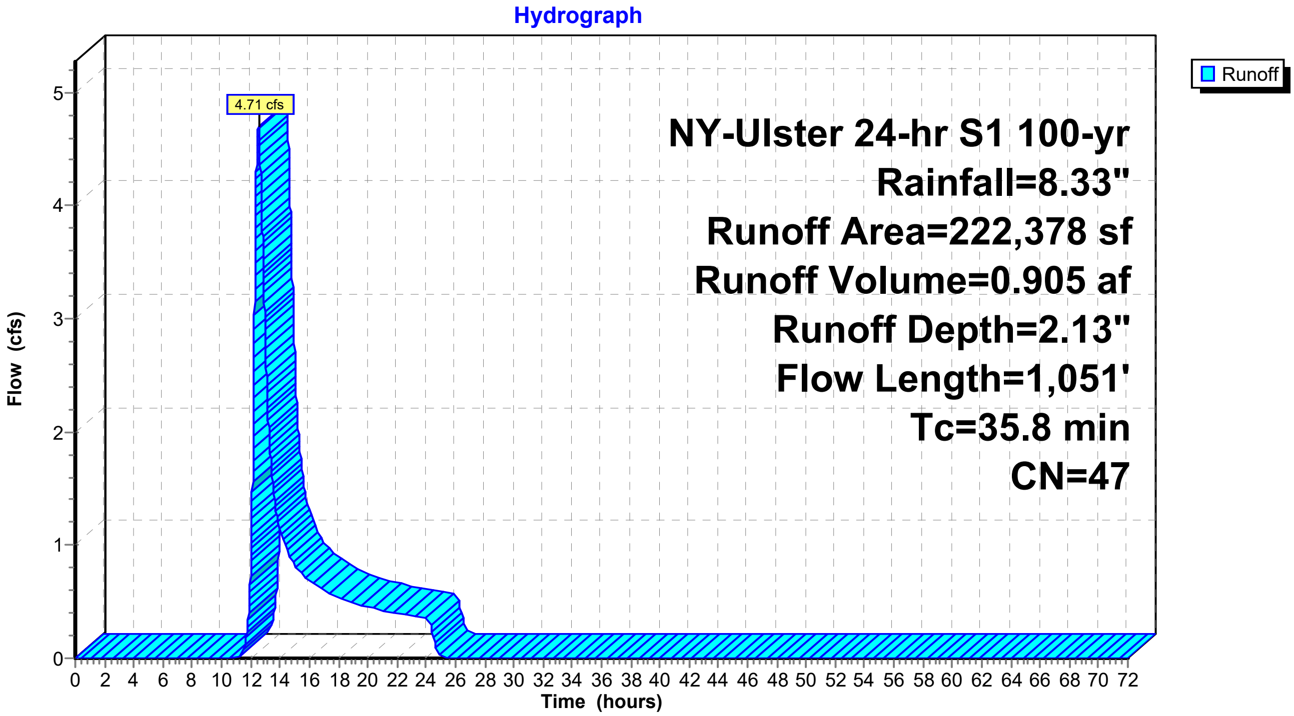
Runoff = 4.71 cfs @ 12.53 hrs, Volume= 0.905 af, Depth= 2.13"
Routed to Reach AP-3 : Existing Catch basin onsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
32,604	98	Paved parking, HSG A
18,656	32	Woods/grass comb., Good, HSG A
171,118	39	>75% Grass cover, Good, HSG A
222,378	47	Weighted Average
189,774		85.34% Pervious Area
32,604		14.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.3	100	0.0026	0.07		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
10.7	376	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.8	575	0.0050	3.47	2.73	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PE, smooth interior
35.8	1,051	Total			

Subcatchment ES-3: Soccer fields & Boices Ln Entrance



Summary for Subcatchment ES-4: East Campus Main Entrance

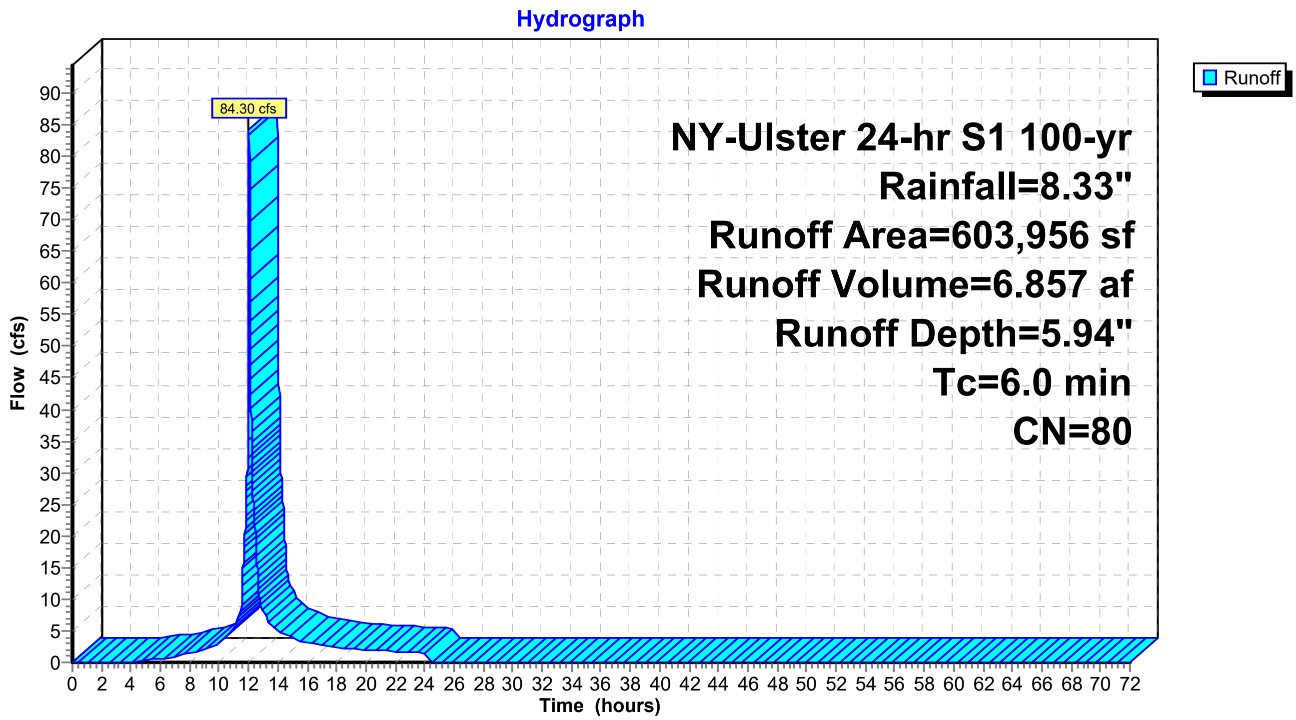
Runoff = 84.30 cfs @ 12.04 hrs, Volume= 6.857 af, Depth= 5.94"
Routed to Reach AP-4 : Northern storm pipe to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
214,844	98	Paved parking, HSG A
14,814	98	Paved parking, HSG D
181,172	98	Roofs, HSG A
187,091	39	>75% Grass cover, Good, HSG A
6,035	80	>75% Grass cover, Good, HSG D
603,956	80	Weighted Average
193,126		31.98% Pervious Area
410,830		68.02% Impervious Area

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

Subcatchment ES-4: East Campus Main Entrance

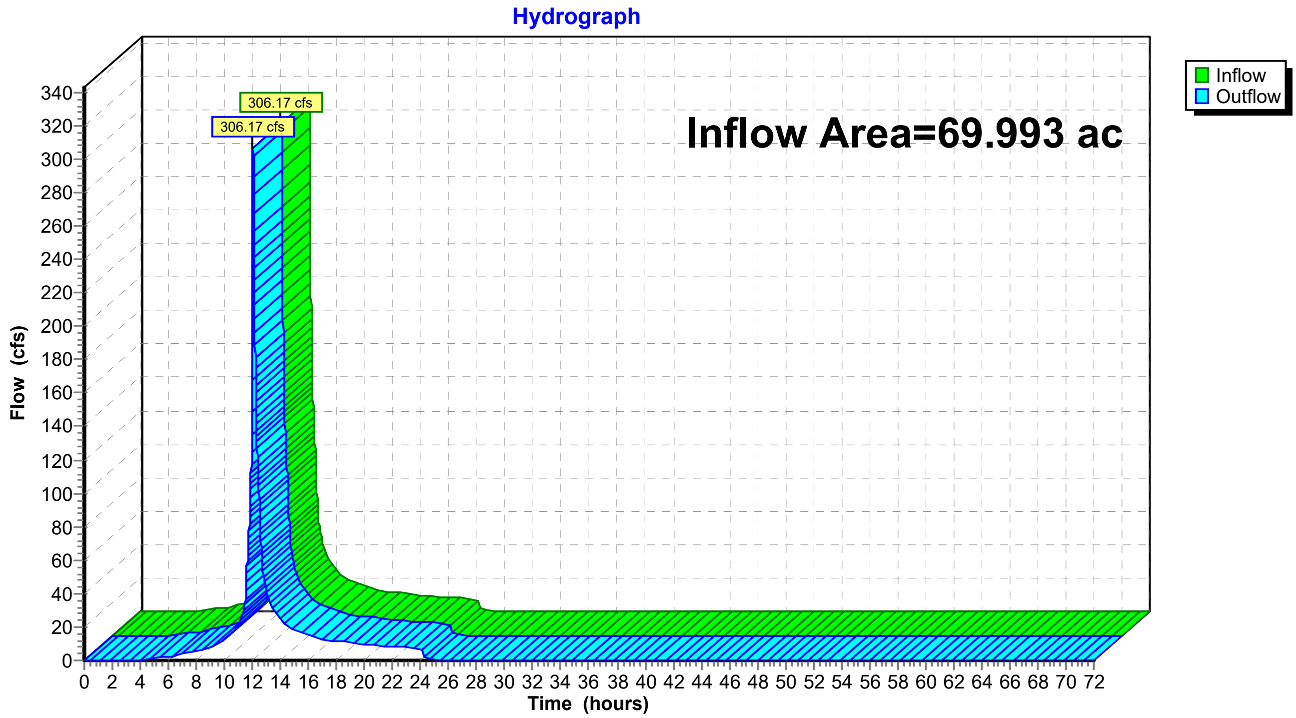


Summary for Reach AP-1: 42" RCP to West Campus

Inflow Area =	69.993 ac, 60.77% Impervious,	Inflow Depth = 5.26"	for 100-yr event	
Inflow =	306.17 cfs @	12.04 hrs, Volume=	30.709 af	
Outflow =	306.17 cfs @	12.04 hrs, Volume=	30.709 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-1: 42" RCP to West Campus

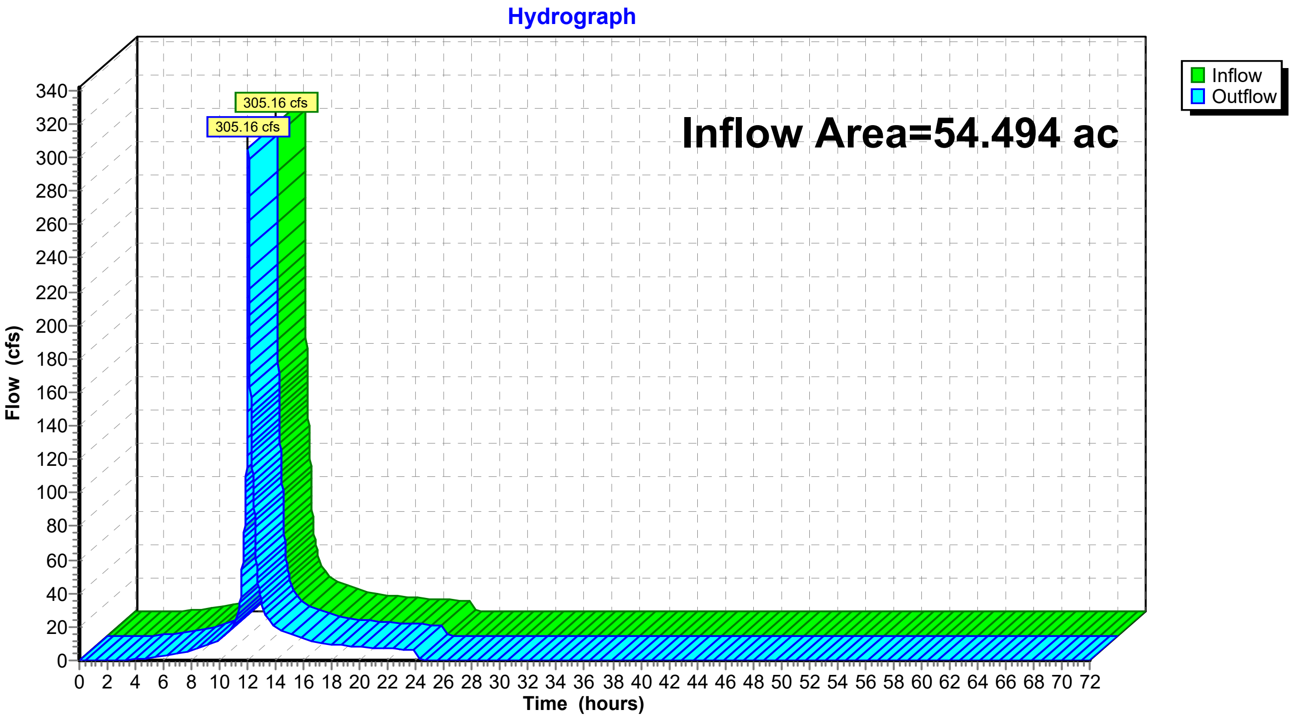


Summary for Reach AP-2: Discharge to Northern Parcel

Inflow Area =	54.494 ac,	64.58% Impervious,	Inflow Depth = 6.11"	for 100-yr event
Inflow =	305.16 cfs @	12.04 hrs, Volume=	27.727 af	
Outflow =	305.16 cfs @	12.04 hrs, Volume=	27.727 af, Atten= 0%, Lag= 0.0 min	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-2: Discharge to Northern Parcel

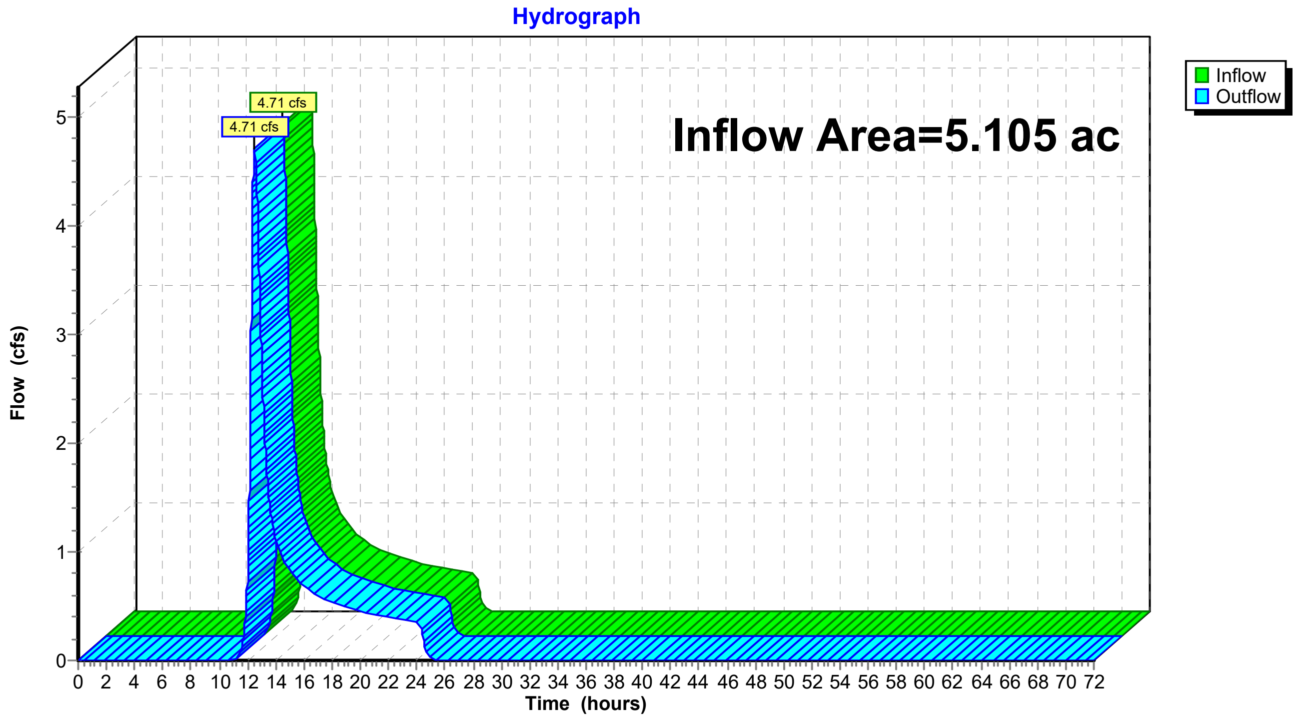


Summary for Reach AP-3: Existing Catch basin onsite

Inflow Area =	5.105 ac,	14.66% Impervious,	Inflow Depth = 2.13"	for 100-yr event	
Inflow =	4.71 cfs @	12.53 hrs,	Volume=	0.905 af	
Outflow =	4.71 cfs @	12.53 hrs,	Volume=	0.905 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-3: Existing Catch basin onsite

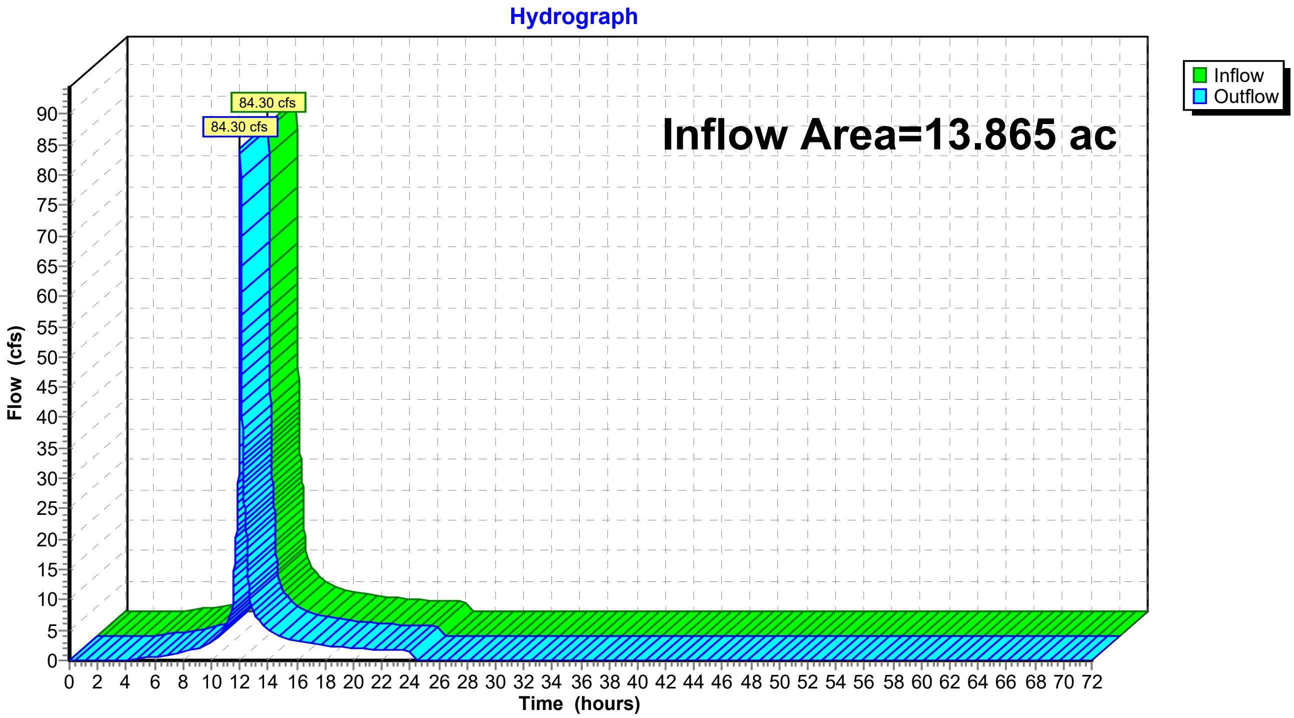


Summary for Reach AP-4: Northern storm pipe to West Campus

Inflow Area =	13.865 ac,	68.02% Impervious,	Inflow Depth = 5.94"	for 100-yr event
Inflow =	84.30 cfs @	12.04 hrs, Volume=	6.857 af	
Outflow =	84.30 cfs @	12.04 hrs, Volume=	6.857 af, Atten= 0%, Lag= 0.0 min	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-4: Northern storm pipe to West Campus



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APPENDIX E:
POST DEVELOPMENT STORMWATER MODELING

LaBella
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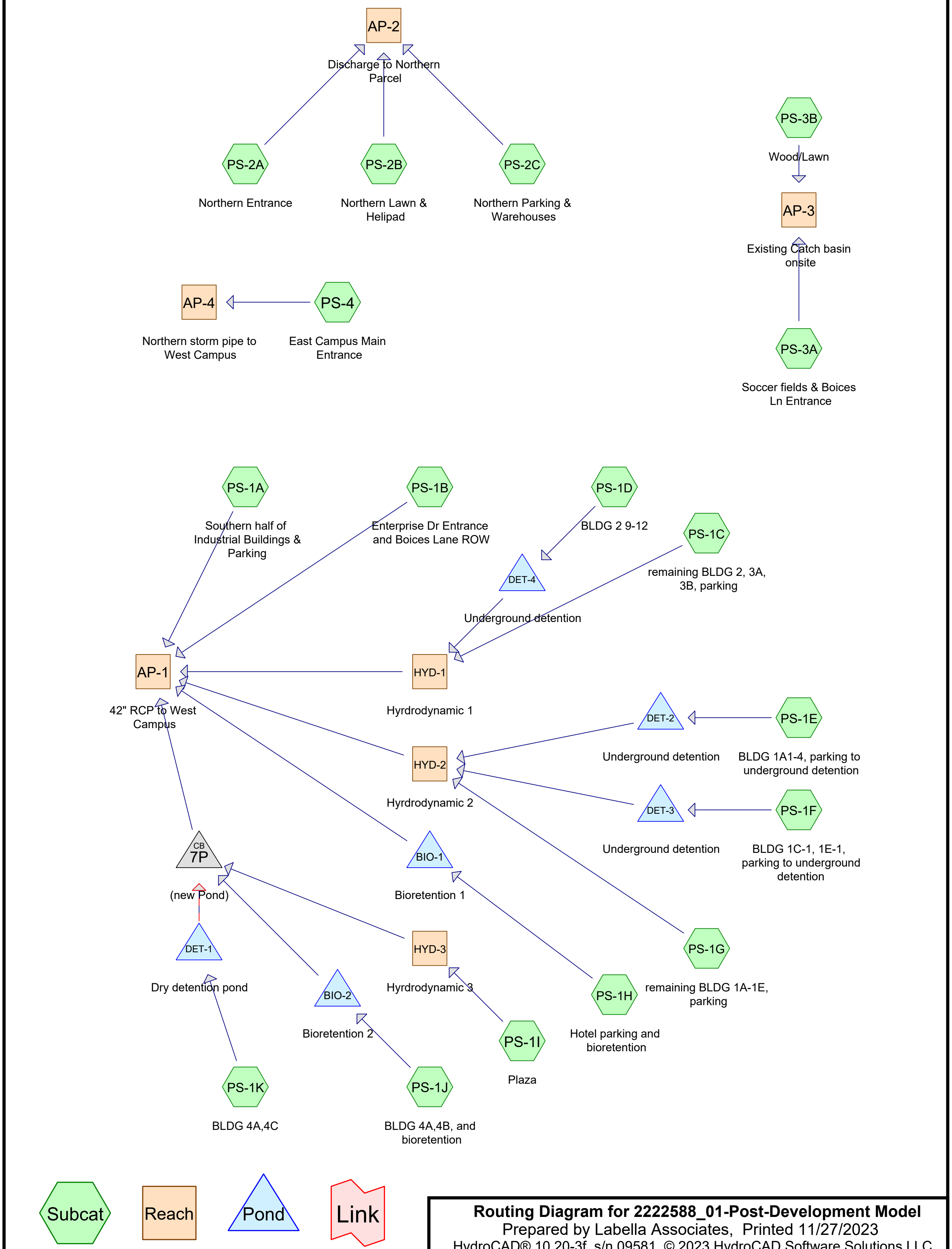


Routing Diagram for 2222588_01-Post-Development Model
Prepared by Labella Associates, Printed 11/27/2023
HydroCAD® 10.20-3f s/n 09581 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	NY-Ulster 24-hr S1	1-yr	Default	24.00	1	2.60	2
2	10-yr	NY-Ulster 24-hr S1	10-yr	Default	24.00	1	4.70	2
3	100-yr	NY-Ulster 24-hr S1	100-yr	Default	24.00	1	8.33	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
44.601	39	>75% Grass cover, Good, HSG A (PS-1A, PS-1B, PS-1C, PS-1E, PS-1F, PS-1G, PS-1H, PS-1I, PS-1J, PS-1K, PS-2A, PS-2B, PS-2C, PS-3A, PS-3B, PS-4)
6.039	80	>75% Grass cover, Good, HSG D (PS-2A, PS-2B, PS-2C, PS-4)
0.223	30	Brush, Good, HSG A (PS-2C)
16.546	98	Paved parking & Roofs, HSG A (PS-1C, PS-1G, PS-1I, PS-1J, PS-1K)
44.364	98	Paved parking, HSG A (PS-1A, PS-1B, PS-1E, PS-1F, PS-1H, PS-2A, PS-2B, PS-2C, PS-3A, PS-3B, PS-4)
4.007	98	Paved parking, HSG D (PS-2A, PS-2B, PS-2C, PS-4)
26.517	98	Roofs, HSG A (PS-1A, PS-1D, PS-1E, PS-1F, PS-2C, PS-4)
0.024	98	Roofs, HSG D (PS-2A, PS-2B)
0.840	32	Woods/grass comb., Good, HSG A (PS-1A, PS-2A, PS-2C, PS-3B)
0.295	79	Woods/grass comb., Good, HSG D (PS-2A, PS-2C)
143.457	**78**	**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPS-1A: Southern half of Runoff Area=1,237,610 sf 74.45% Impervious Runoff Depth=1.13"
Tc=6.0 min CN=83 Runoff=40.78 cfs 2.680 af

SubcatchmentPS-1B: Enterprise Dr Runoff Area=510,169 sf 33.48% Impervious Runoff Depth=0.18"
Flow Length=589' Tc=36.5 min CN=59 Runoff=0.40 cfs 0.175 af

SubcatchmentPS-1C: remaining BLDG 2, Runoff Area=243,057 sf 84.80% Impervious Runoff Depth=1.54"
Tc=6.0 min CN=89 Runoff=11.13 cfs 0.717 af

SubcatchmentPS-1D: BLDG 2 9-12 Runoff Area=14,520 sf 100.00% Impervious Runoff Depth=2.37"
Tc=6.0 min CN=98 Runoff=0.93 cfs 0.066 af

SubcatchmentPS-1E: BLDG 1A1-4, Runoff Area=30,231 sf 61.27% Impervious Runoff Depth=0.71"
Tc=6.0 min CN=75 Runoff=0.56 cfs 0.041 af

SubcatchmentPS-1F: BLDG 1C-1, 1E-1, Runoff Area=100,730 sf 77.37% Impervious Runoff Depth=1.26"
Tc=6.0 min CN=85 Runoff=3.73 cfs 0.243 af

SubcatchmentPS-1G: remaining BLDG Runoff Area=211,633 sf 80.68% Impervious Runoff Depth=1.40"
Tc=6.0 min CN=87 Runoff=8.75 cfs 0.565 af

SubcatchmentPS-1H: Hotel parking and Runoff Area=134,145 sf 59.26% Impervious Runoff Depth=0.67"
Tc=6.0 min CN=74 Runoff=2.28 cfs 0.171 af

SubcatchmentPS-1I: Plaza Runoff Area=167,791 sf 75.50% Impervious Runoff Depth=1.19"
Tc=6.0 min CN=84 Runoff=5.87 cfs 0.383 af

SubcatchmentPS-1J: BLDG 4A,4B, and Runoff Area=201,327 sf 51.49% Impervious Runoff Depth=0.47"
Tc=6.0 min CN=69 Runoff=1.98 cfs 0.180 af

SubcatchmentPS-1K: BLDG 4A,4C Runoff Area=218,869 sf 51.87% Impervious Runoff Depth=0.50"
Tc=6.0 min CN=70 Runoff=2.45 cfs 0.211 af

SubcatchmentPS-2A: Northern Entrance Runoff Area=141,498 sf 27.01% Impervious Runoff Depth=1.07"
Flow Length=227' Slope=0.0150 '/' Tc=13.6 min CN=82 Runoff=3.10 cfs 0.290 af

SubcatchmentPS-2B: Northern Lawn & Runoff Area=270,919 sf 27.69% Impervious Runoff Depth=0.80"
Flow Length=449' Tc=20.8 min CN=77 Runoff=3.40 cfs 0.417 af

SubcatchmentPS-2C: Northern Parking Runoff Area=1,961,346 sf 72.39% Impervious Runoff Depth=1.07"
Tc=6.0 min CN=82 Runoff=60.77 cfs 4.022 af

SubcatchmentPS-3A: Soccer fields & Runoff Area=133,805 sf 22.65% Impervious Runoff Depth=0.06"
Flow Length=1,107' Tc=36.0 min CN=52 Runoff=0.02 cfs 0.015 af

SubcatchmentPS-3B: Wood/Lawn Runoff Area=67,376 sf 9.46% Impervious Runoff Depth=0.00"
Flow Length=422' Tc=18.7 min CN=44 Runoff=0.00 cfs 0.000 af

Subcatchment PS-4: East Campus Main Runoff Area=603,956 sf 68.02% Impervious Runoff Depth=0.96"
Tc=6.0 min CN=80 Runoff=16.42 cfs 1.108 af

Reach AP-1: 42" RCP to West Campus Inflow=66.90 cfs 5.410 af
Outflow=66.90 cfs 5.410 af

Reach AP-2: Discharge to Northern Parcel Inflow=63.98 cfs 4.729 af
Outflow=63.98 cfs 4.729 af

Reach AP-3: Existing Catch basin onsite Inflow=0.02 cfs 0.015 af
Outflow=0.02 cfs 0.015 af

Reach AP-4: Northern storm pipe to West Campus Inflow=16.42 cfs 1.108 af
Outflow=16.42 cfs 1.108 af

Reach HYD-1: Hyrdrodynamic1 Inflow=11.27 cfs 0.783 af
Outflow=11.27 cfs 0.783 af

Reach HYD-2: Hyrdrodynamic2 Inflow=8.87 cfs 0.844 af
Outflow=8.87 cfs 0.844 af

Reach HYD-3: Hyrdrodynamic3 Inflow=5.87 cfs 0.383 af
Outflow=5.87 cfs 0.383 af

Pond 7P: (new Pond) Peak Elev=165.61' Inflow=5.93 cfs 0.757 af
36.0" Round Culvert n=0.012 L=191.0' S=0.0050 '/' Outflow=5.93 cfs 0.757 af

Pond BIO-1: Bioretention 1 Peak Elev=176.20' Storage=4,634 cf Inflow=2.28 cfs 0.171 af
Outflow=0.08 cfs 0.171 af

Pond BIO-2: Bioretention 2 Peak Elev=173.96' Storage=4,957 cf Inflow=1.98 cfs 0.180 af
Outflow=0.07 cfs 0.180 af

Pond DET-1: Dry detention pond Peak Elev=177.30' Storage=5,357 cf Inflow=2.45 cfs 0.211 af
Primary=0.10 cfs 0.193 af Secondary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.193 af

Pond DET-2: Underground detention Peak Elev=172.17' Storage=563 cf Inflow=0.56 cfs 0.041 af
Outflow=0.08 cfs 0.041 af

Pond DET-3: Underground detention Peak Elev=170.68' Storage=5,519 cf Inflow=3.73 cfs 0.243 af
Outflow=0.18 cfs 0.239 af

Pond DET-4: Underground detention Peak Elev=171.23' Storage=834 cf Inflow=0.93 cfs 0.066 af
Outflow=0.19 cfs 0.066 af

Total Runoff Area = 143.457 ac Runoff Volume = 11.283 af Average Runoff Depth = 0.94"
36.25% Pervious = 51.998 ac 63.75% Impervious = 91.459 ac

Summary for Subcatchment PS-1A: Southern half of Industrial Buildings & Parking

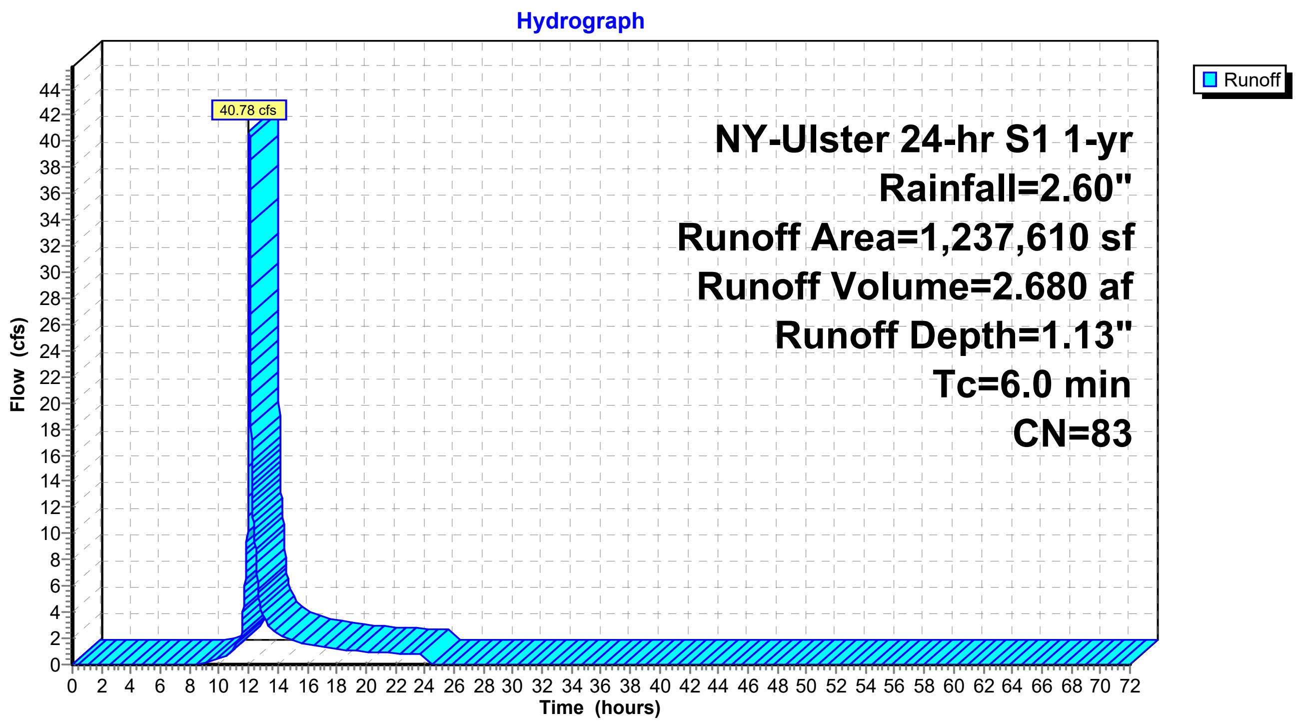
Runoff = 40.78 cfs @ 12.04 hrs, Volume= 2.680 af, Depth= 1.13"
Routed to Reach AP-1 : 42" RCP to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
456,406	98	Paved parking, HSG A
465,018	98	Roofs, HSG A
313,400	39	>75% Grass cover, Good, HSG A
2,786	32	Woods/grass comb., Good, HSG A
1,237,610	83	Weighted Average
316,186		25.55% Pervious Area
921,424		74.45% Impervious Area

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

Subcatchment PS-1A: Southern half of Industrial Buildings & Parking



Summary for Subcatchment PS-1B: Enterprise Dr Entrance and Boices Lane ROW

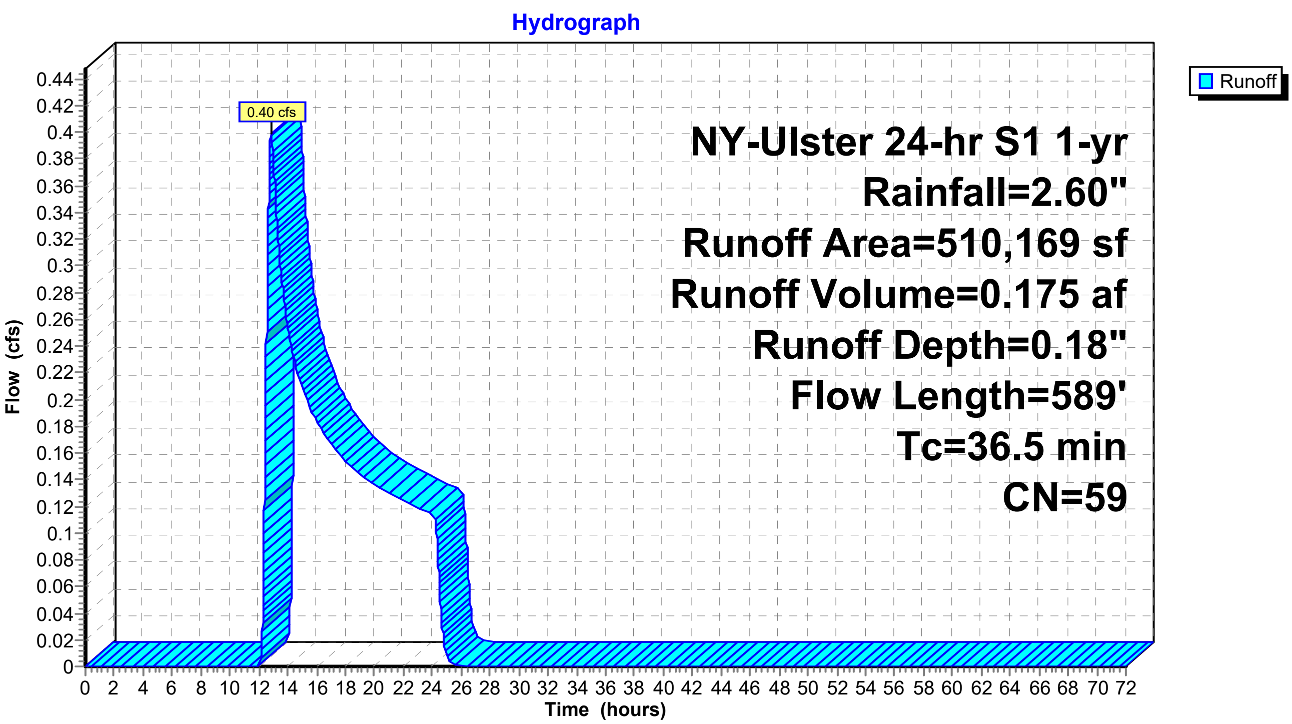
Runoff = 0.40 cfs @ 12.86 hrs, Volume= 0.175 af, Depth= 0.18"
Routed to Reach AP-1 : 42" RCP to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
170,783	98	Paved parking, HSG A
339,386	39	>75% Grass cover, Good, HSG A
510,169	59	Weighted Average
339,386		66.52% Pervious Area
170,783		33.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.1	150	0.0030	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
6.7	155	0.0030	0.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	284	0.0050	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 Corrugated PE, smooth interior
36.5	589	Total			

Subcatchment PS-1B: Enterprise Dr Entrance and Boices Lane ROW



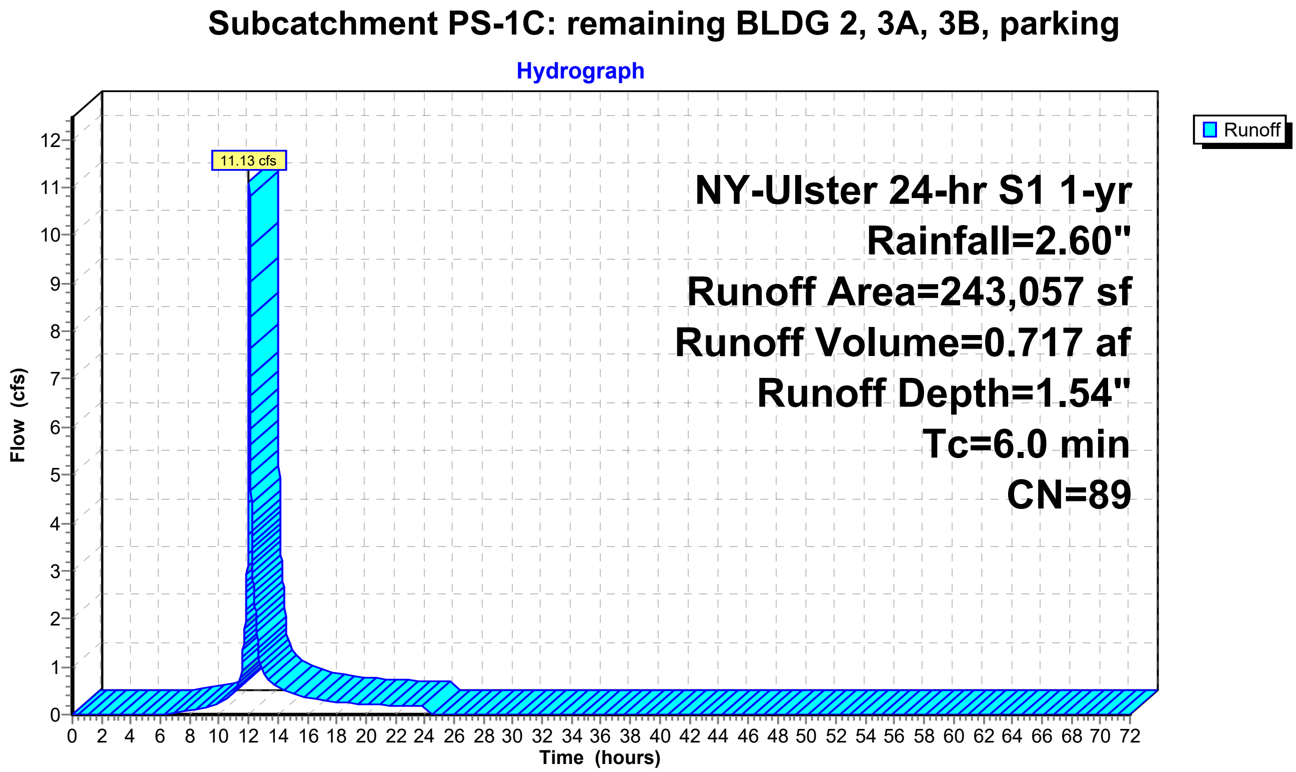
Summary for Subcatchment PS-1C: remaining BLDG 2, 3A, 3B, parking

Runoff = 11.13 cfs @ 12.04 hrs, Volume= 0.717 af, Depth= 1.54"
Routed to Reach HYD-1 : Hyrdrodynamic 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

	Area (sf)	CN	Description
*	206,118	98	Paved parking & Roofs, HSG A
	36,939	39	>75% Grass cover, Good, HSG A
	243,057	89	Weighted Average
	36,939		15.20% Pervious Area
	206,118		84.80% Impervious Area

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



Summary for Subcatchment PS-1D: BLDG 2 9-12

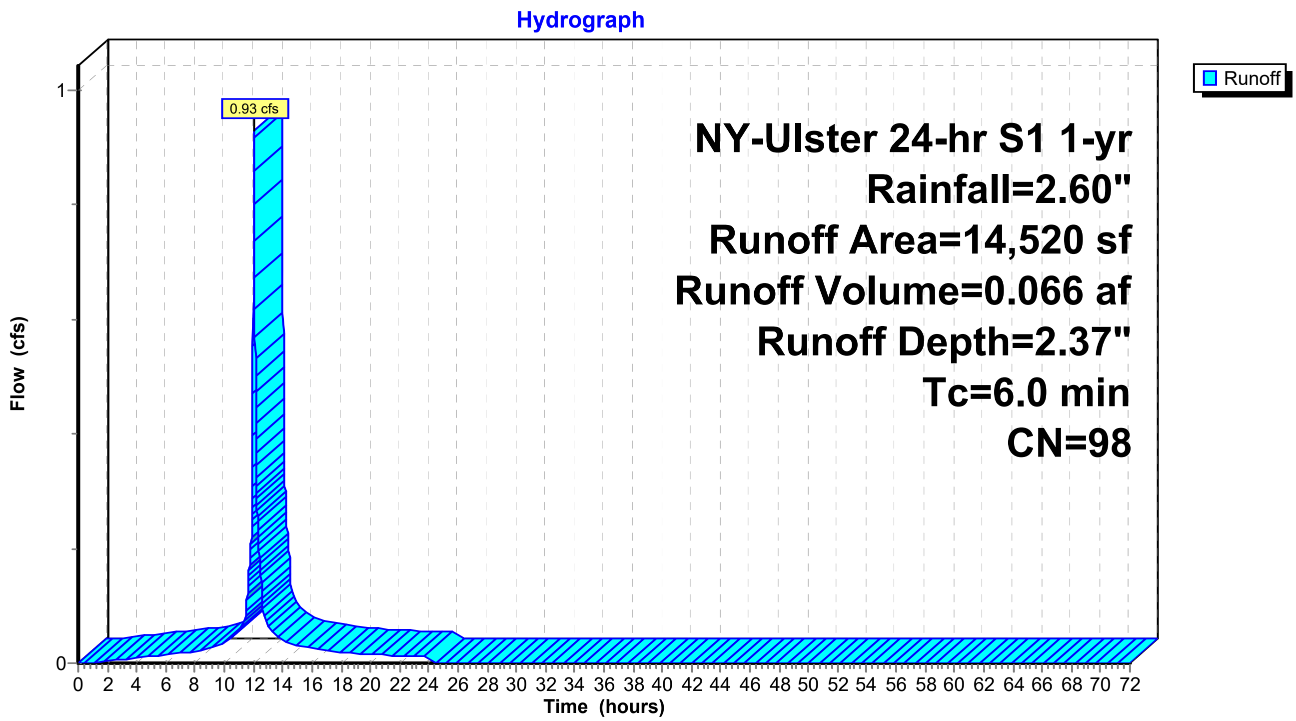
Runoff = 0.93 cfs @ 12.04 hrs, Volume= 0.066 af, Depth= 2.37"
Routed to Pond DET-4 : Underground detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
14,520	98	Roofs, HSG A
14,520		100.00% Impervious Area

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

Subcatchment PS-1D: BLDG 2 9-12



Summary for Subcatchment PS-1E: BLDG 1A1-4, parking to underground detention

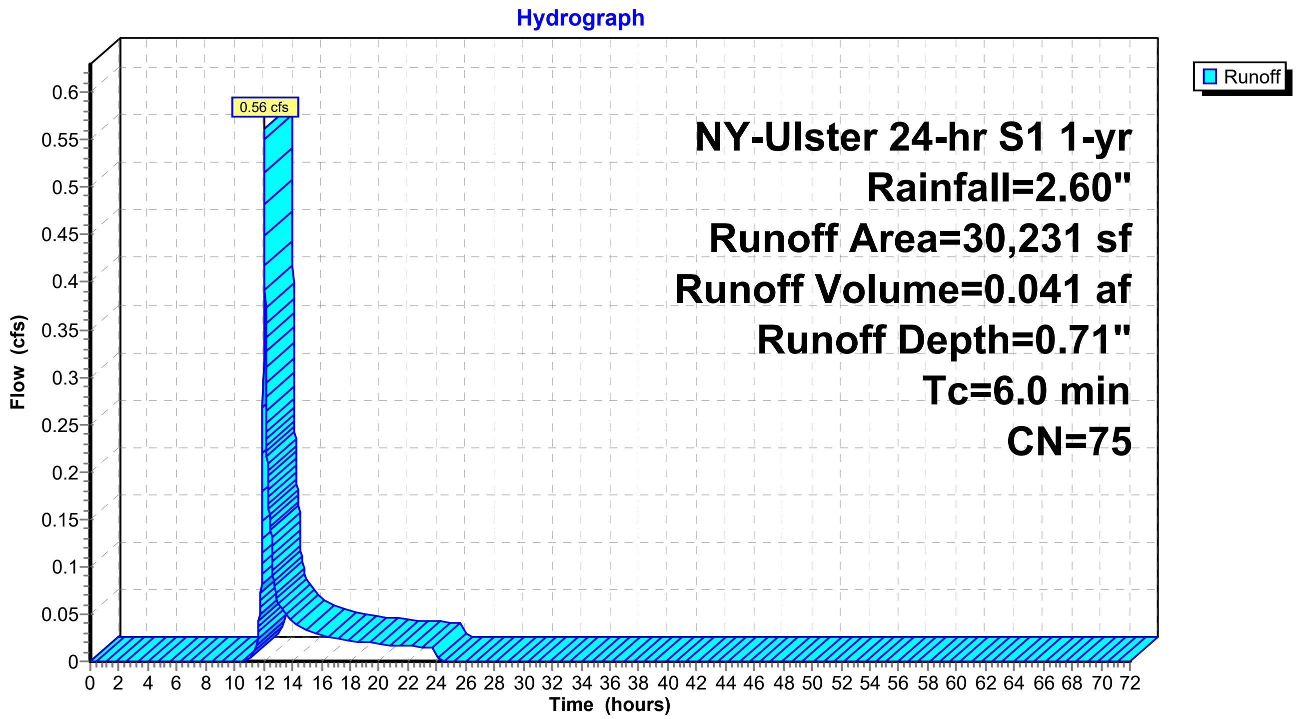
Runoff = 0.56 cfs @ 12.04 hrs, Volume= 0.041 af, Depth= 0.71"
Routed to Pond DET-2 : Underground detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
10,577	98	Paved parking, HSG A
11,709	39	>75% Grass cover, Good, HSG A
7,945	98	Roofs, HSG A
30,231	75	Weighted Average
11,709		38.73% Pervious Area
18,522		61.27% Impervious Area

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

Subcatchment PS-1E: BLDG 1A1-4, parking to underground detention



Summary for Subcatchment PS-1F: BLDG 1C-1, 1E-1, parking to underground detention

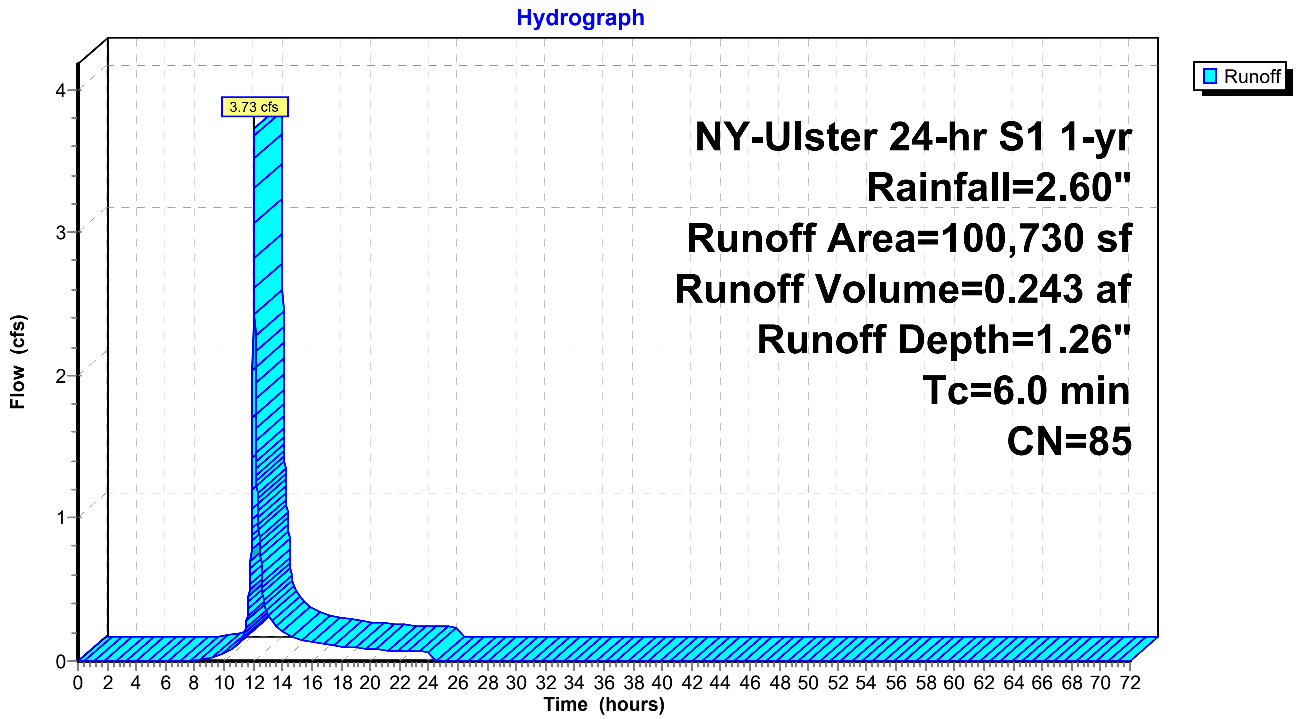
Runoff = 3.73 cfs @ 12.04 hrs, Volume= 0.243 af, Depth= 1.26"
Routed to Pond DET-3 : Underground detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
27,131	98	Roofs, HSG A
50,806	98	Paved parking, HSG A
22,793	39	>75% Grass cover, Good, HSG A
100,730	85	Weighted Average
22,793		22.63% Pervious Area
77,937		77.37% Impervious Area

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

Subcatchment PS-1F: BLDG 1C-1, 1E-1, parking to underground detention



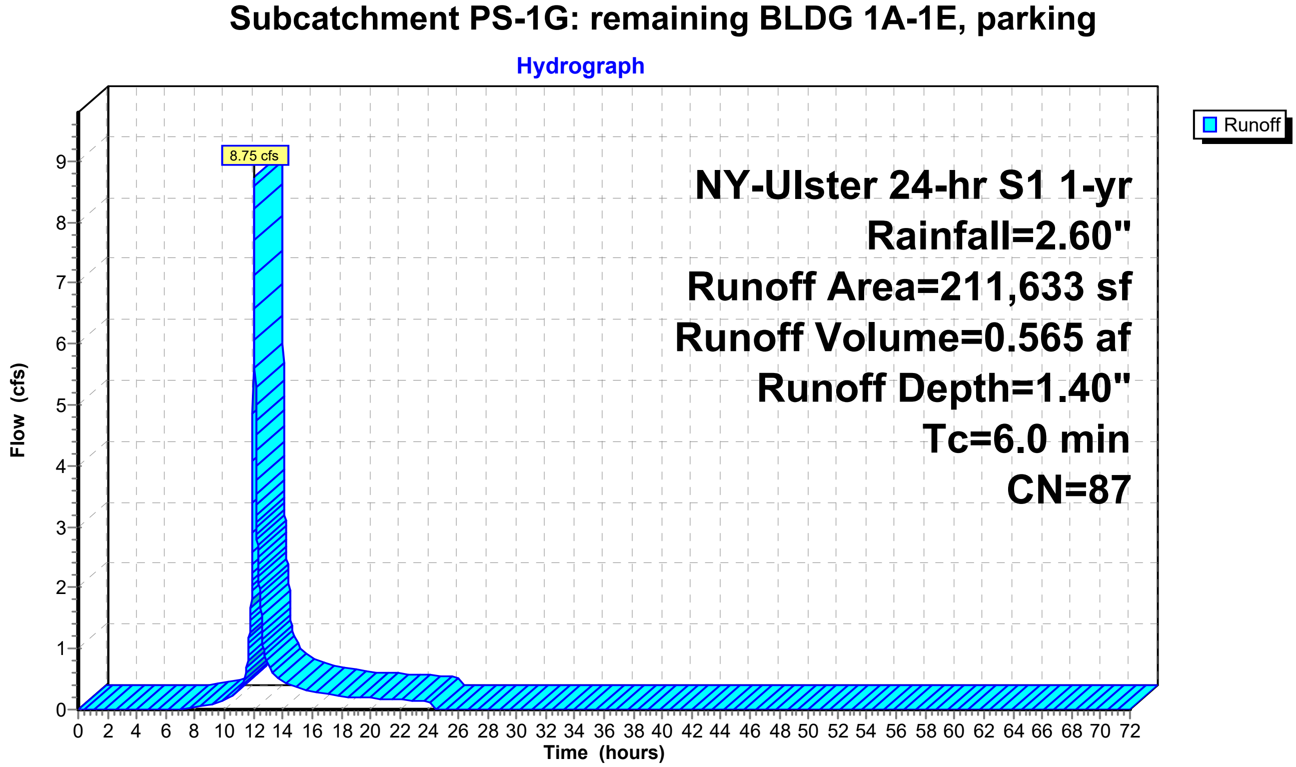
Summary for Subcatchment PS-1G: remaining BLDG 1A-1E, parking

Runoff = 8.75 cfs @ 12.04 hrs, Volume= 0.565 af, Depth= 1.40"
Routed to Reach HYD-2 : Hyrdrodynamic 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

	Area (sf)	CN	Description
*	170,756	98	Paved parking & Roofs, HSG A
	40,877	39	>75% Grass cover, Good, HSG A
	211,633	87	Weighted Average
	40,877		19.32% Pervious Area
	170,756		80.68% Impervious Area

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



Summary for Subcatchment PS-1H: Hotel parking and bioretention

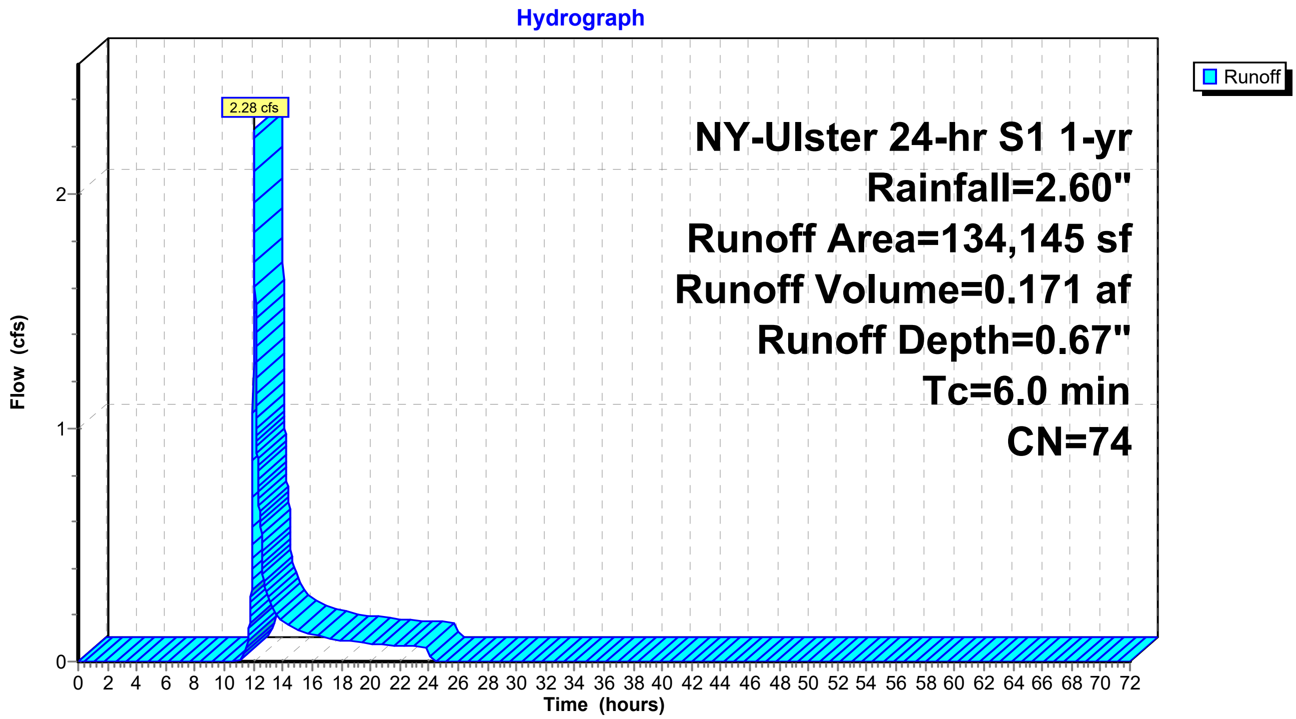
Runoff = 2.28 cfs @ 12.05 hrs, Volume= 0.171 af, Depth= 0.67"
Routed to Pond BIO-1 : Bioretention 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
79,488	98	Paved parking, HSG A
54,657	39	>75% Grass cover, Good, HSG A
134,145	74	Weighted Average
54,657		40.74% Pervious Area
79,488		59.26% Impervious Area

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

Subcatchment PS-1H: Hotel parking and bioretention



Summary for Subcatchment PS-1I: Plaza

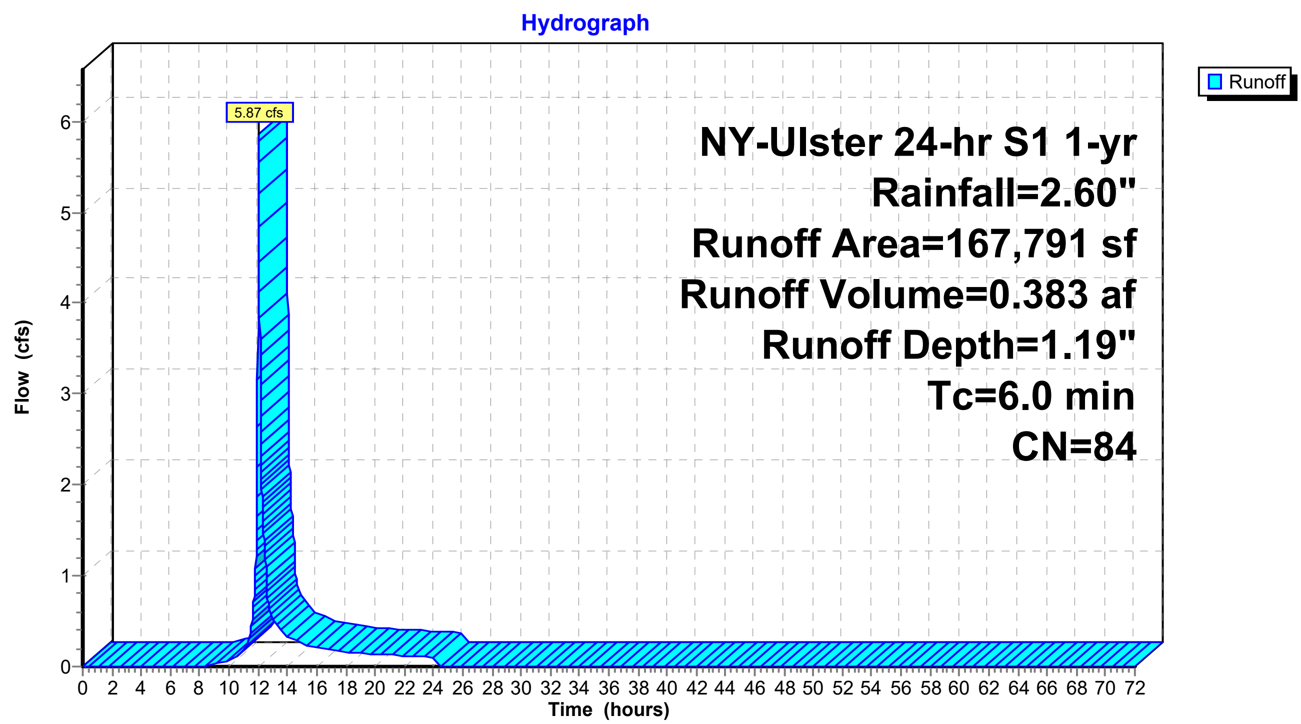
Runoff = 5.87 cfs @ 12.04 hrs, Volume= 0.383 af, Depth= 1.19"
Routed to Reach HYD-3 : Hyrdrodynamic 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

	Area (sf)	CN	Description
*	126,677	98	Paved parking & Roofs, HSG A
	41,114	39	>75% Grass cover, Good, HSG A
	167,791	84	Weighted Average
	41,114		24.50% Pervious Area
	126,677		75.50% Impervious Area

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

Subcatchment PS-1I: Plaza



Summary for Subcatchment PS-1J: BLDG 4A,4B, and bioretention

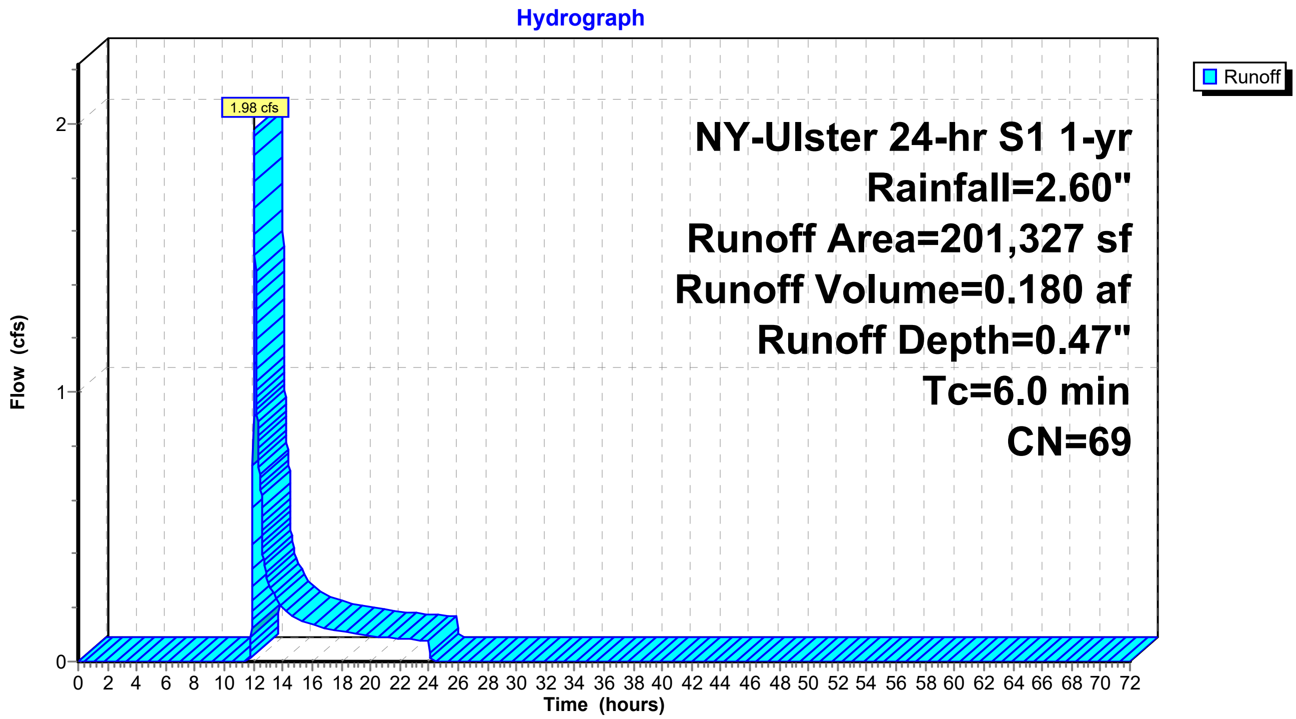
Runoff = 1.98 cfs @ 12.05 hrs, Volume= 0.180 af, Depth= 0.47"
Routed to Pond BIO-2 : Bioretention 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

	Area (sf)	CN	Description
*	103,655	98	Paved parking & Roofs, HSG A
	97,672	39	>75% Grass cover, Good, HSG A
	201,327	69	Weighted Average
	97,672		48.51% Pervious Area
	103,655		51.49% Impervious Area

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

Subcatchment PS-1J: BLDG 4A,4B, and bioretention



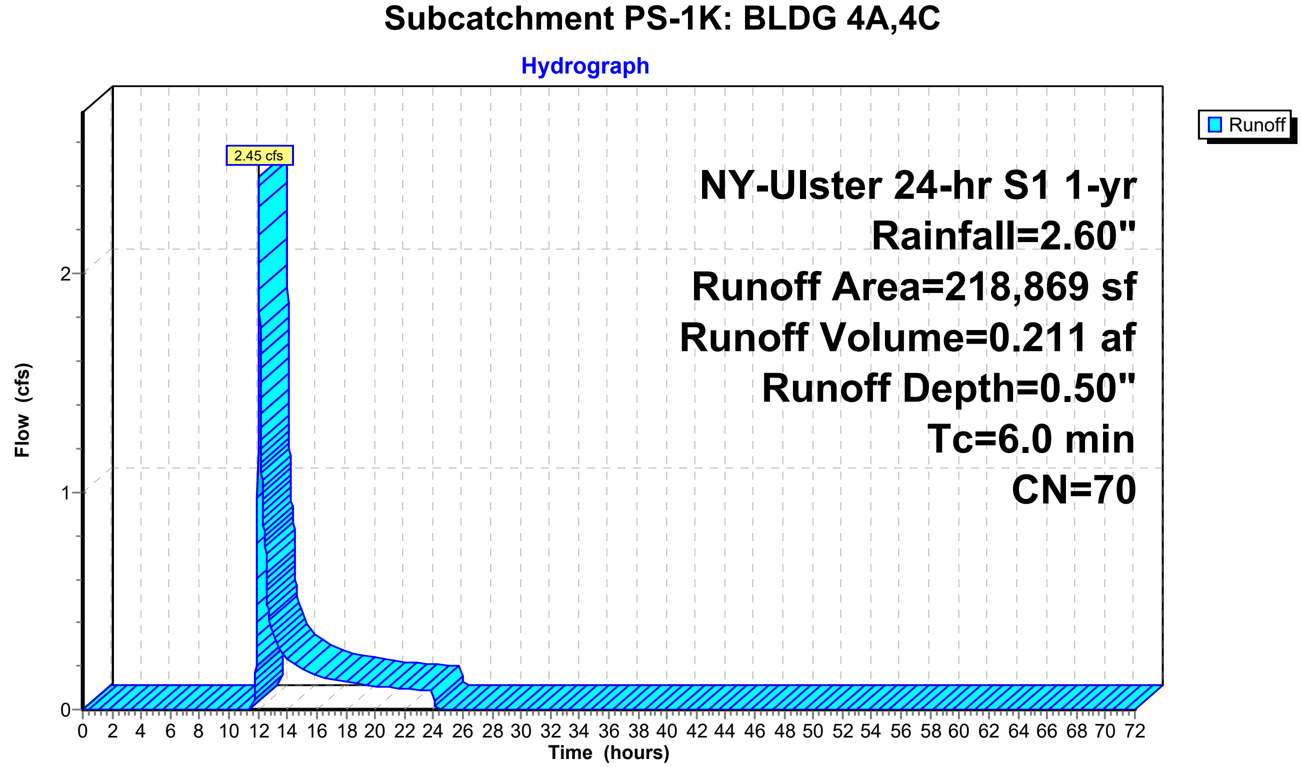
Summary for Subcatchment PS-1K: BLDG 4A,4C

Runoff = 2.45 cfs @ 12.05 hrs, Volume= 0.211 af, Depth= 0.50"
Routed to Pond DET-1 : Dry detention pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

	Area (sf)	CN	Description
*	113,536	98	Paved parking & Roofs, HSG A
	105,333	39	>75% Grass cover, Good, HSG A
	218,869	70	Weighted Average
	105,333		48.13% Pervious Area
	113,536		51.87% Impervious Area

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



Summary for Subcatchment PS-2A: Northern Entrance

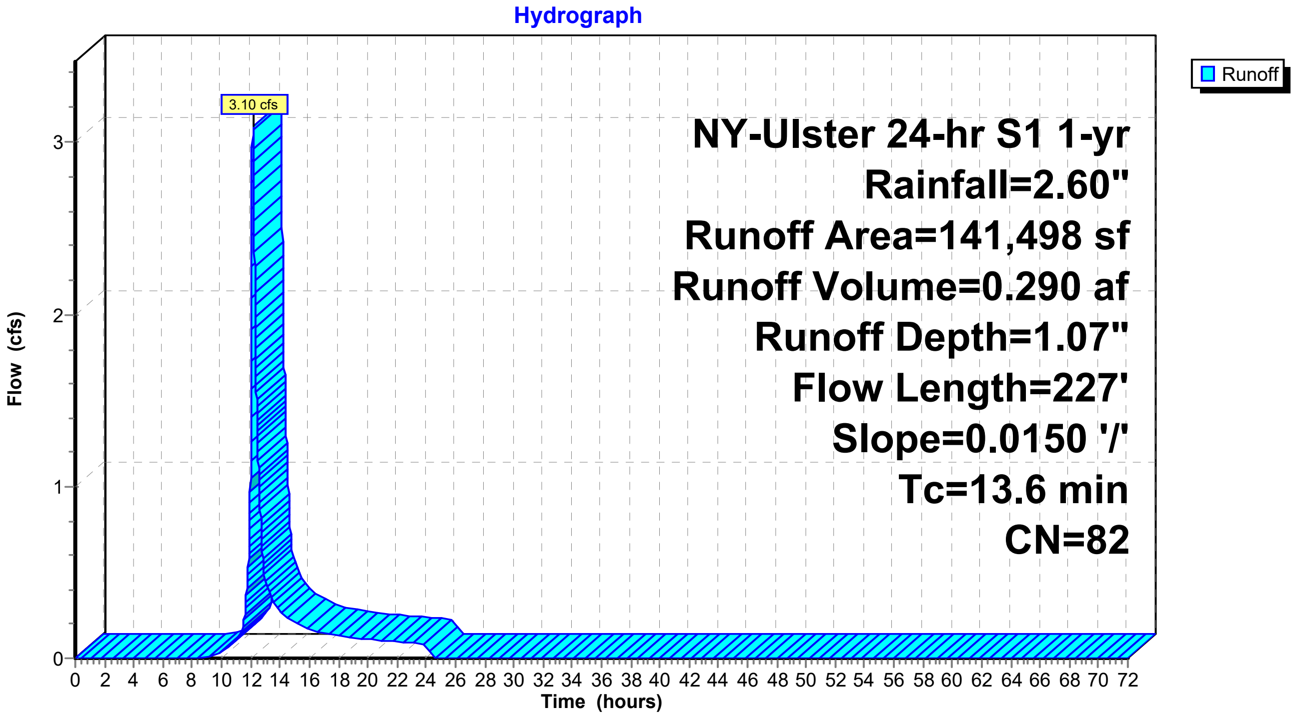
Runoff = 3.10 cfs @ 12.14 hrs, Volume= 0.290 af, Depth= 1.07"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
4,821	98	Paved parking, HSG A
32,718	98	Paved parking, HSG D
682	98	Roofs, HSG D
4,958	32	Woods/grass comb., Good, HSG A
11,275	79	Woods/grass comb., Good, HSG D
4,843	39	>75% Grass cover, Good, HSG A
82,201	80	>75% Grass cover, Good, HSG D
141,498	82	Weighted Average
103,277		72.99% Pervious Area
38,221		27.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0150	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
2.5	127	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.6	227	Total			

Subcatchment PS-2A: Northern Entrance



Summary for Subcatchment PS-2B: Northern Lawn & Helipad

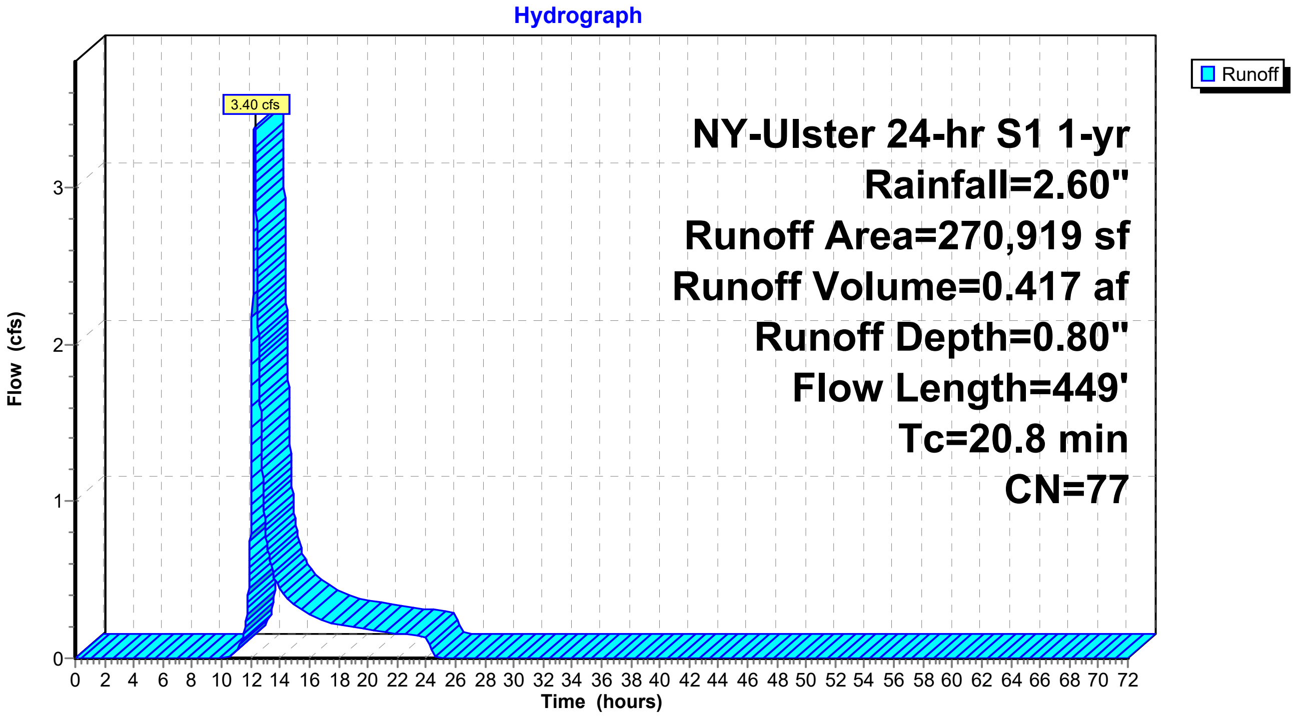
Runoff = 3.40 cfs @ 12.26 hrs, Volume= 0.417 af, Depth= 0.80"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
35,226	98	Paved parking, HSG A
39,420	98	Paved parking, HSG D
374	98	Roofs, HSG D
50,804	39	>75% Grass cover, Good, HSG A
145,095	80	>75% Grass cover, Good, HSG D
270,919	77	Weighted Average
195,899		72.31% Pervious Area
75,020		27.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0080	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
0.1	14	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.4	102	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.1	233	0.0180	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.8	449	Total			

Subcatchment PS-2B: Northern Lawn & Helipad



Summary for Subcatchment PS-2C: Northern Parking & Warehouses

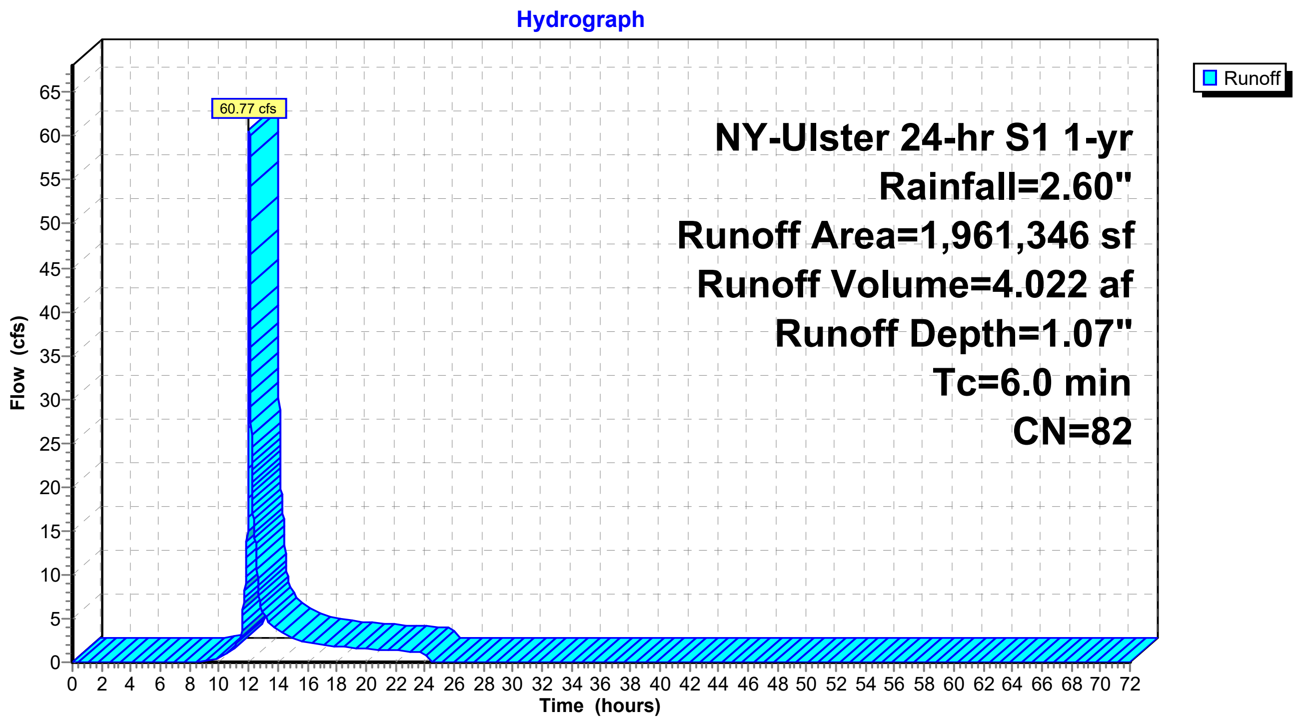
Runoff = 60.77 cfs @ 12.04 hrs, Volume= 4.022 af, Depth= 1.07"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
872,867	98	Paved parking, HSG A
87,604	98	Paved parking, HSG D
459,315	98	Roofs, HSG A
22,924	32	Woods/grass comb., Good, HSG A
1,554	79	Woods/grass comb., Good, HSG D
477,620	39	>75% Grass cover, Good, HSG A
29,747	80	>75% Grass cover, Good, HSG D
9,715	30	Brush, Good, HSG A
1,961,346	82	Weighted Average
541,560		27.61% Pervious Area
1,419,786		72.39% Impervious Area

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

Subcatchment PS-2C: Northern Parking & Warehouses



Summary for Subcatchment PS-3A: Soccer fields & Boices Ln Entrance

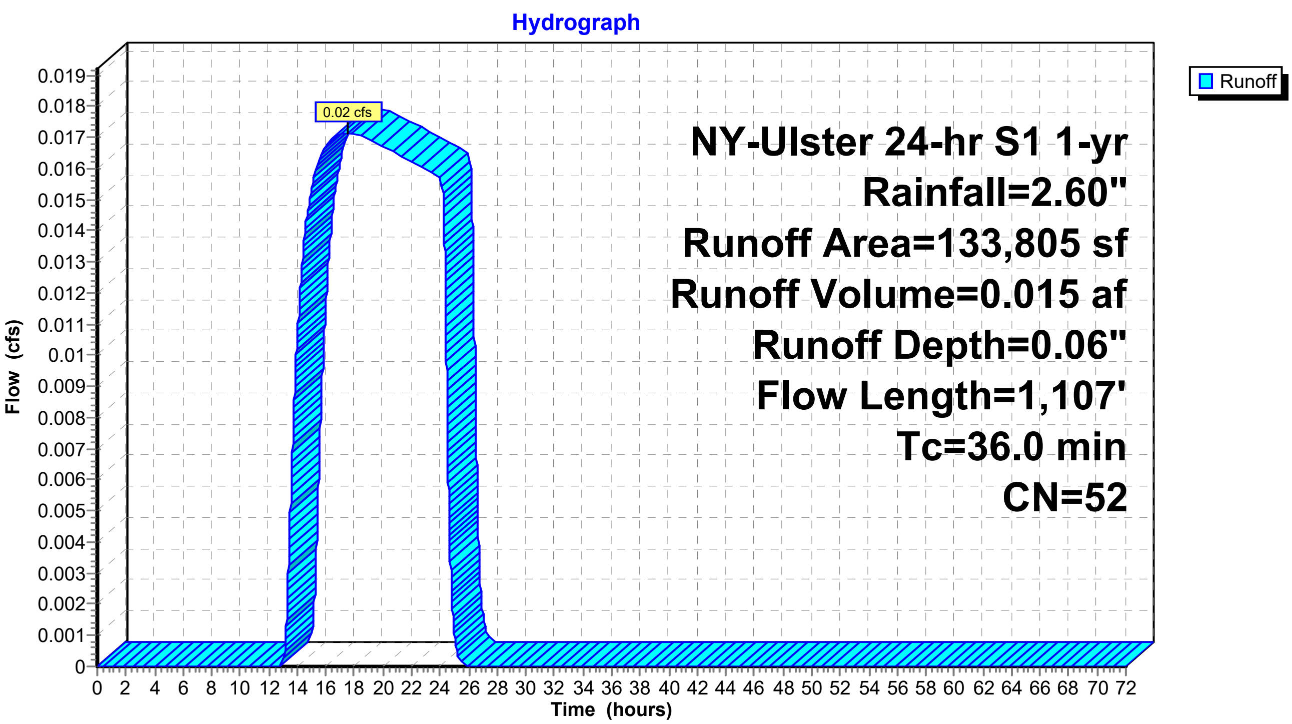
Runoff = 0.02 cfs @ 17.48 hrs, Volume= 0.015 af, Depth= 0.06"
Routed to Reach AP-3 : Existing Catch basin onsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
30,306	98	Paved parking, HSG A
103,499	39	>75% Grass cover, Good, HSG A
133,805	52	Weighted Average
103,499		77.35% Pervious Area
30,306		22.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.3	100	0.0026	0.07		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
10.7	376	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.0	631	0.0050	3.47	2.73	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PE, smooth interior
36.0	1,107	Total			

Subcatchment PS-3A: Soccer fields & Boices Ln Entrance



Summary for Subcatchment PS-3B: Wood/Lawn

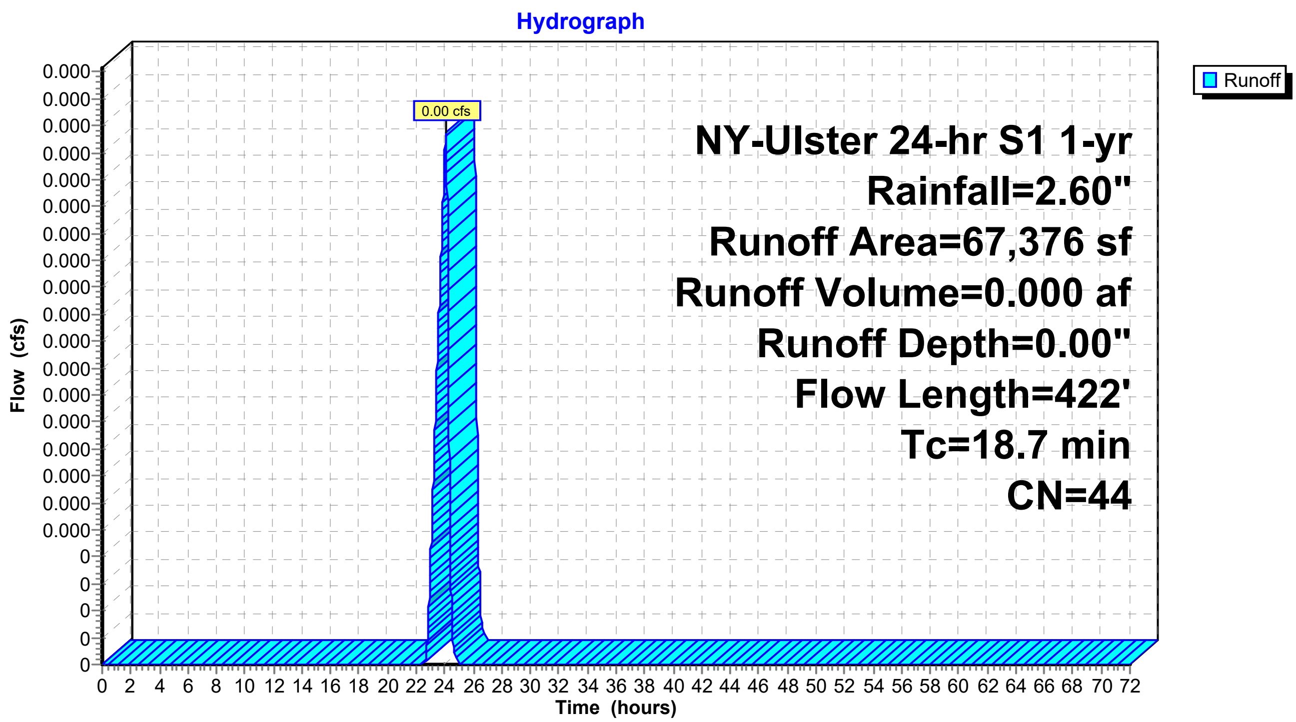
Runoff = 0.00 cfs @ 24.08 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Reach AP-3 : Existing Catch basin onsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
5,931	32	Woods/grass comb., Good, HSG A
55,072	39	>75% Grass cover, Good, HSG A
6,373	98	Paved parking, HSG A
67,376	44	Weighted Average
61,003		90.54% Pervious Area
6,373		9.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0190	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
8.6	322	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
18.7	422	Total			

Subcatchment PS-3B: Wood/Lawn



Summary for Subcatchment PS-4: East Campus Main Entrance

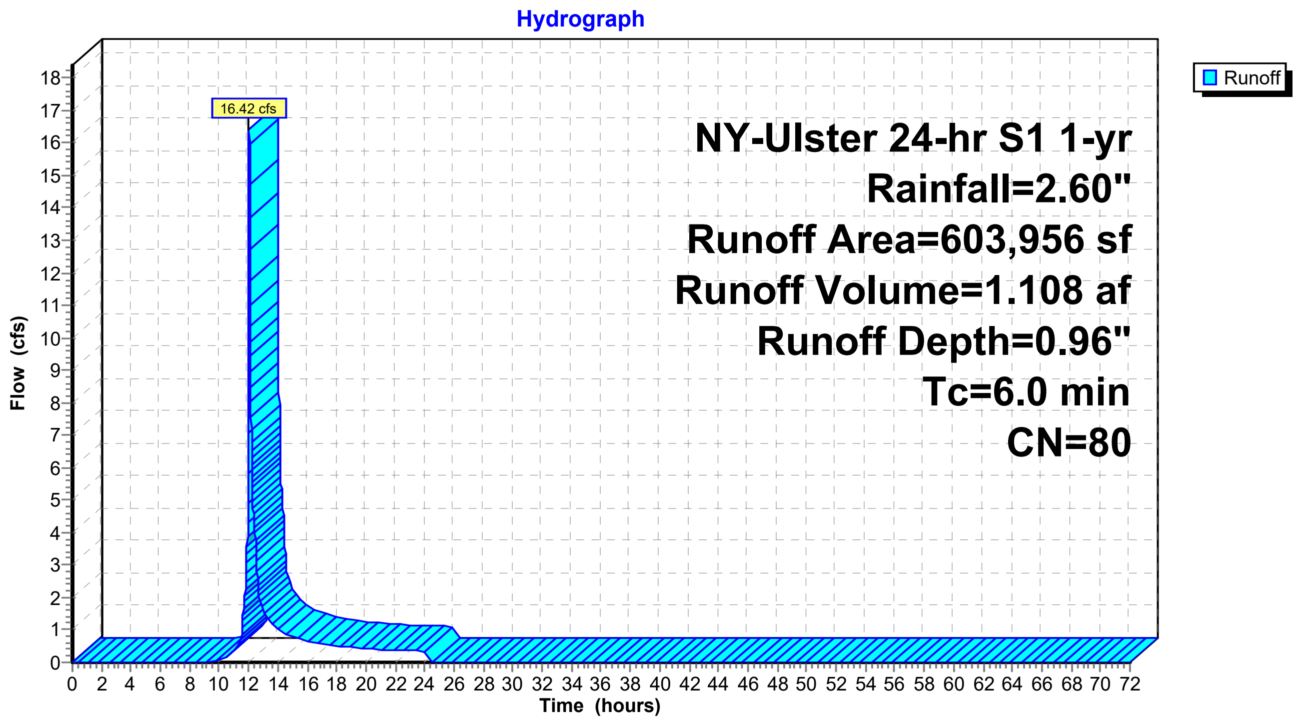
Runoff = 16.42 cfs @ 12.04 hrs, Volume= 1.108 af, Depth= 0.96"
Routed to Reach AP-4 : Northern storm pipe to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 1-yr Rainfall=2.60"

Area (sf)	CN	Description
214,844	98	Paved parking, HSG A
14,814	98	Paved parking, HSG D
181,172	98	Roofs, HSG A
187,091	39	>75% Grass cover, Good, HSG A
6,035	80	>75% Grass cover, Good, HSG D
603,956	80	Weighted Average
193,126		31.98% Pervious Area
410,830		68.02% Impervious Area

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

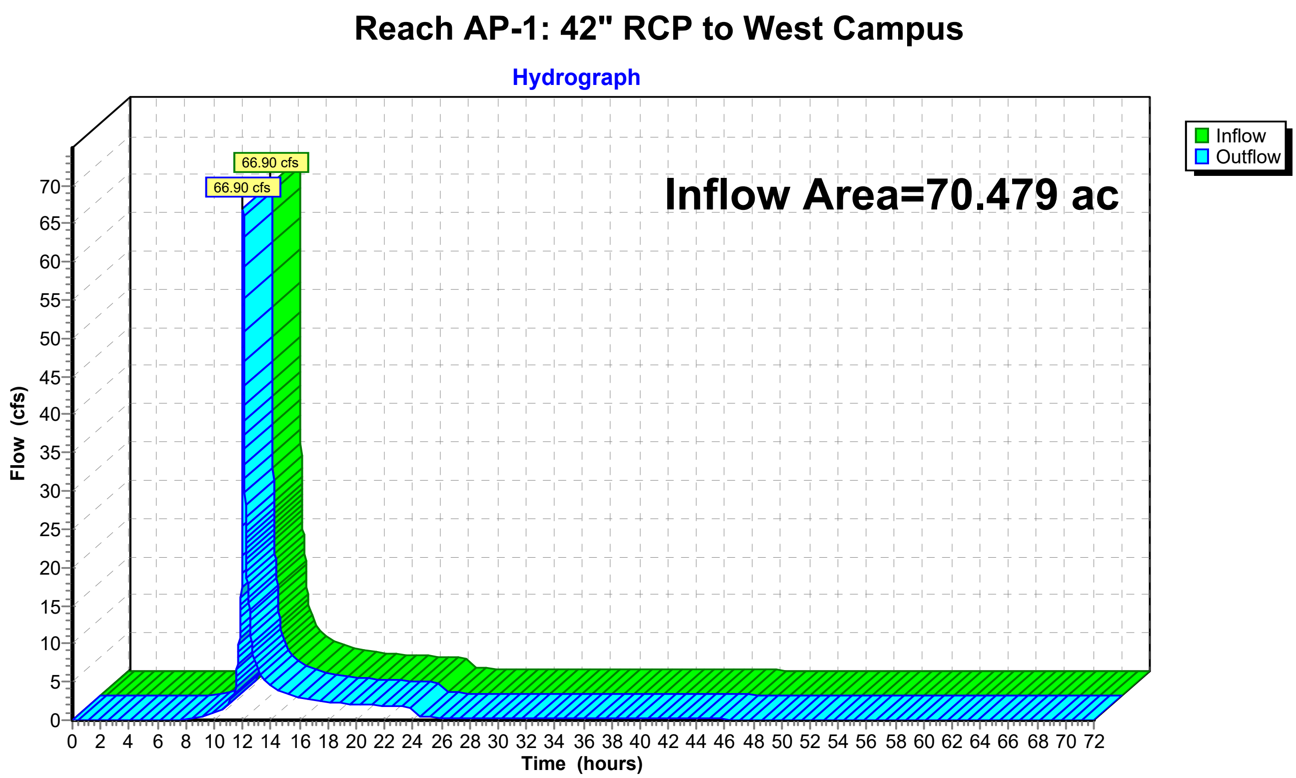
Subcatchment PS-4: East Campus Main Entrance



Summary for Reach AP-1: 42" RCP to West Campus

Inflow Area = 70.479 ac, 65.26% Impervious, Inflow Depth = 0.92" for 1-yr event
Inflow = 66.90 cfs @ 12.04 hrs, Volume= 5.410 af
Outflow = 66.90 cfs @ 12.04 hrs, Volume= 5.410 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1R

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

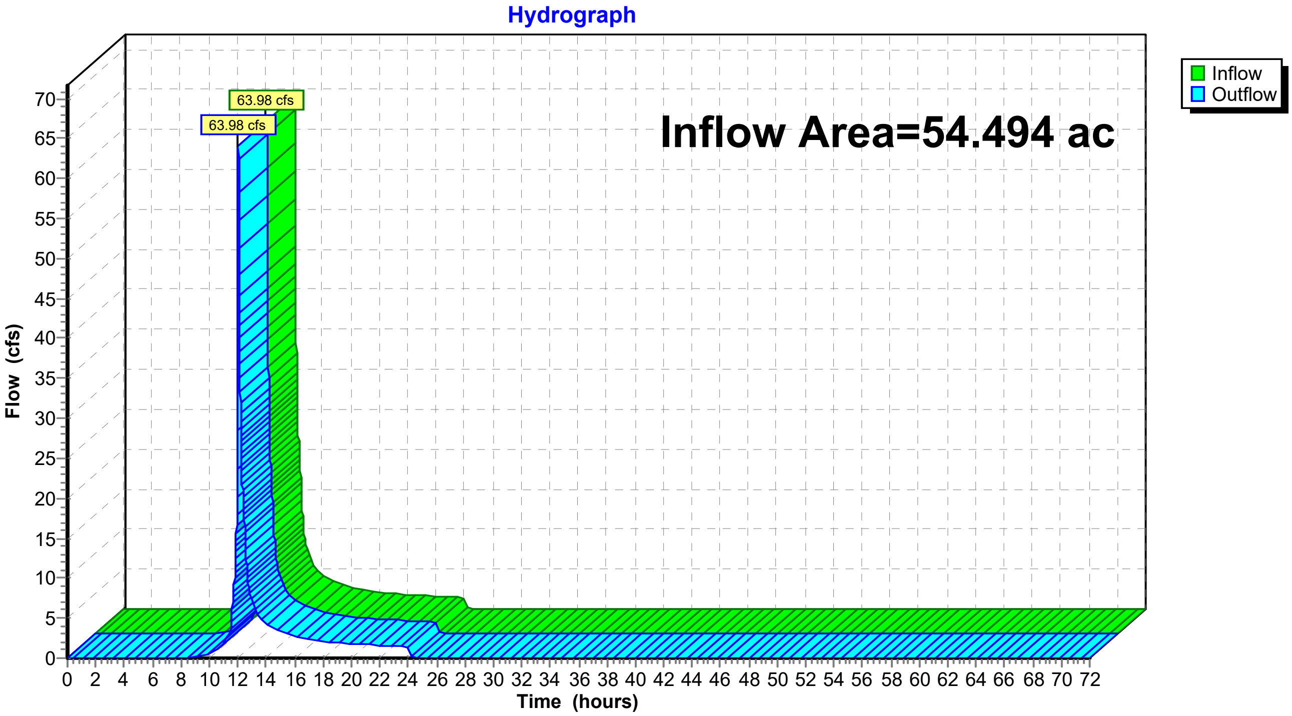


Summary for Reach AP-2: Discharge to Northern Parcel

Inflow Area = 54.494 ac, 64.58% Impervious, Inflow Depth = 1.04" for 1-yr event
Inflow = 63.98 cfs @ 12.04 hrs, Volume= 4.729 af
Outflow = 63.98 cfs @ 12.04 hrs, Volume= 4.729 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1R

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-2: Discharge to Northern Parcel

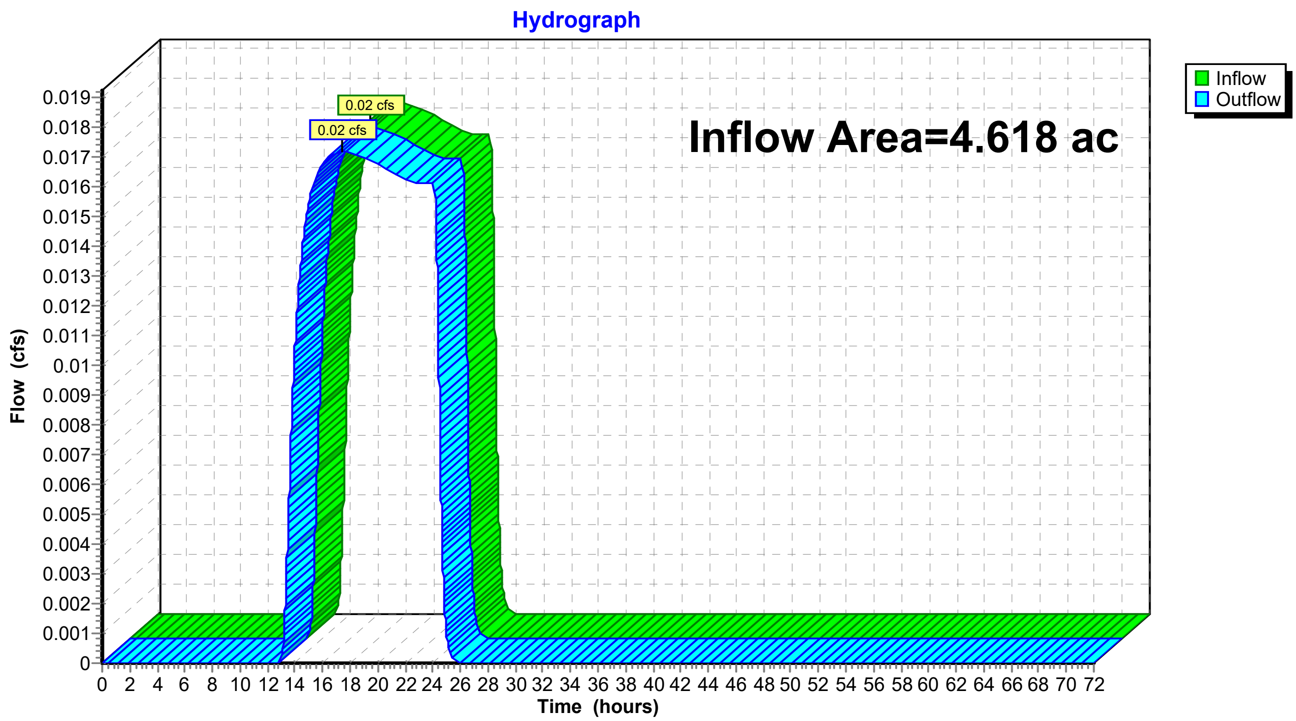


Summary for Reach AP-3: Existing Catch basin onsite

Inflow Area = 4.618 ac, 18.23% Impervious, Inflow Depth = 0.04" for 1-yr event
Inflow = 0.02 cfs @ 17.48 hrs, Volume= 0.015 af
Outflow = 0.02 cfs @ 17.48 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1R

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

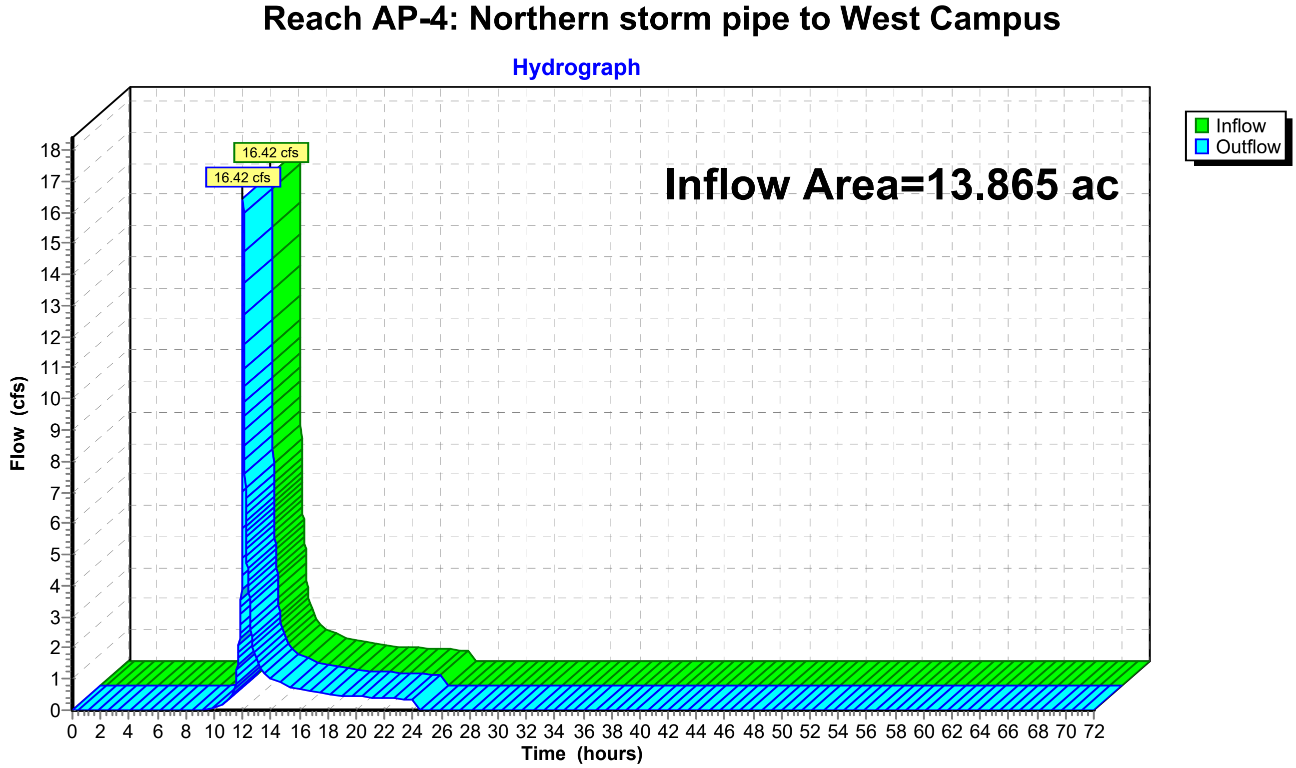
Reach AP-3: Existing Catch basin onsite



Summary for Reach AP-4: Northern storm pipe to West Campus

Inflow Area = 13.865 ac, 68.02% Impervious, Inflow Depth = 0.96" for 1-yr event
Inflow = 16.42 cfs @ 12.04 hrs, Volume= 1.108 af
Outflow = 16.42 cfs @ 12.04 hrs, Volume= 1.108 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1R

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

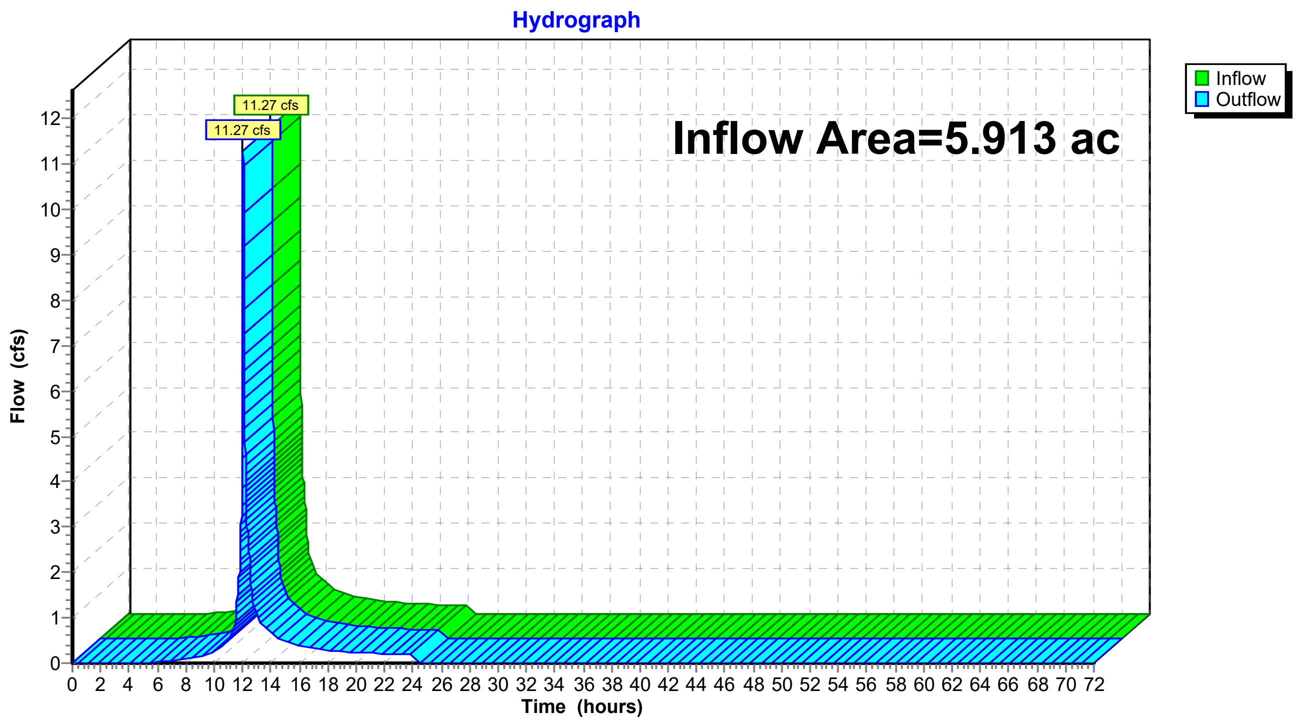


Summary for Reach HYD-1: Hyrdrodynamic 1

Inflow Area = 5.913 ac, 85.66% Impervious, Inflow Depth = 1.59" for 1-yr event
Inflow = 11.27 cfs @ 12.04 hrs, Volume= 0.783 af
Outflow = 11.27 cfs @ 12.04 hrs, Volume= 0.783 af, Atten= 0%, Lag= 0.0 min
Routed to Reach AP-1 : 42" RCP to West Campus

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach HYD-1: Hyrdrodynamic 1

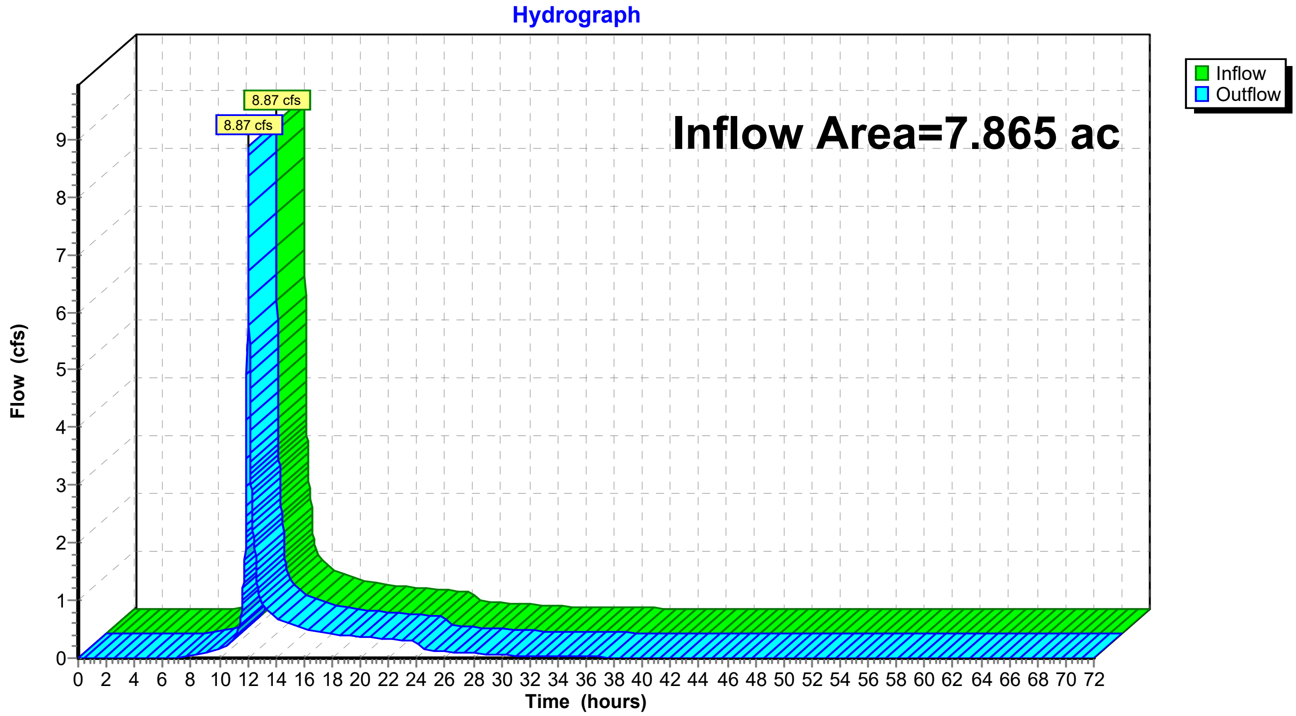


Summary for Reach HYD-2: Hyrdrodynamic 2

Inflow Area = 7.865 ac, 78.00% Impervious, Inflow Depth > 1.29" for 1-yr event
Inflow = 8.87 cfs @ 12.04 hrs, Volume= 0.844 af
Outflow = 8.87 cfs @ 12.04 hrs, Volume= 0.844 af, Atten= 0%, Lag= 0.0 min
Routed to Reach AP-1 : 42" RCP to West Campus

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach HYD-2: Hyrdrodynamic 2

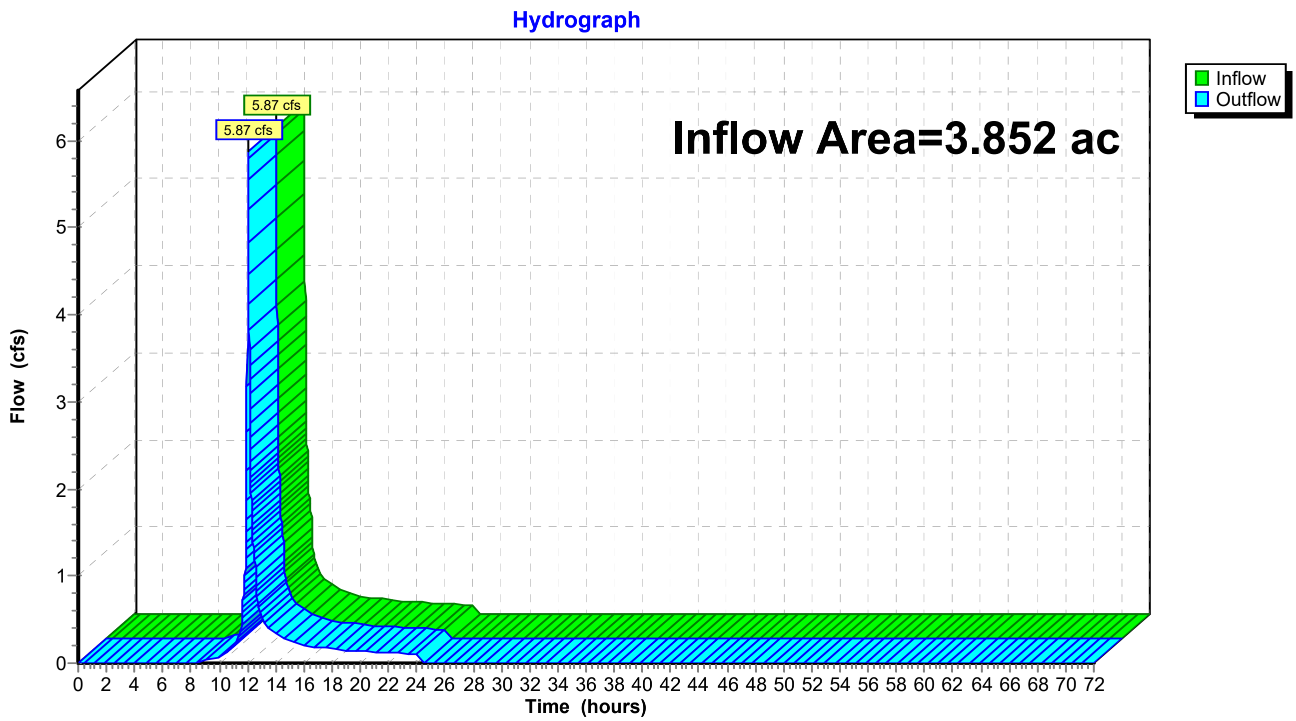


Summary for Reach HYD-3: Hyrdrodynamic 3

Inflow Area = 3.852 ac, 75.50% Impervious, Inflow Depth = 1.19" for 1-yr event
Inflow = 5.87 cfs @ 12.04 hrs, Volume= 0.383 af
Outflow = 5.87 cfs @ 12.04 hrs, Volume= 0.383 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 7P : (new Pond)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach HYD-3: Hyrdrodynamic 3



Summary for Pond 7P: (new Pond)

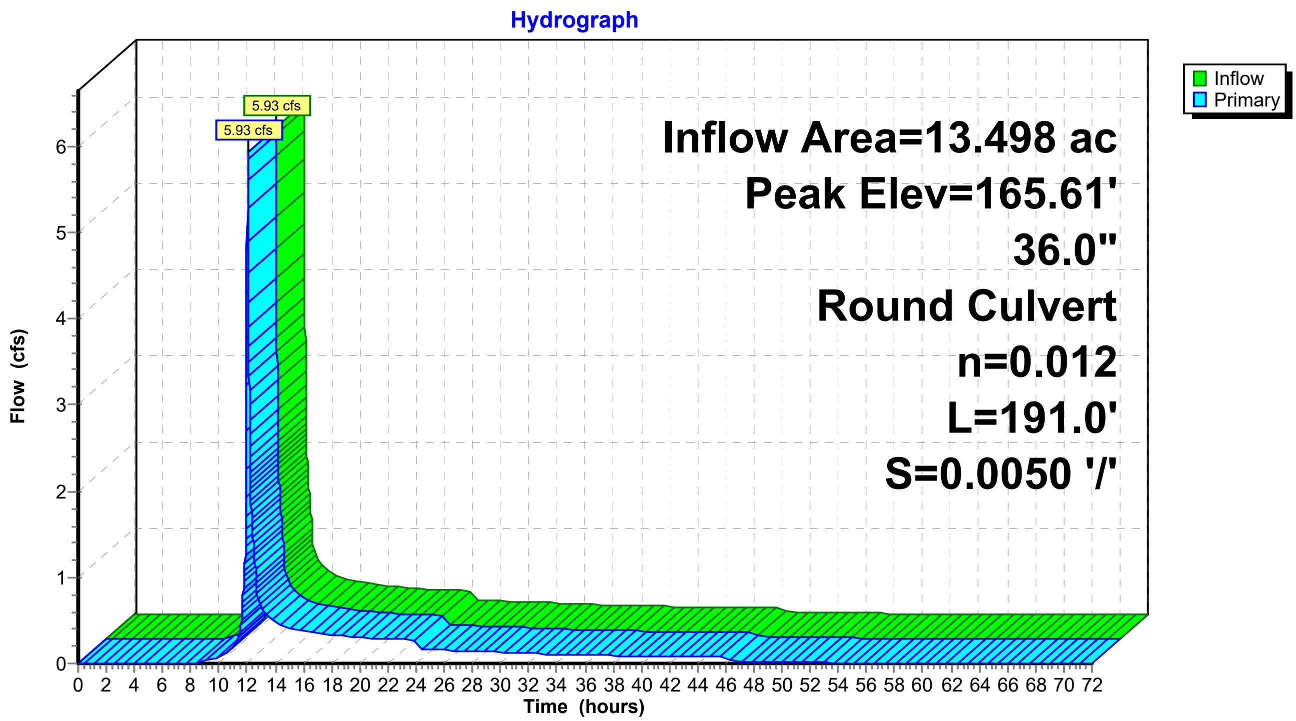
Inflow Area = 13.498 ac, 58.48% Impervious, Inflow Depth > 0.67" for 1-yr event
Inflow = 5.93 cfs @ 12.04 hrs, Volume= 0.757 af
Outflow = 5.93 cfs @ 12.04 hrs, Volume= 0.757 af, Atten= 0%, Lag= 0.0 min
Primary = 5.93 cfs @ 12.04 hrs, Volume= 0.757 af
Routed to Reach AP-1 : 42" RCP to West Campus

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 165.61' @ 12.04 hrs
Flood Elev= 176.88'

Device	Routing	Invert	Outlet Devices
#1	Primary	164.57'	**36.0" Round Culvert** L= 191.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 164.57' / 163.61' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=5.93 cfs @ 12.04 hrs HW=165.61' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 5.93 cfs @ 2.74 fps)

Pond 7P: (new Pond)



Summary for Pond BIO-1: Bioretention 1

Inflow Area = 3.080 ac, 59.26% Impervious, Inflow Depth = 0.67" for 1-yr event
Inflow = 2.28 cfs @ 12.05 hrs, Volume= 0.171 af
Outflow = 0.08 cfs @ 20.67 hrs, Volume= 0.171 af, Atten= 97%, Lag= 517.5 min
Primary = 0.08 cfs @ 20.67 hrs, Volume= 0.171 af
Routed to Reach AP-1 : 42" RCP to West Campus

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 176.20' @ 20.67 hrs Surf.Area= 10,265 sf Storage= 4,634 cf
Flood Elev= 177.00' Surf.Area= 29,686 sf Storage= 16,567 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 833.3 min (1,739.3 - 906.0)

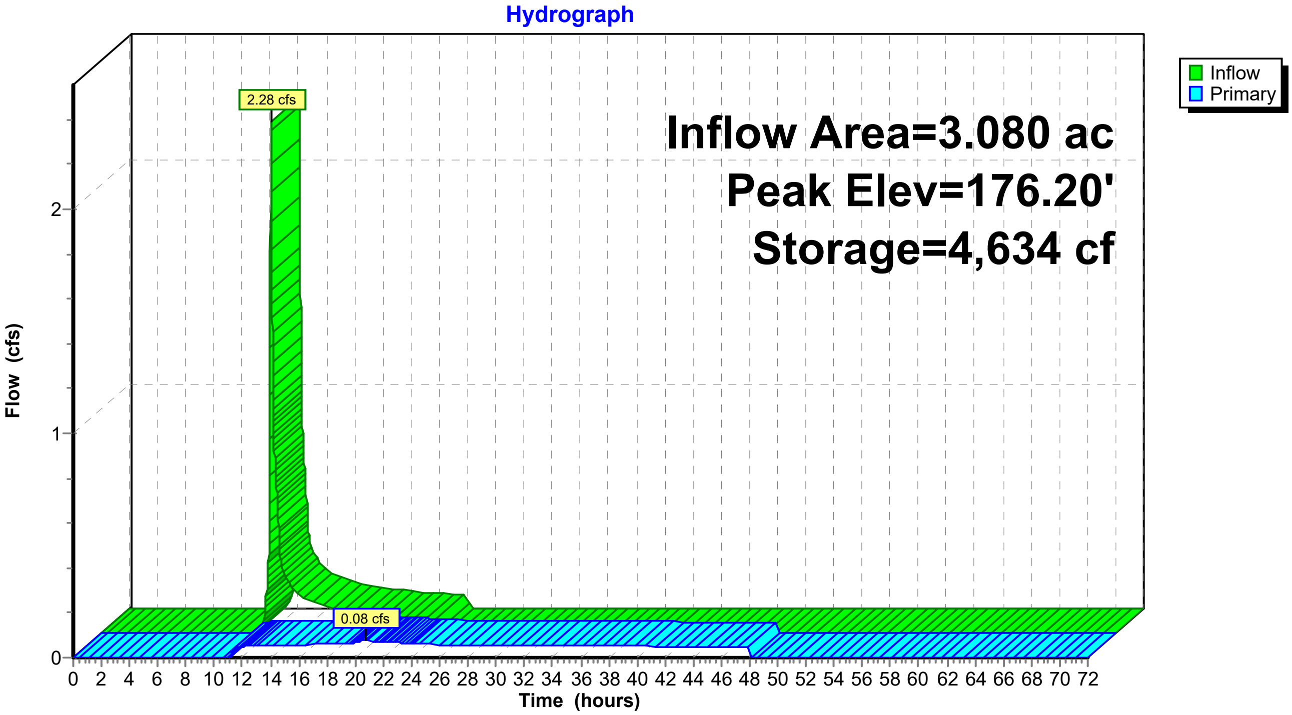
Volume	Invert	Avail.Storage	Storage Description
#1	175.70'	16,567 cf	**Filter (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
175.70	8,149	0	0
176.20	10,251	4,600	4,600
176.70	12,378	5,657	10,257
177.00	29,686	6,310	16,567

Device	Routing	Invert	Outlet Devices
#1	Device 8	175.70'	**0.250 in/hr Exfiltration over Surface area**
#2	Device 8	176.20'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#3	Device 8	176.20'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#4	Device 8	176.20'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#5	Device 8	176.70'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#6	Device 8	176.70'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#7	Device 8	176.70'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#8	Primary	170.60'	**12.0" Round Culvert** L= 209.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 170.60' / 169.90' S= 0.0033 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.08 cfs @ 20.67 hrs HW=176.20' TW=0.00' (Dynamic Tailwater)
└─**8=Culvert** (Passes 0.08 cfs of 5.30 cfs potential flow)
  ├─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)
  ├─**2=Orifice/Grate** (Weir Controls 0.01 cfs @ 0.19 fps)
  ├─**3=Orifice/Grate** (Weir Controls 0.01 cfs @ 0.19 fps)
  ├─**4=Orifice/Grate** (Weir Controls 0.01 cfs @ 0.19 fps)
  ├─**5=Orifice/Grate** (Controls 0.00 cfs)
  ├─**6=Orifice/Grate** (Controls 0.00 cfs)
  └─**7=Orifice/Grate** (Controls 0.00 cfs)

Pond BIO-1: Bioretention 1



Summary for Pond BIO-2: Bioretention 2

Inflow Area = 4.622 ac, 51.49% Impervious, Inflow Depth = 0.47" for 1-yr event
Inflow = 1.98 cfs @ 12.05 hrs, Volume= 0.180 af
Outflow = 0.07 cfs @ 24.05 hrs, Volume= 0.180 af, Atten= 97%, Lag= 719.9 min
Primary = 0.07 cfs @ 24.05 hrs, Volume= 0.180 af
Routed to Pond 7P : (new Pond)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 173.96' @ 24.05 hrs Surf.Area= 11,471 sf Storage= 4,957 cf
Flood Elev= 177.00' Surf.Area= 31,079 sf Storage= 66,076 cf

Plug-Flow detention time= 790.0 min calculated for 0.180 af (100% of inflow)
Center-of-Mass det. time= 790.1 min (1,721.9 - 931.7)

Volume	Invert	Avail.Storage	Storage Description
#1	174.00'	3,374 cf	**Forebay (Prismatic)**Listed below (Recalc)
#2	173.50'	62,702 cf	**Filter (Prismatic)**Listed below (Recalc)
		66,076 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
174.00	2,923	0	0
175.00	3,825	3,374	3,374

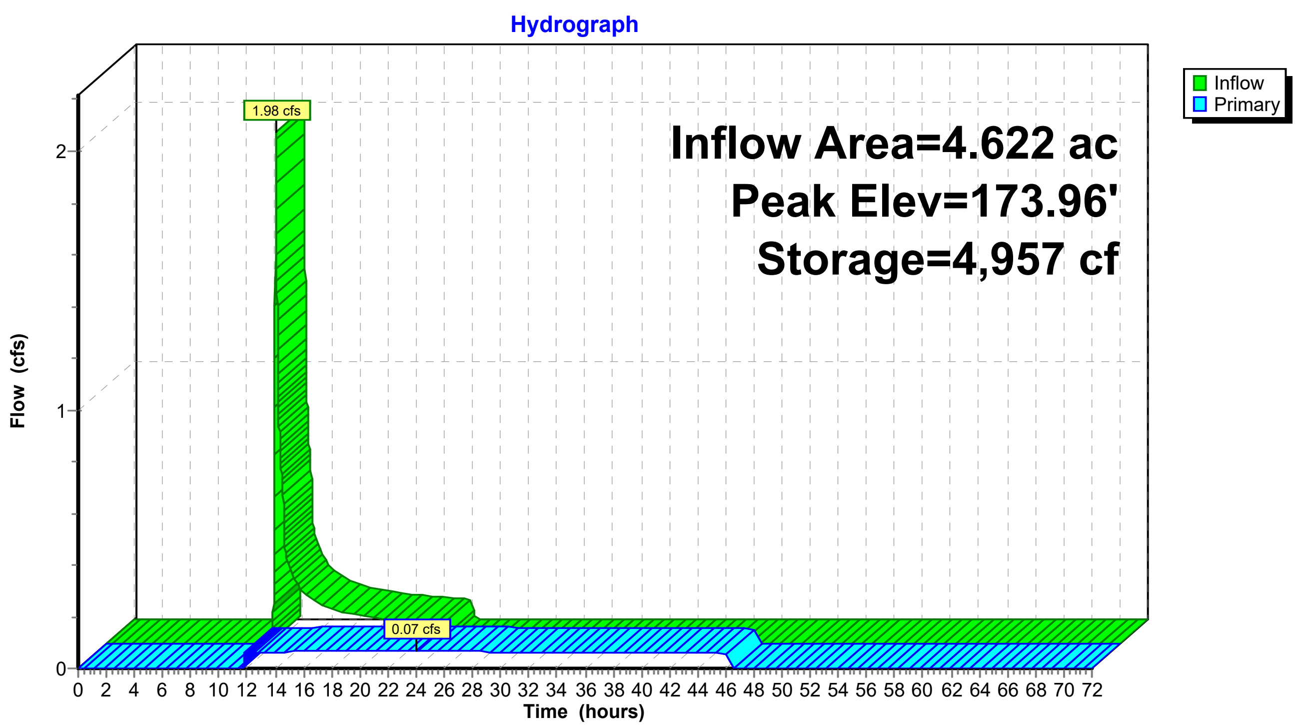
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
173.50	10,039	0	0
174.00	11,592	5,408	5,408
175.00	14,774	13,183	18,591
176.00	23,097	18,936	37,526
177.00	27,254	25,176	62,702

Device	Routing	Invert	Outlet Devices
#1	Device 7	173.50'	**0.250 in/hr Exfiltration over Surface area**
#2	Device 7	174.00'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#3	Device 7	174.00'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#4	Device 7	174.50'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#5	Device 7	174.50'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#6	Device 7	174.50'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads

#7	Primary	169.30'	**12.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 169.30' / 169.10' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.07 cfs @ 24.05 hrs HW=173.96' TW=164.78' (Dynamic Tailwater)
7=Culvert (Passes 0.07 cfs of 6.09 cfs potential flow)
- **1=Exfiltration** (Exfiltration Controls 0.07 cfs)
- **2=Orifice/Grate** (Controls 0.00 cfs)
- **3=Orifice/Grate** (Controls 0.00 cfs)
- **4=Orifice/Grate** (Controls 0.00 cfs)
- **5=Orifice/Grate** (Controls 0.00 cfs)
- **6=Orifice/Grate** (Controls 0.00 cfs)

Pond BIO-2: Bioretention 2



Summary for Pond DET-1: Dry detention pond

Inflow Area = 5.025 ac, 51.87% Impervious, Inflow Depth = 0.50" for 1-yr event
Inflow = 2.45 cfs @ 12.05 hrs, Volume= 0.211 af
Outflow = 0.10 cfs @ 21.27 hrs, Volume= 0.193 af, Atten= 96%, Lag= 553.5 min
Primary = 0.10 cfs @ 21.27 hrs, Volume= 0.193 af
Routed to Pond 7P : (new Pond)
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 7P : (new Pond)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 177.30' @ 21.27 hrs Surf.Area= 18,186 sf Storage= 5,357 cf
Flood Elev= 180.00' Surf.Area= 29,356 sf Storage= 69,185 cf

Plug-Flow detention time= 791.6 min calculated for 0.193 af (92% of inflow)
Center-of-Mass det. time= 751.0 min (1,677.1 - 926.2)

Volume	Invert	Avail.Storage	Storage Description
#1	177.00'	69,185 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

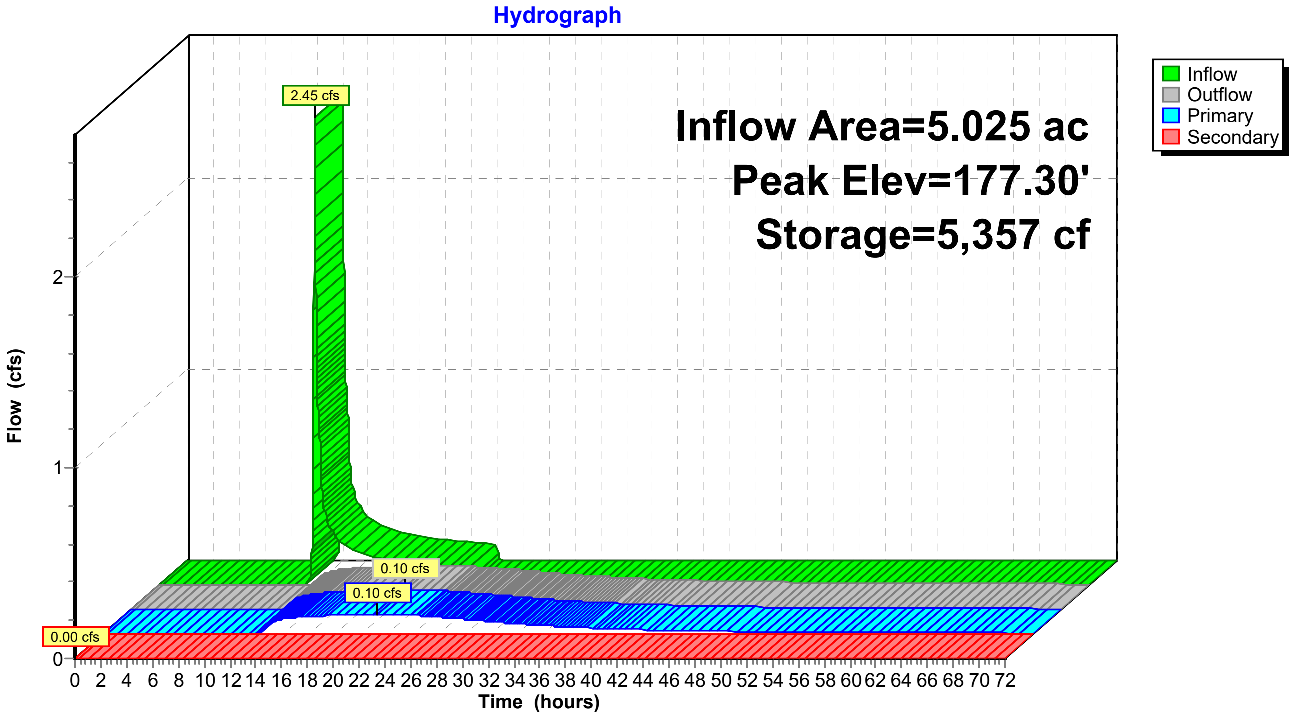
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
177.00	16,977	0	0
178.00	20,946	18,962	18,962
179.00	25,072	23,009	41,971
180.00	29,356	27,214	69,185

Device	Routing	Invert	Outlet Devices
#1	Primary	177.00'	**12.0" Round Culvert** L= 72.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 177.00' / 176.12' S= 0.0122 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	177.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	178.19'	**20.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	179.00'	**48.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Secondary	179.50'	**10.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.10 cfs @ 21.27 hrs HW=177.30' TW=164.79' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.10 cfs of 0.30 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.10 cfs @ 2.04 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=177.00' TW=164.57' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DET-1: Dry detention pond



Summary for Pond DET-2: Underground detention

Inflow Area = 0.694 ac, 61.27% Impervious, Inflow Depth = 0.71" for 1-yr event
Inflow = 0.56 cfs @ 12.04 hrs, Volume= 0.041 af
Outflow = 0.08 cfs @ 12.68 hrs, Volume= 0.041 af, Atten= 85%, Lag= 38.3 min
Primary = 0.08 cfs @ 12.68 hrs, Volume= 0.041 af
Routed to Reach HYD-2 : Hyrdrodynamic 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 172.17' @ 12.68 hrs Surf.Area= 2,344 sf Storage= 563 cf
Flood Elev= 174.92' Surf.Area= 2,344 sf Storage= 6,819 cf

Plug-Flow detention time= 170.3 min calculated for 0.041 af (99% of inflow)
Center-of-Mass det. time= 166.7 min (1,068.1 - 901.4)

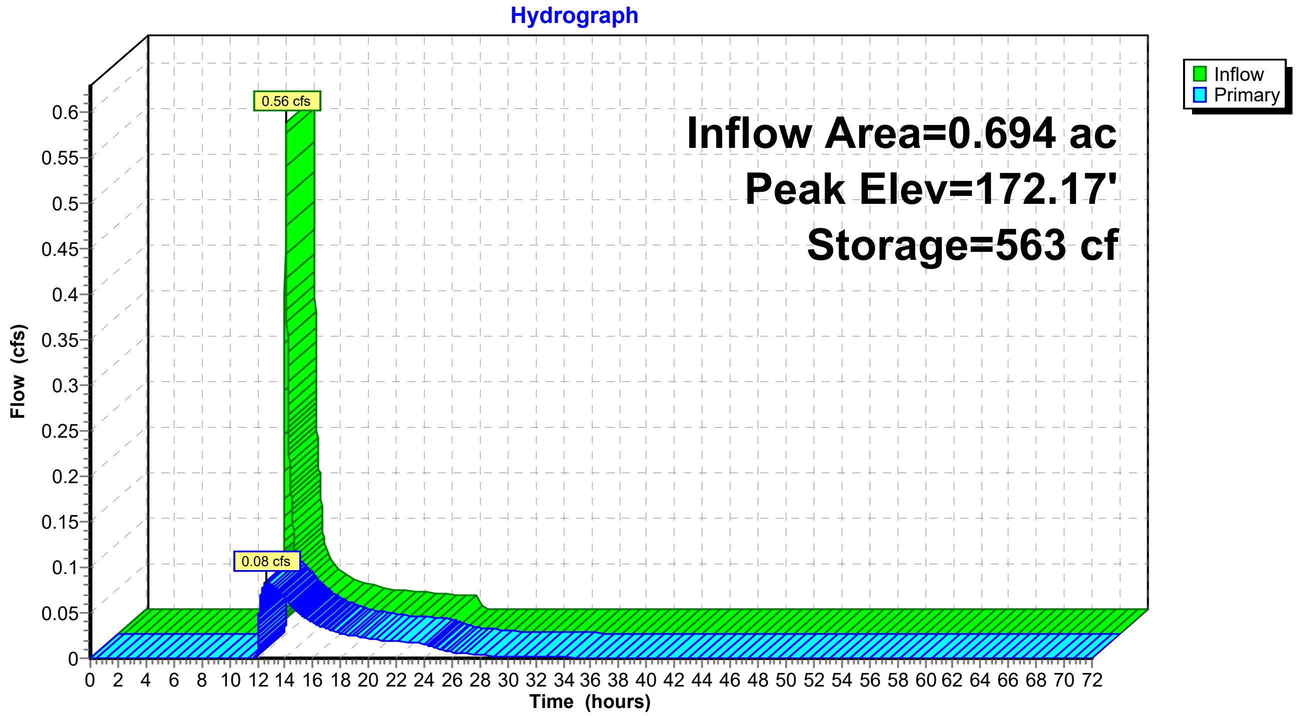
Volume	Invert	Avail.Storage	Storage Description
#1A	171.92'	0 cf	**29.65'W x 79.07'L x 3.00'H Field A** 7,030 cf Overall - 7,030 cf Embedded = 0 cf x 40.0% Voids
#2A	171.92'	6,819 cf	**ACO StormBrixx SD 1** x 300 Inside #1 Inside= 23.7"W x 36.0"H => 5.75 sf x 3.95'L = 22.7 cf Outside= 23.7"W x 36.0"H => 5.93 sf x 3.95'L = 23.4 cf 300 Chambers in 15 Rows
		6,819 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	171.92'	**12.0" Round Culvert** L= 74.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 171.92' / 171.55' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	171.92'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	174.42'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.08 cfs @ 12.68 hrs HW=172.17' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.08 cfs of 0.19 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 1.69 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DET-2: Underground detention



Summary for Pond DET-3: Underground detention

Inflow Area = 2.312 ac, 77.37% Impervious, Inflow Depth = 1.26" for 1-yr event
Inflow = 3.73 cfs @ 12.04 hrs, Volume= 0.243 af
Outflow = 0.18 cfs @ 14.44 hrs, Volume= 0.239 af, Atten= 95%, Lag= 143.9 min
Primary = 0.18 cfs @ 14.44 hrs, Volume= 0.239 af
Routed to Reach HYD-2 : Hyrdrodynamic 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 170.68' @ 14.44 hrs Surf.Area= 7,971 sf Storage= 5,519 cf
Flood Elev= 174.47' Surf.Area= 7,971 sf Storage= 34,778 cf

Plug-Flow detention time= 463.4 min calculated for 0.239 af (98% of inflow)
Center-of-Mass det. time= 454.7 min (1,311.3 - 856.6)

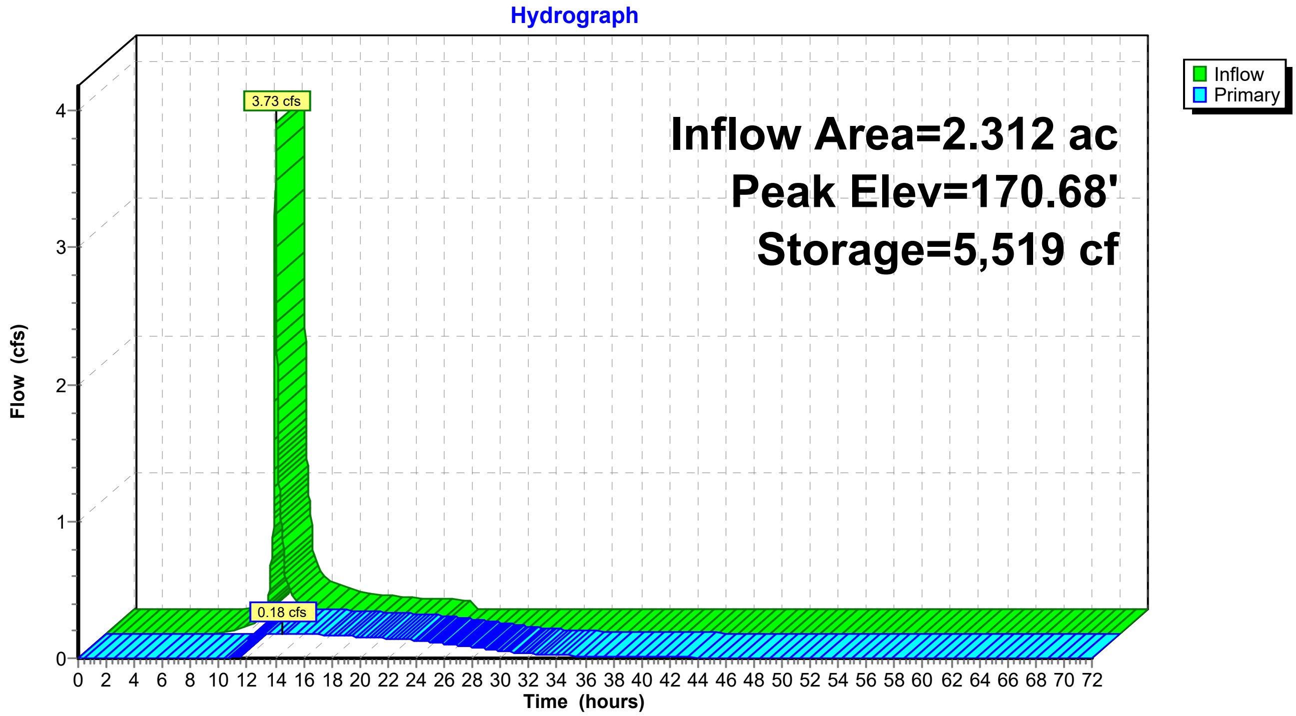
Volume	Invert	Avail.Storage	Storage Description
#1A	169.97'	0 cf	**59.30'W x 134.42'L x 4.50'H Field A** 35,854 cf Overall - 35,854 cf Embedded = 0 cf x 40.0% Voids
#2A	169.97'	34,778 cf	**ACO StormBrixx SD 1.5** x 1020 Inside #1 Inside= 23.7"W x 54.0"H => 8.62 sf x 3.95'L = 34.1 cf Outside= 23.7"W x 54.0"H => 8.89 sf x 3.95'L = 35.2 cf 1020 Chambers in 30 Rows
		34,778 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	169.97'	**18.0" Round Culvert** L= 128.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 169.97' / 169.33' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	169.97'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	173.97'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.18 cfs @ 14.44 hrs HW=170.68' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.18 cfs of 1.88 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.18 cfs @ 3.69 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DET-3: Underground detention



Summary for Pond DET-4: Underground detention

Inflow Area = 0.333 ac,100.00% Impervious, Inflow Depth = 2.37" for 1-yr event
Inflow = 0.93 cfs @ 12.04 hrs, Volume= 0.066 af
Outflow = 0.19 cfs @ 12.38 hrs, Volume= 0.066 af, Atten= 80%, Lag= 20.5 min
Primary = 0.19 cfs @ 12.38 hrs, Volume= 0.066 af
Routed to Reach HYD-1 : Hyrdrodynamic 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 171.23' @ 12.38 hrs Surf.Area= 1,125 sf Storage= 834 cf
Flood Elev= 173.47' Surf.Area= 1,125 sf Storage= 3,273 cf

Plug-Flow detention time= 80.7 min calculated for 0.066 af (100% of inflow)
Center-of-Mass det. time= 79.9 min (844.0 - 764.1)

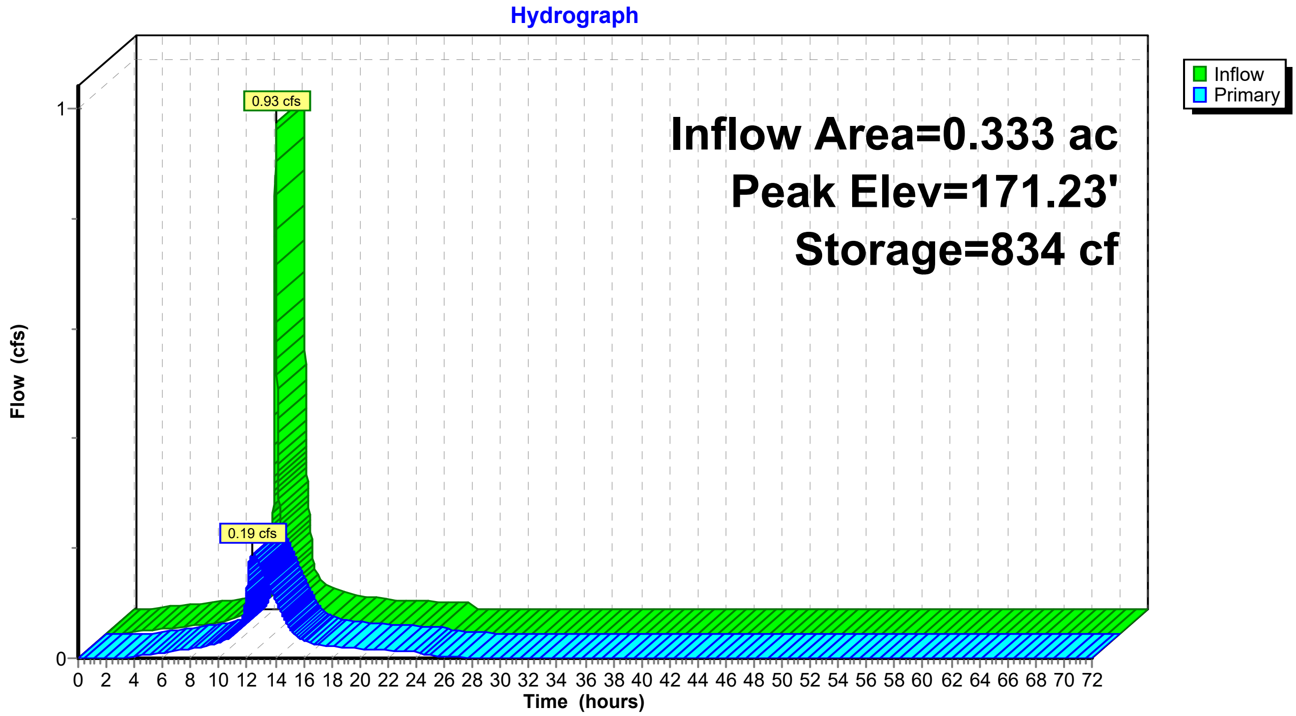
Volume	Invert	Avail.Storage	Storage Description
#1A	170.47'	0 cf	**23.72'W x 47.44'L x 3.00'H Field A** 3,374 cf Overall - 3,374 cf Embedded = 0 cf x 40.0% Voids
#2A	170.47'	3,273 cf	**ACO StormBrixx SD 1** x 144 Inside #1 Inside= 23.7"W x 36.0"H => 5.75 sf x 3.95'L = 22.7 cf Outside= 23.7"W x 36.0"H => 5.93 sf x 3.95'L = 23.4 cf 144 Chambers in 12 Rows
		3,273 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	170.47'	**12.0" Round Culvert** L= 71.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 170.47' / 170.12' S= 0.0049 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	170.47'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	172.97'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.19 cfs @ 12.38 hrs HW=171.23' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.19 cfs of 1.45 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.19 cfs @ 3.85 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DET-4: Underground detention



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPS-1A: Southern half of Runoff Area=1,237,610 sf 74.45% Impervious Runoff Depth=2.90"
Tc=6.0 min CN=83 Runoff=95.73 cfs 6.876 af

SubcatchmentPS-1B: Enterprise Dr Runoff Area=510,169 sf 33.48% Impervious Runoff Depth=1.07"
Flow Length=589' Tc=36.5 min CN=59 Runoff=5.46 cfs 1.042 af

SubcatchmentPS-1C: remaining BLDG 2, Runoff Area=243,057 sf 84.80% Impervious Runoff Depth=3.49"
Tc=6.0 min CN=89 Runoff=22.16 cfs 1.621 af

SubcatchmentPS-1D: BLDG 2 9-12 Runoff Area=14,520 sf 100.00% Impervious Runoff Depth=4.46"
Tc=6.0 min CN=98 Runoff=1.53 cfs 0.124 af

SubcatchmentPS-1E: BLDG 1A1-4, Runoff Area=30,231 sf 61.27% Impervious Runoff Depth=2.21"
Tc=6.0 min CN=75 Runoff=1.76 cfs 0.128 af

SubcatchmentPS-1F: BLDG 1C-1, 1E-1, Runoff Area=100,730 sf 77.37% Impervious Runoff Depth=3.09"
Tc=6.0 min CN=85 Runoff=8.27 cfs 0.596 af

SubcatchmentPS-1G: remaining BLDG Runoff Area=211,633 sf 80.68% Impervious Runoff Depth=3.29"
Tc=6.0 min CN=87 Runoff=18.35 cfs 1.330 af

SubcatchmentPS-1H: Hotel parking and Runoff Area=134,145 sf 59.26% Impervious Runoff Depth=2.13"
Tc=6.0 min CN=74 Runoff=7.50 cfs 0.546 af

SubcatchmentPS-1I: Plaza Runoff Area=167,791 sf 75.50% Impervious Runoff Depth=3.00"
Tc=6.0 min CN=84 Runoff=13.38 cfs 0.962 af

SubcatchmentPS-1J: BLDG 4A,4B, and Runoff Area=201,327 sf 51.49% Impervious Runoff Depth=1.74"
Tc=6.0 min CN=69 Runoff=8.94 cfs 0.671 af

SubcatchmentPS-1K: BLDG 4A,4C Runoff Area=218,869 sf 51.87% Impervious Runoff Depth=1.82"
Tc=6.0 min CN=70 Runoff=10.21 cfs 0.761 af

SubcatchmentPS-2A: Northern Entrance Runoff Area=141,498 sf 27.01% Impervious Runoff Depth=2.81"
Flow Length=227' Slope=0.0150 '/' Tc=13.6 min CN=82 Runoff=7.71 cfs 0.761 af

SubcatchmentPS-2B: Northern Lawn & Runoff Area=270,919 sf 27.69% Impervious Runoff Depth=2.37"
Flow Length=449' Tc=20.8 min CN=77 Runoff=10.17 cfs 1.230 af

SubcatchmentPS-2C: Northern Parking Runoff Area=1,961,346 sf 72.39% Impervious Runoff Depth=2.81"
Tc=6.0 min CN=82 Runoff=147.03 cfs 10.552 af

SubcatchmentPS-3A: Soccer fields & Runoff Area=133,805 sf 22.65% Impervious Runoff Depth=0.67"
Flow Length=1,107' Tc=36.0 min CN=52 Runoff=0.70 cfs 0.173 af

SubcatchmentPS-3B: Wood/Lawn Runoff Area=67,376 sf 9.46% Impervious Runoff Depth=0.31"
Flow Length=422' Tc=18.7 min CN=44 Runoff=0.10 cfs 0.040 af

Subcatchment PS-4: East Campus Main Runoff Area=603,956 sf 68.02% Impervious Runoff Depth=2.63"
Tc=6.0 min CN=80 Runoff=42.37 cfs 3.042 af

Reach AP-1: 42" RCP to West Campus Inflow=151.55 cfs 14.612 af
Outflow=151.55 cfs 14.612 af

Reach AP-2: Discharge to Northern Parcel Inflow=156.95 cfs 12.544 af
Outflow=156.95 cfs 12.544 af

Reach AP-3: Existing Catch basin onsite Inflow=0.81 cfs 0.213 af
Outflow=0.81 cfs 0.213 af

Reach AP-4: Northern storm pipe to West Campus Inflow=42.37 cfs 3.042 af
Outflow=42.37 cfs 3.042 af

Reach HYD-1: Hyrdrodynamic1 Inflow=22.37 cfs 1.745 af
Outflow=22.37 cfs 1.745 af

Reach HYD-2: Hyrdrodynamic2 Inflow=18.71 cfs 2.048 af
Outflow=18.71 cfs 2.048 af

Reach HYD-3: Hyrdrodynamic3 Inflow=13.38 cfs 0.962 af
Outflow=13.38 cfs 0.962 af

Pond 7P: (new Pond) Peak Elev=166.21' Inflow=13.56 cfs 2.355 af
36.0" Round Culvert n=0.012 L=191.0' S=0.0050 '/' Outflow=13.56 cfs 2.355 af

Pond BIO-1: Bioretention 1 Peak Elev=176.33' Storage=6,008 cf Inflow=7.50 cfs 0.546 af
Outflow=4.17 cfs 0.546 af

Pond BIO-2: Bioretention 2 Peak Elev=174.15' Storage=7,659 cf Inflow=8.94 cfs 0.671 af
Outflow=3.40 cfs 0.671 af

Pond DET-1: Dry detention pond Peak Elev=178.19' Storage=23,008 cf Inflow=10.21 cfs 0.761 af
Primary=0.24 cfs 0.722 af Secondary=0.00 cfs 0.000 af Outflow=0.24 cfs 0.722 af

Pond DET-2: Underground detention Peak Elev=172.86' Storage=2,140 cf Inflow=1.76 cfs 0.128 af
Outflow=0.21 cfs 0.127 af

Pond DET-3: Underground detention Peak Elev=171.93' Storage=15,149 cf Inflow=8.27 cfs 0.596 af
Outflow=0.32 cfs 0.591 af

Pond DET-4: Underground detention Peak Elev=171.93' Storage=1,595 cf Inflow=1.53 cfs 0.124 af
Outflow=0.27 cfs 0.124 af

Total Runoff Area = 143.457 ac Runoff Volume = 30.455 af Average Runoff Depth = 2.55"
36.25% Pervious = 51.998 ac 63.75% Impervious = 91.459 ac

Summary for Subcatchment PS-1A: Southern half of Industrial Buildings & Parking

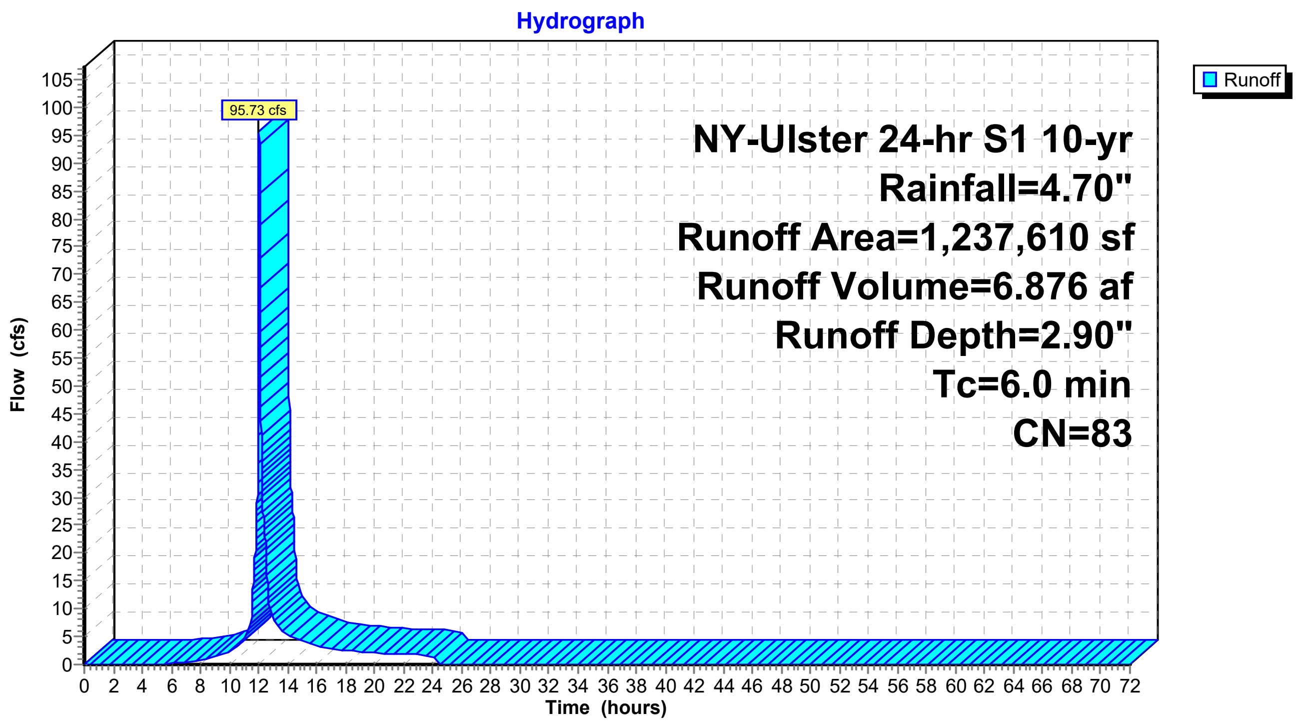
Runoff = 95.73 cfs @ 12.04 hrs, Volume= 6.876 af, Depth= 2.90"
Routed to Reach AP-1 : 42" RCP to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
456,406	98	Paved parking, HSG A
465,018	98	Roofs, HSG A
313,400	39	>75% Grass cover, Good, HSG A
2,786	32	Woods/grass comb., Good, HSG A
1,237,610	83	Weighted Average
316,186		25.55% Pervious Area
921,424		74.45% Impervious Area

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

Subcatchment PS-1A: Southern half of Industrial Buildings & Parking



Summary for Subcatchment PS-1B: Enterprise Dr Entrance and Boices Lane ROW

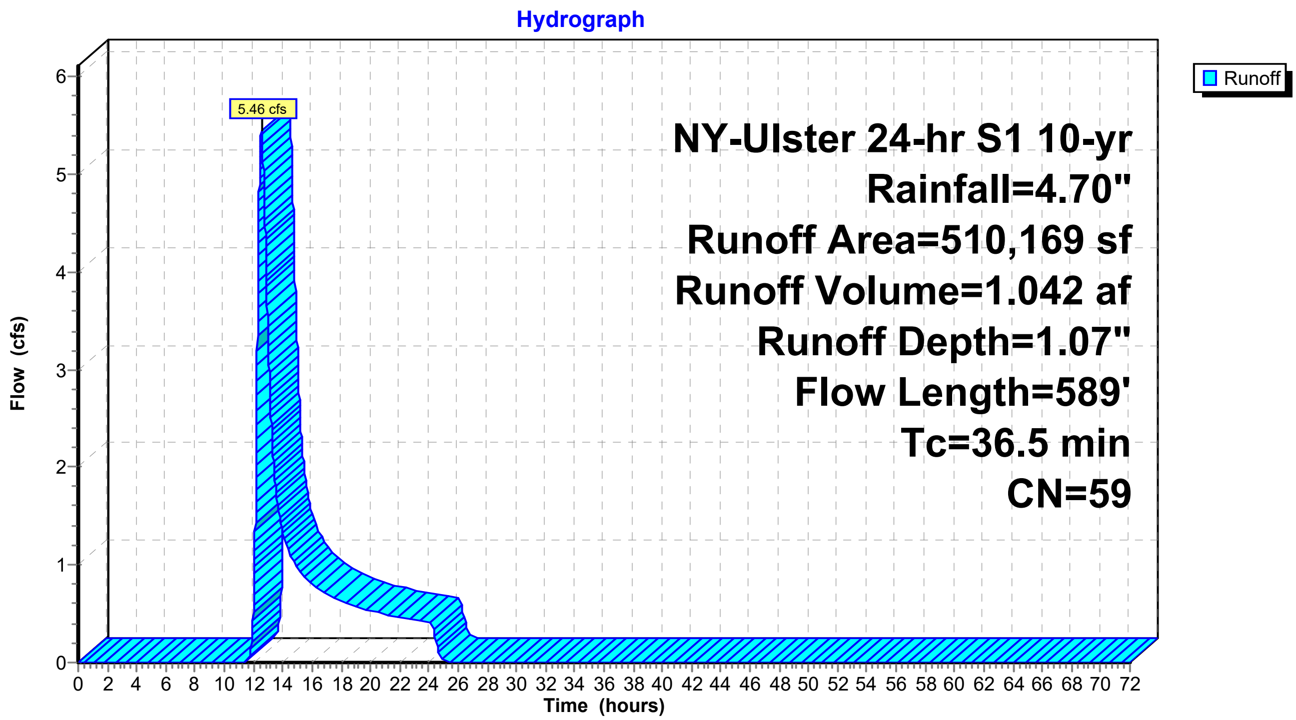
Runoff = 5.46 cfs @ 12.53 hrs, Volume= 1.042 af, Depth= 1.07"
Routed to Reach AP-1 : 42" RCP to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
170,783	98	Paved parking, HSG A
339,386	39	>75% Grass cover, Good, HSG A
510,169	59	Weighted Average
339,386		66.52% Pervious Area
170,783		33.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.1	150	0.0030	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
6.7	155	0.0030	0.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	284	0.0050	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 Corrugated PE, smooth interior
36.5	589	Total			

Subcatchment PS-1B: Enterprise Dr Entrance and Boices Lane ROW



Summary for Subcatchment PS-1C: remaining BLDG 2, 3A, 3B, parking

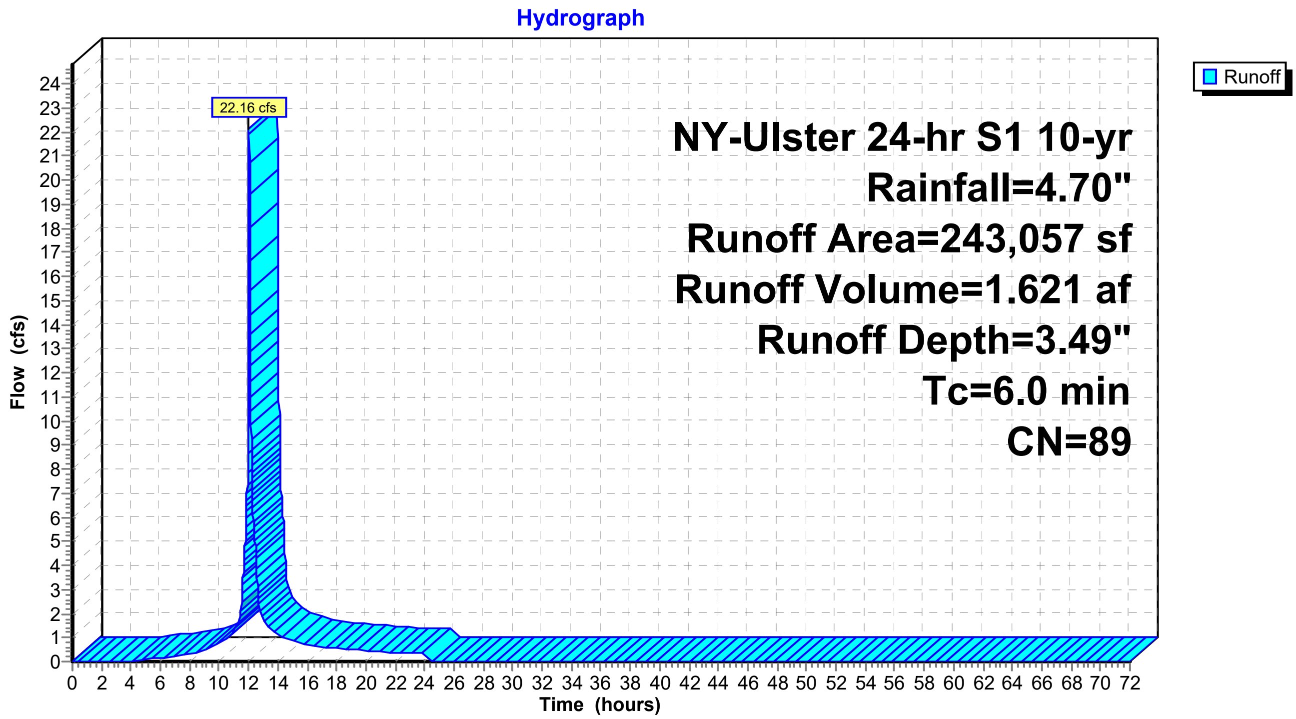
Runoff = 22.16 cfs @ 12.04 hrs, Volume= 1.621 af, Depth= 3.49"
Routed to Reach HYD-1 : Hyrdrodynamic 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

	Area (sf)	CN	Description
*	206,118	98	Paved parking & Roofs, HSG A
	36,939	39	>75% Grass cover, Good, HSG A
	243,057	89	Weighted Average
	36,939		15.20% Pervious Area
	206,118		84.80% Impervious Area

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

Subcatchment PS-1C: remaining BLDG 2, 3A, 3B, parking



Summary for Subcatchment PS-1D: BLDG 2 9-12

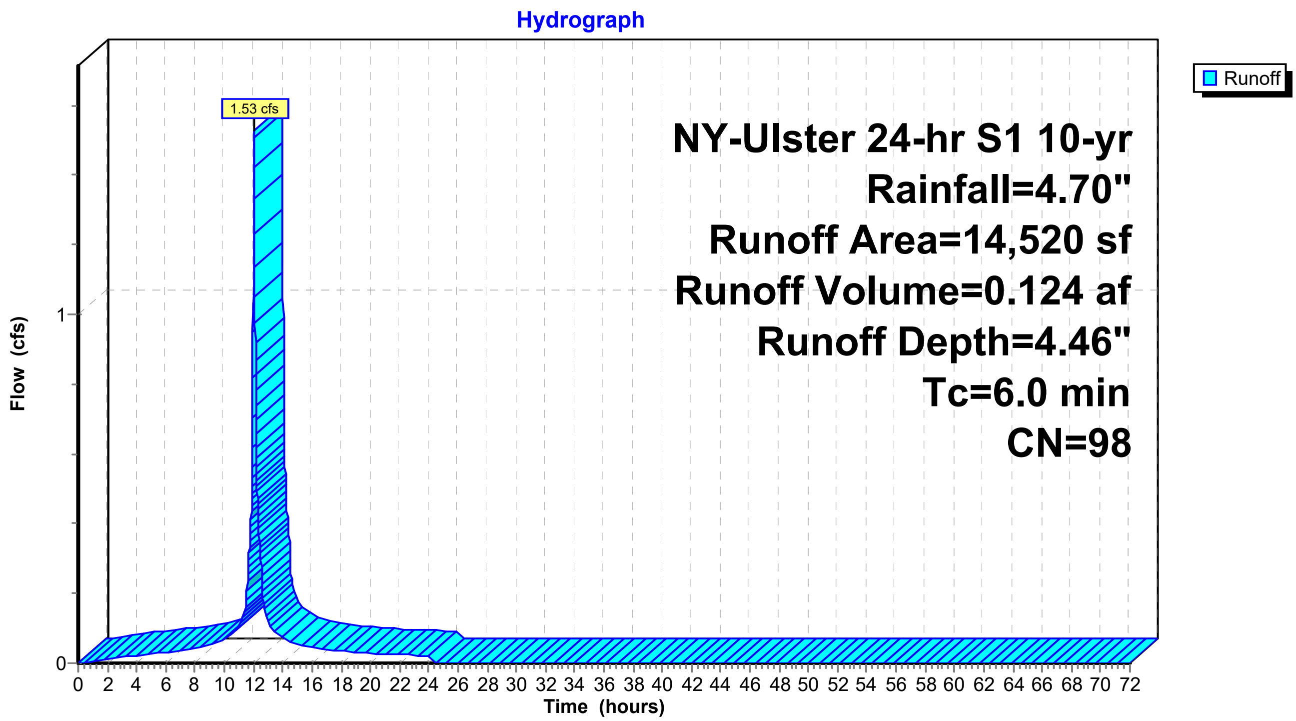
Runoff = 1.53 cfs @ 12.04 hrs, Volume= 0.124 af, Depth= 4.46"
Routed to Pond DET-4 : Underground detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
14,520	98	Roofs, HSG A
14,520		100.00% Impervious Area

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

Subcatchment PS-1D: BLDG 2 9-12



Summary for Subcatchment PS-1E: BLDG 1A1-4, parking to underground detention

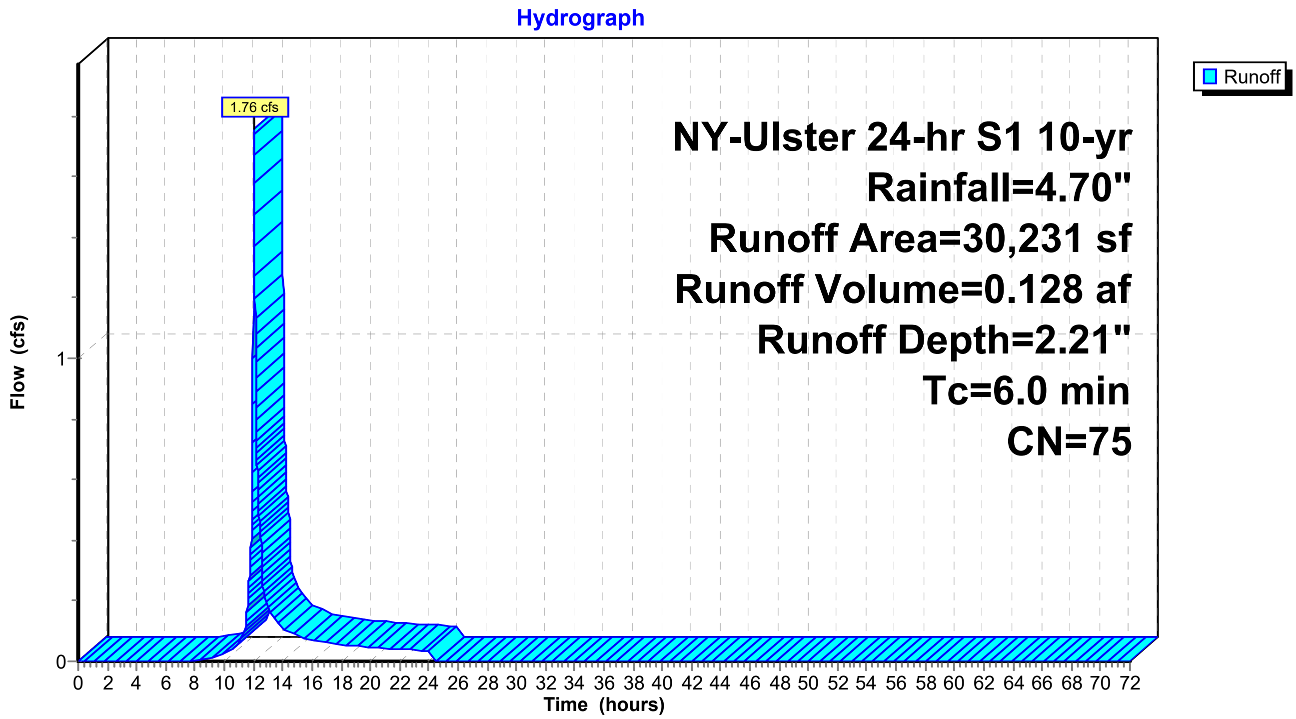
Runoff = 1.76 cfs @ 12.04 hrs, Volume= 0.128 af, Depth= 2.21"
Routed to Pond DET-2 : Underground detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
10,577	98	Paved parking, HSG A
11,709	39	>75% Grass cover, Good, HSG A
7,945	98	Roofs, HSG A
30,231	75	Weighted Average
11,709		38.73% Pervious Area
18,522		61.27% Impervious Area

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

Subcatchment PS-1E: BLDG 1A1-4, parking to underground detention



Summary for Subcatchment PS-1F: BLDG 1C-1, 1E-1, parking to underground detention

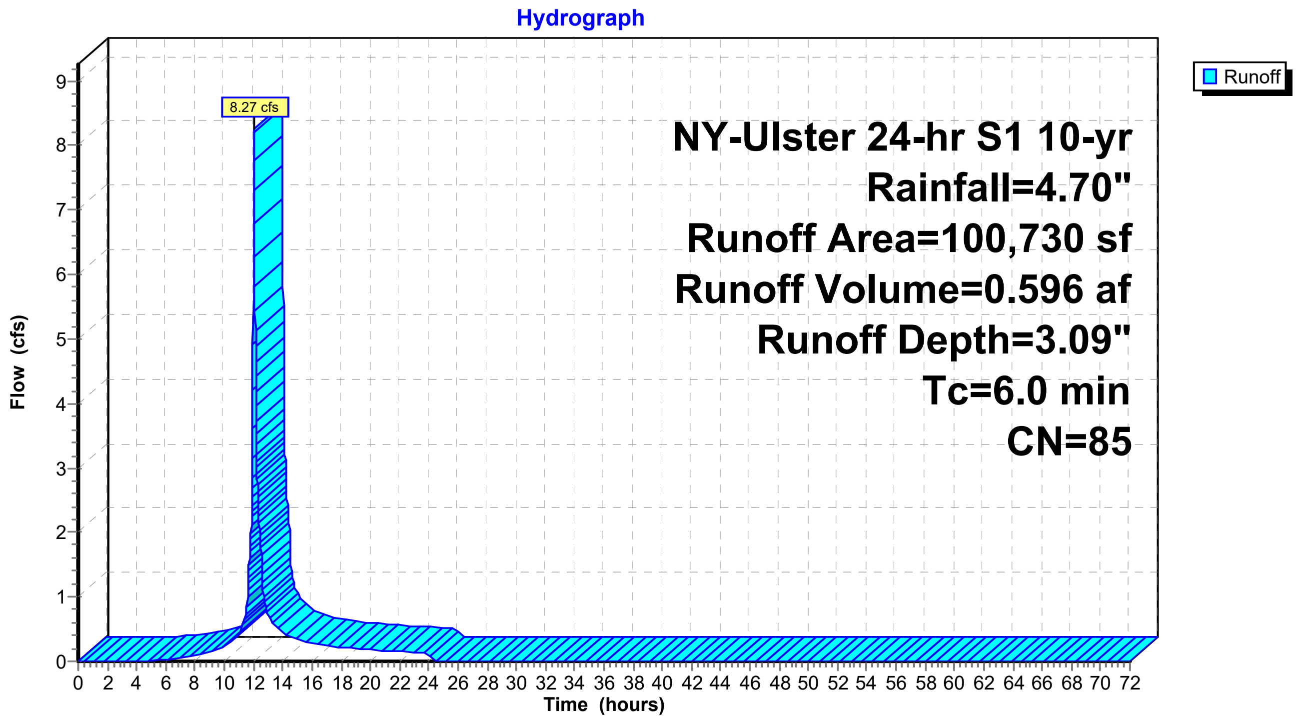
Runoff = 8.27 cfs @ 12.04 hrs, Volume= 0.596 af, Depth= 3.09"
Routed to Pond DET-3 : Underground detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
27,131	98	Roofs, HSG A
50,806	98	Paved parking, HSG A
22,793	39	>75% Grass cover, Good, HSG A
100,730	85	Weighted Average
22,793		22.63% Pervious Area
77,937		77.37% Impervious Area

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

Subcatchment PS-1F: BLDG 1C-1, 1E-1, parking to underground detention



Summary for Subcatchment PS-1G: remaining BLDG 1A-1E, parking

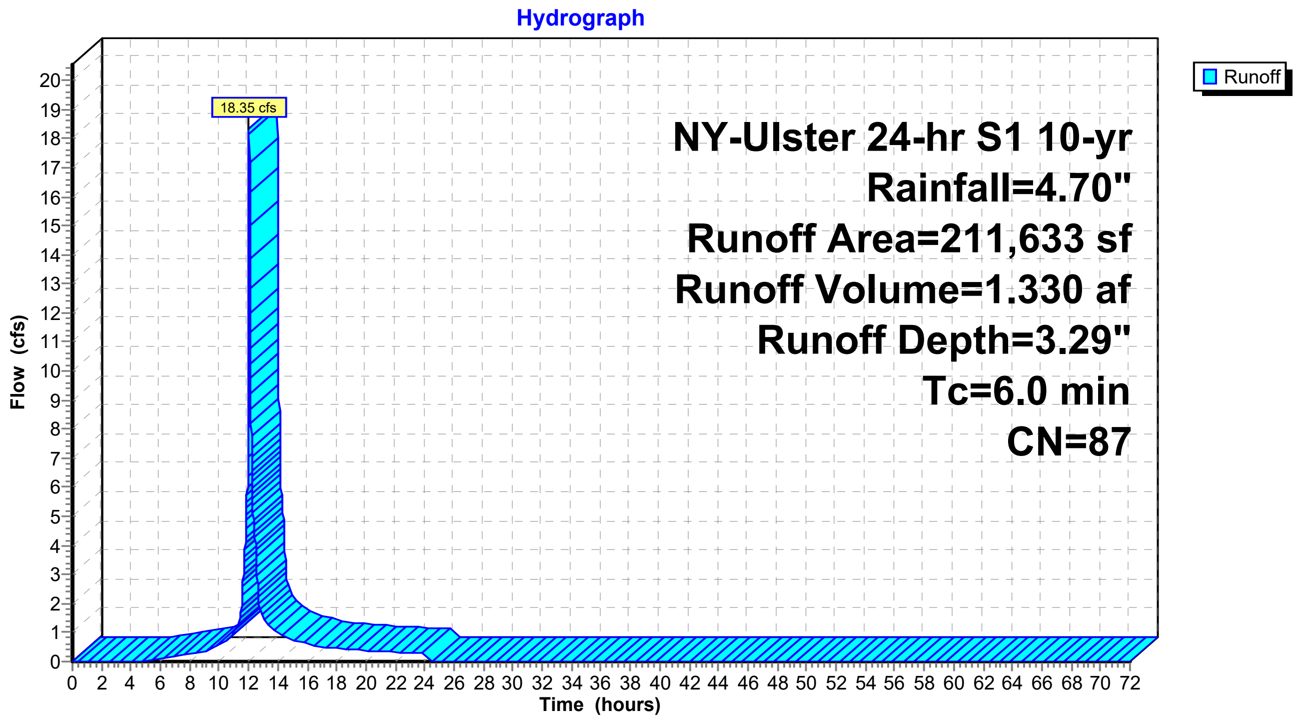
Runoff = 18.35 cfs @ 12.04 hrs, Volume= 1.330 af, Depth= 3.29"
Routed to Reach HYD-2 : Hyrdrodynamic 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

	Area (sf)	CN	Description
*	170,756	98	Paved parking & Roofs, HSG A
	40,877	39	>75% Grass cover, Good, HSG A
	211,633	87	Weighted Average
	40,877		19.32% Pervious Area
	170,756		80.68% Impervious Area

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

Subcatchment PS-1G: remaining BLDG 1A-1E, parking



Summary for Subcatchment PS-1H: Hotel parking and bioretention

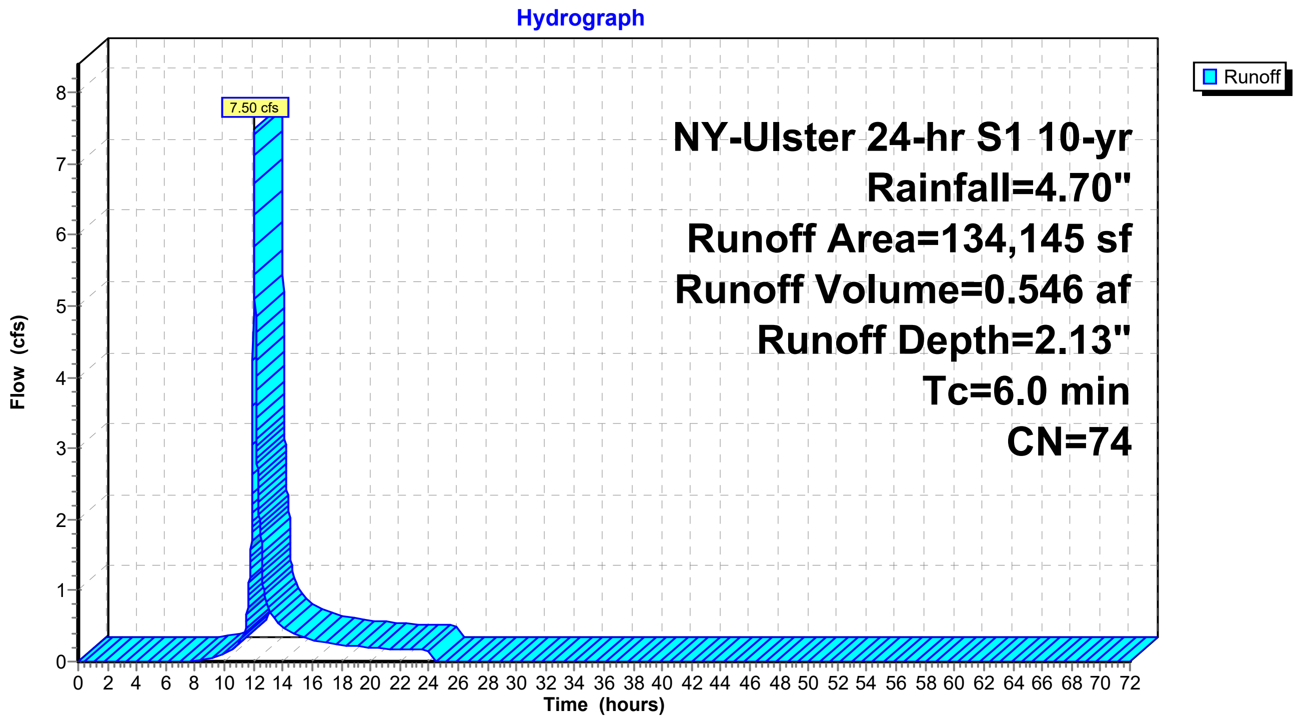
Runoff = 7.50 cfs @ 12.04 hrs, Volume= 0.546 af, Depth= 2.13"
Routed to Pond BIO-1 : Bioretention 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
79,488	98	Paved parking, HSG A
54,657	39	>75% Grass cover, Good, HSG A
134,145	74	Weighted Average
54,657		40.74% Pervious Area
79,488		59.26% Impervious Area

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

Subcatchment PS-1H: Hotel parking and bioretention



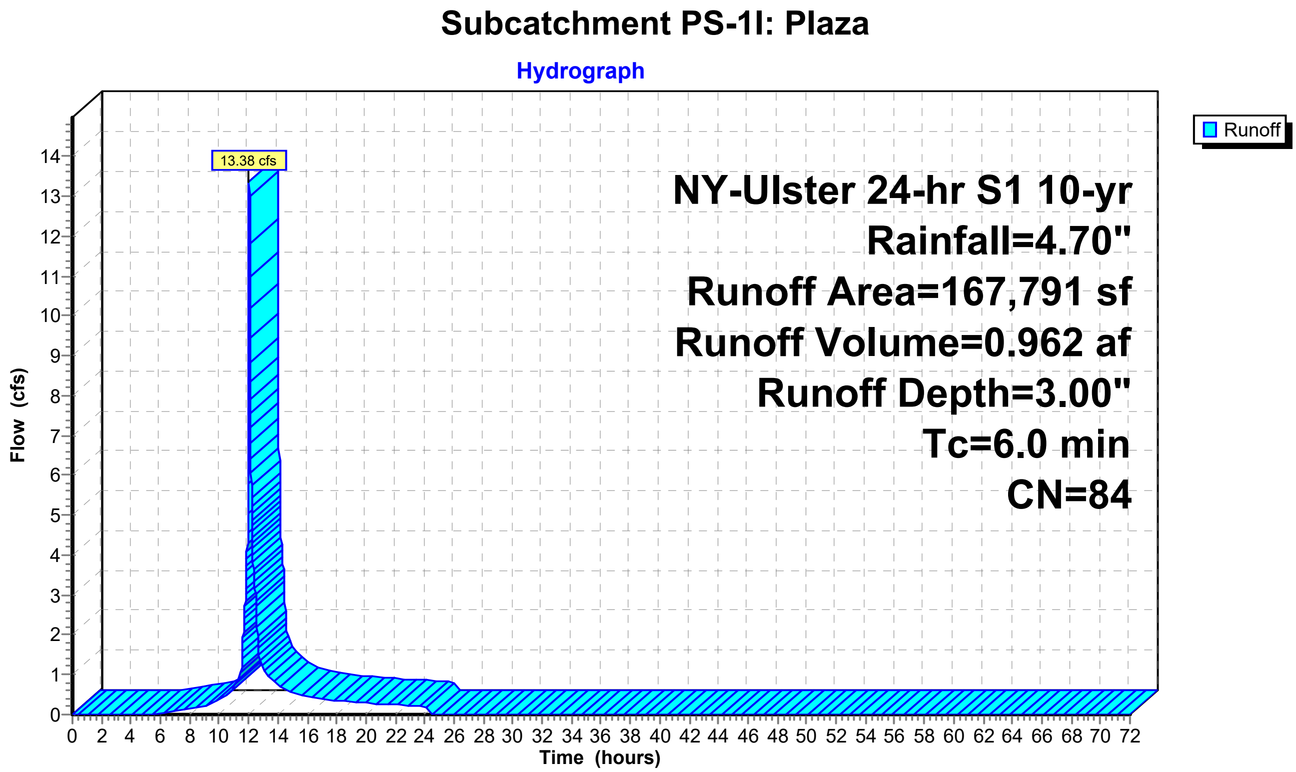
Summary for Subcatchment PS-1I: Plaza

Runoff = 13.38 cfs @ 12.04 hrs, Volume= 0.962 af, Depth= 3.00"
Routed to Reach HYD-3 : Hyrdrodynamic 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

	Area (sf)	CN	Description
*	126,677	98	Paved parking & Roofs, HSG A
	41,114	39	>75% Grass cover, Good, HSG A
	167,791	84	Weighted Average
	41,114		24.50% Pervious Area
	126,677		75.50% Impervious Area

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



Summary for Subcatchment PS-1J: BLDG 4A,4B, and bioretention

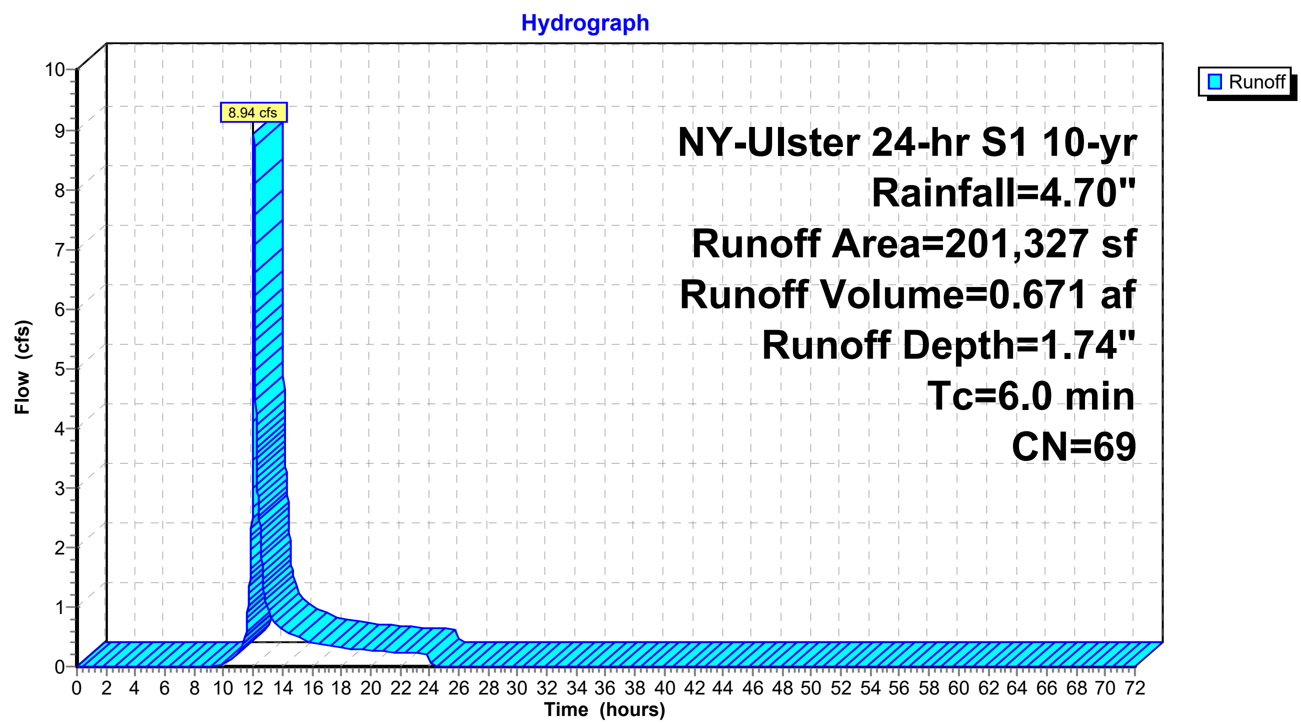
Runoff = 8.94 cfs @ 12.04 hrs, Volume= 0.671 af, Depth= 1.74"
Routed to Pond BIO-2 : Bioretention 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

	Area (sf)	CN	Description
*	103,655	98	Paved parking & Roofs, HSG A
	97,672	39	>75% Grass cover, Good, HSG A
	201,327	69	Weighted Average
	97,672		48.51% Pervious Area
	103,655		51.49% Impervious Area

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

Subcatchment PS-1J: BLDG 4A,4B, and bioretention



Summary for Subcatchment PS-1K: BLDG 4A,4C

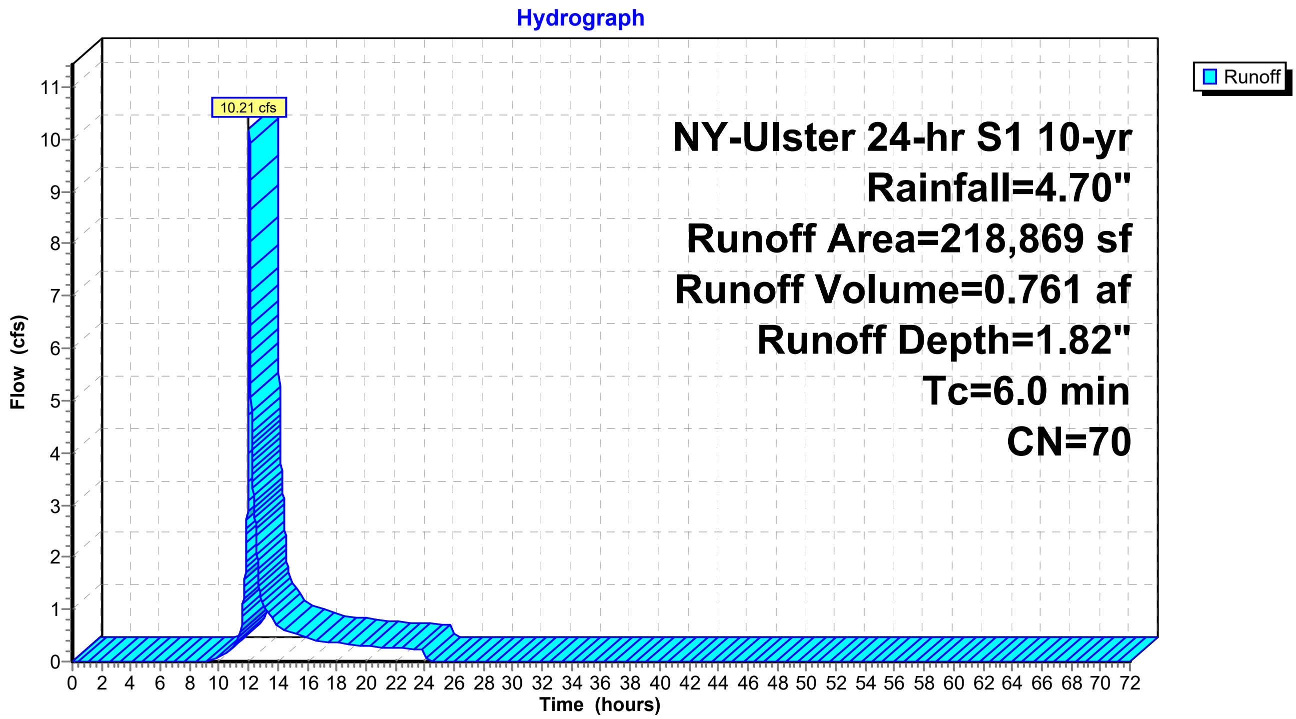
Runoff = 10.21 cfs @ 12.04 hrs, Volume= 0.761 af, Depth= 1.82"
Routed to Pond DET-1 : Dry detention pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

	Area (sf)	CN	Description
*	113,536	98	Paved parking & Roofs, HSG A
	105,333	39	>75% Grass cover, Good, HSG A
	218,869	70	Weighted Average
	105,333		48.13% Pervious Area
	113,536		51.87% Impervious Area

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

Subcatchment PS-1K: BLDG 4A,4C



Summary for Subcatchment PS-2A: Northern Entrance

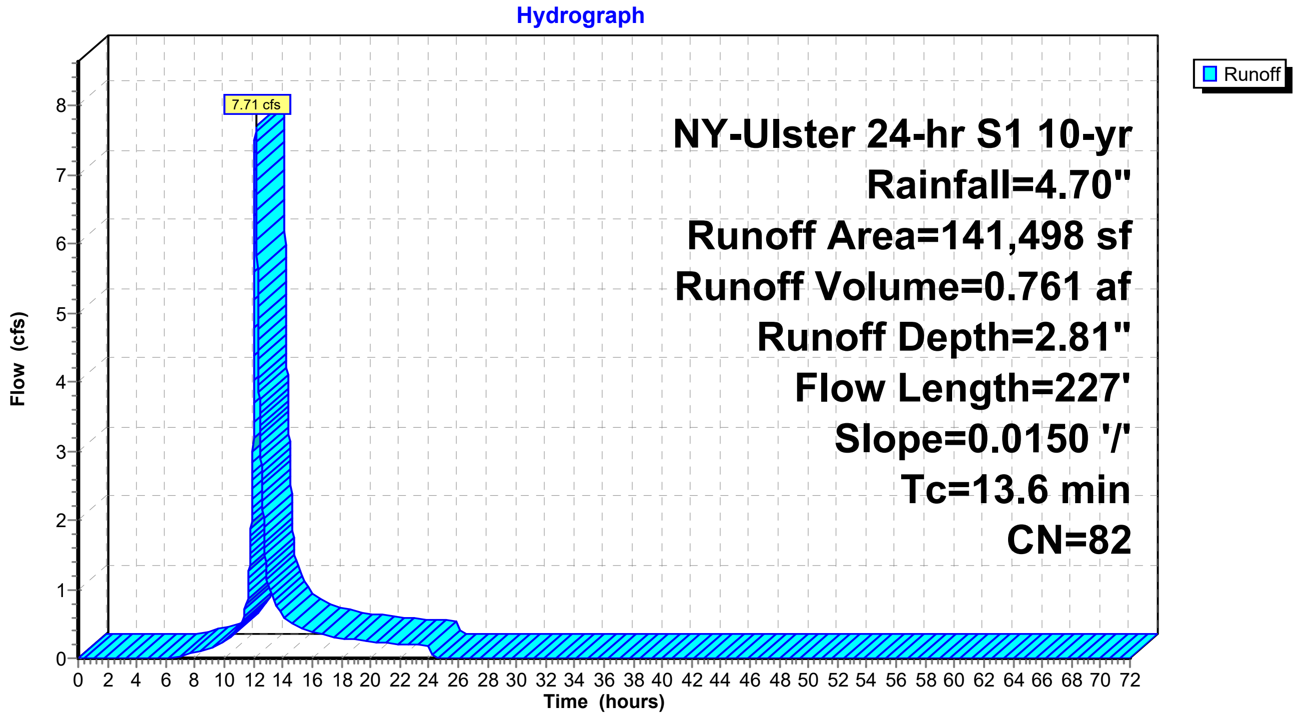
Runoff = 7.71 cfs @ 12.14 hrs, Volume= 0.761 af, Depth= 2.81"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
4,821	98	Paved parking, HSG A
32,718	98	Paved parking, HSG D
682	98	Roofs, HSG D
4,958	32	Woods/grass comb., Good, HSG A
11,275	79	Woods/grass comb., Good, HSG D
4,843	39	>75% Grass cover, Good, HSG A
82,201	80	>75% Grass cover, Good, HSG D
141,498	82	Weighted Average
103,277		72.99% Pervious Area
38,221		27.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0150	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
2.5	127	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.6	227	Total			

Subcatchment PS-2A: Northern Entrance



Summary for Subcatchment PS-2B: Northern Lawn & Helipad

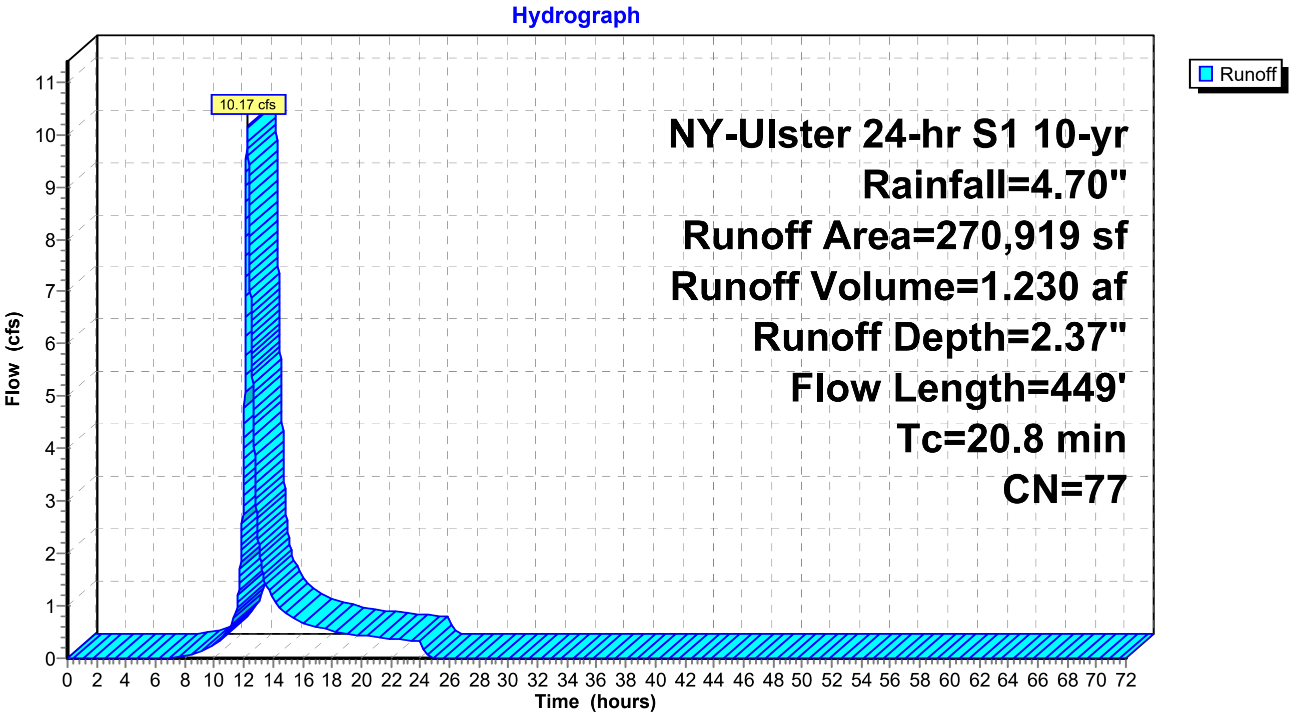
Runoff = 10.17 cfs @ 12.24 hrs, Volume= 1.230 af, Depth= 2.37"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
35,226	98	Paved parking, HSG A
39,420	98	Paved parking, HSG D
374	98	Roofs, HSG D
50,804	39	>75% Grass cover, Good, HSG A
145,095	80	>75% Grass cover, Good, HSG D
270,919	77	Weighted Average
195,899		72.31% Pervious Area
75,020		27.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0080	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
0.1	14	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.4	102	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.1	233	0.0180	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.8	449	Total			

Subcatchment PS-2B: Northern Lawn & Helipad



Summary for Subcatchment PS-2C: Northern Parking & Warehouses

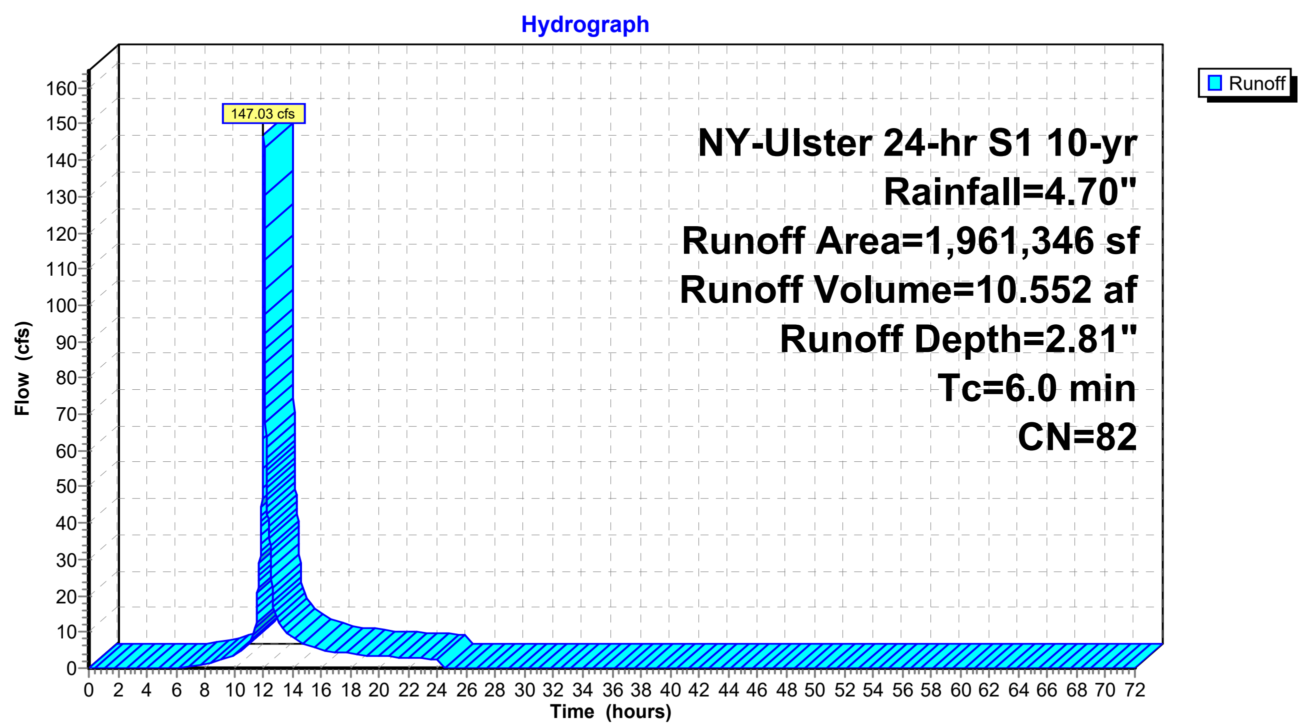
Runoff = 147.03 cfs @ 12.04 hrs, Volume= 10.552 af, Depth= 2.81"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
872,867	98	Paved parking, HSG A
87,604	98	Paved parking, HSG D
459,315	98	Roofs, HSG A
22,924	32	Woods/grass comb., Good, HSG A
1,554	79	Woods/grass comb., Good, HSG D
477,620	39	>75% Grass cover, Good, HSG A
29,747	80	>75% Grass cover, Good, HSG D
9,715	30	Brush, Good, HSG A
1,961,346	82	Weighted Average
541,560		27.61% Pervious Area
1,419,786		72.39% Impervious Area

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

Subcatchment PS-2C: Northern Parking & Warehouses



Summary for Subcatchment PS-3A: Soccer fields & Boices Ln Entrance

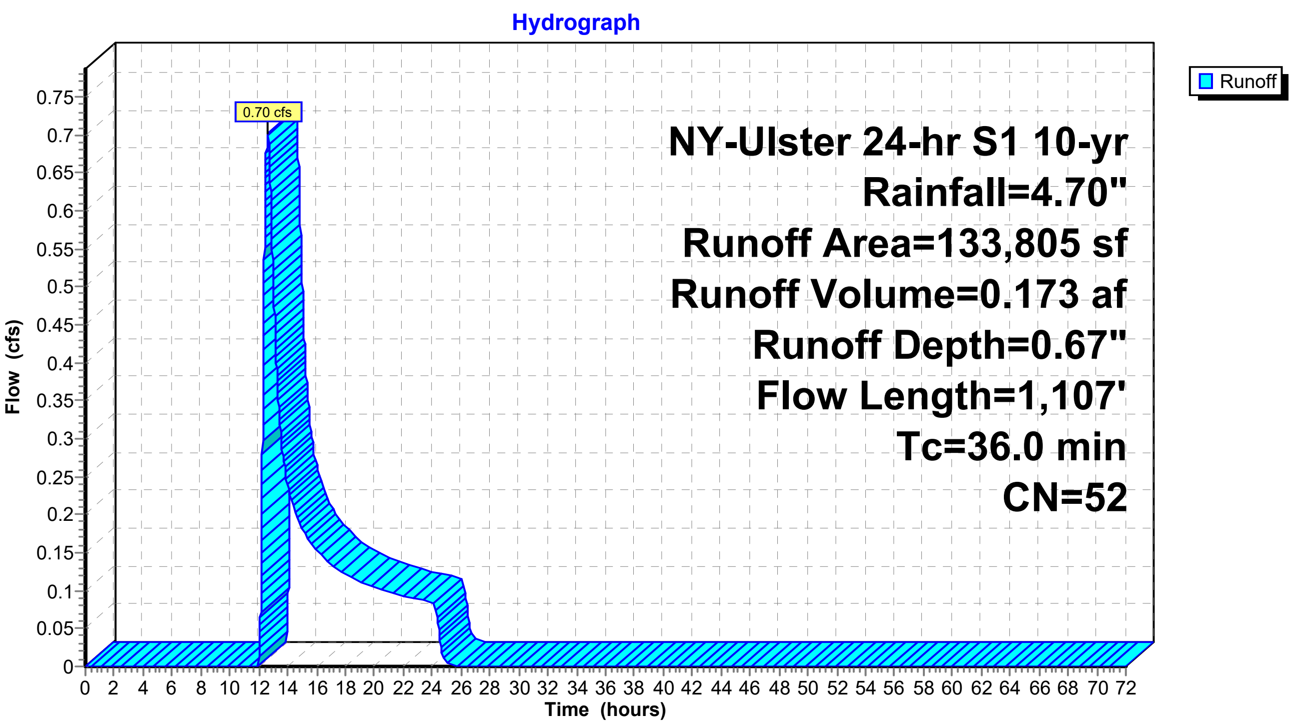
Runoff = 0.70 cfs @ 12.60 hrs, Volume= 0.173 af, Depth= 0.67"
Routed to Reach AP-3 : Existing Catch basin onsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
30,306	98	Paved parking, HSG A
103,499	39	>75% Grass cover, Good, HSG A
133,805	52	Weighted Average
103,499		77.35% Pervious Area
30,306		22.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.3	100	0.0026	0.07		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
10.7	376	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.0	631	0.0050	3.47	2.73	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PE, smooth interior
36.0	1,107	Total			

Subcatchment PS-3A: Soccer fields & Boices Ln Entrance



Summary for Subcatchment PS-3B: Wood/Lawn

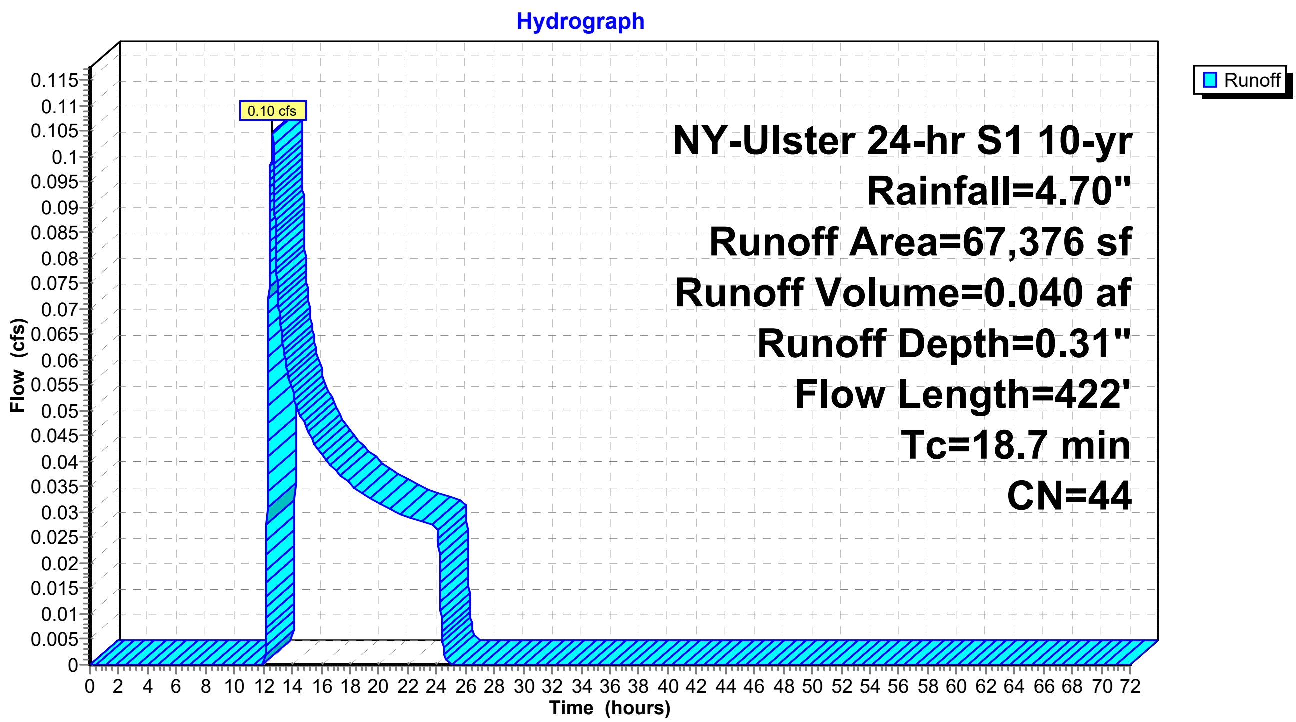
Runoff = 0.10 cfs @ 12.63 hrs, Volume= 0.040 af, Depth= 0.31"
Routed to Reach AP-3 : Existing Catch basin onsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
5,931	32	Woods/grass comb., Good, HSG A
55,072	39	>75% Grass cover, Good, HSG A
6,373	98	Paved parking, HSG A
67,376	44	Weighted Average
61,003		90.54% Pervious Area
6,373		9.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0190	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
8.6	322	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
18.7	422	Total			

Subcatchment PS-3B: Wood/Lawn



Summary for Subcatchment PS-4: East Campus Main Entrance

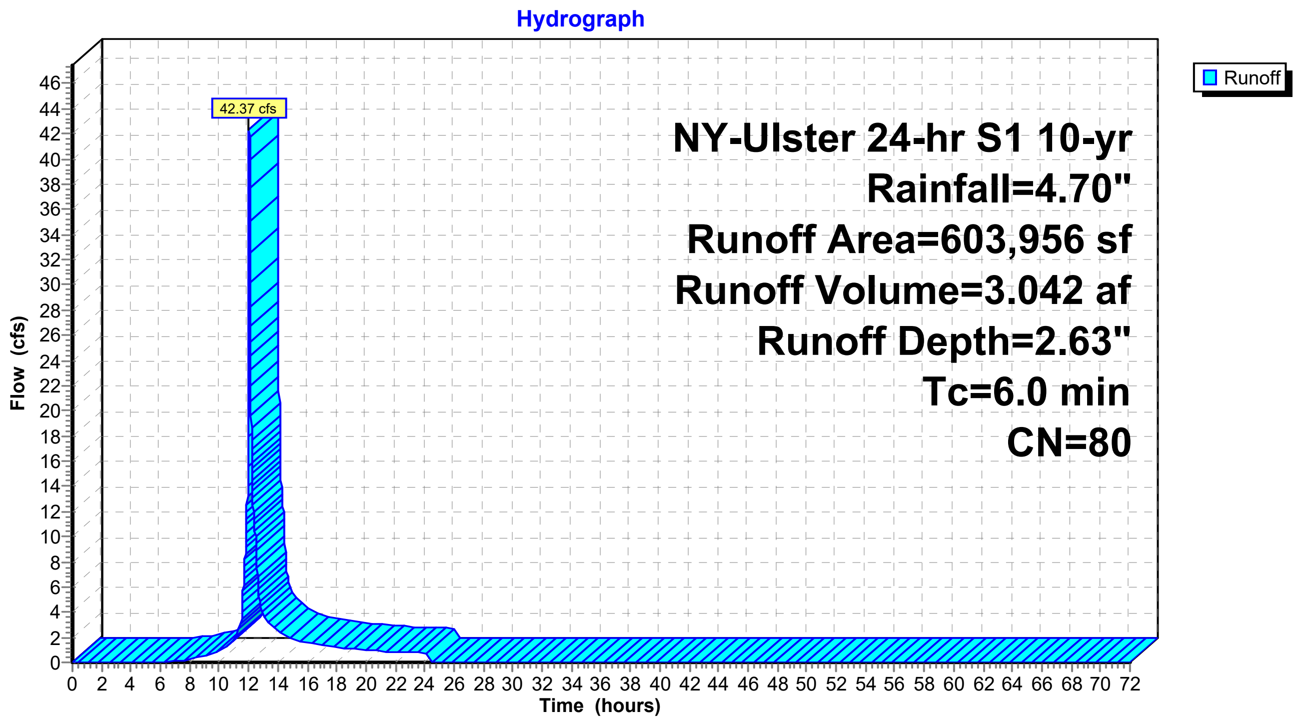
Runoff = 42.37 cfs @ 12.04 hrs, Volume= 3.042 af, Depth= 2.63"
Routed to Reach AP-4 : Northern storm pipe to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 10-yr Rainfall=4.70"

Area (sf)	CN	Description
214,844	98	Paved parking, HSG A
14,814	98	Paved parking, HSG D
181,172	98	Roofs, HSG A
187,091	39	>75% Grass cover, Good, HSG A
6,035	80	>75% Grass cover, Good, HSG D
603,956	80	Weighted Average
193,126		31.98% Pervious Area
410,830		68.02% Impervious Area

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

Subcatchment PS-4: East Campus Main Entrance

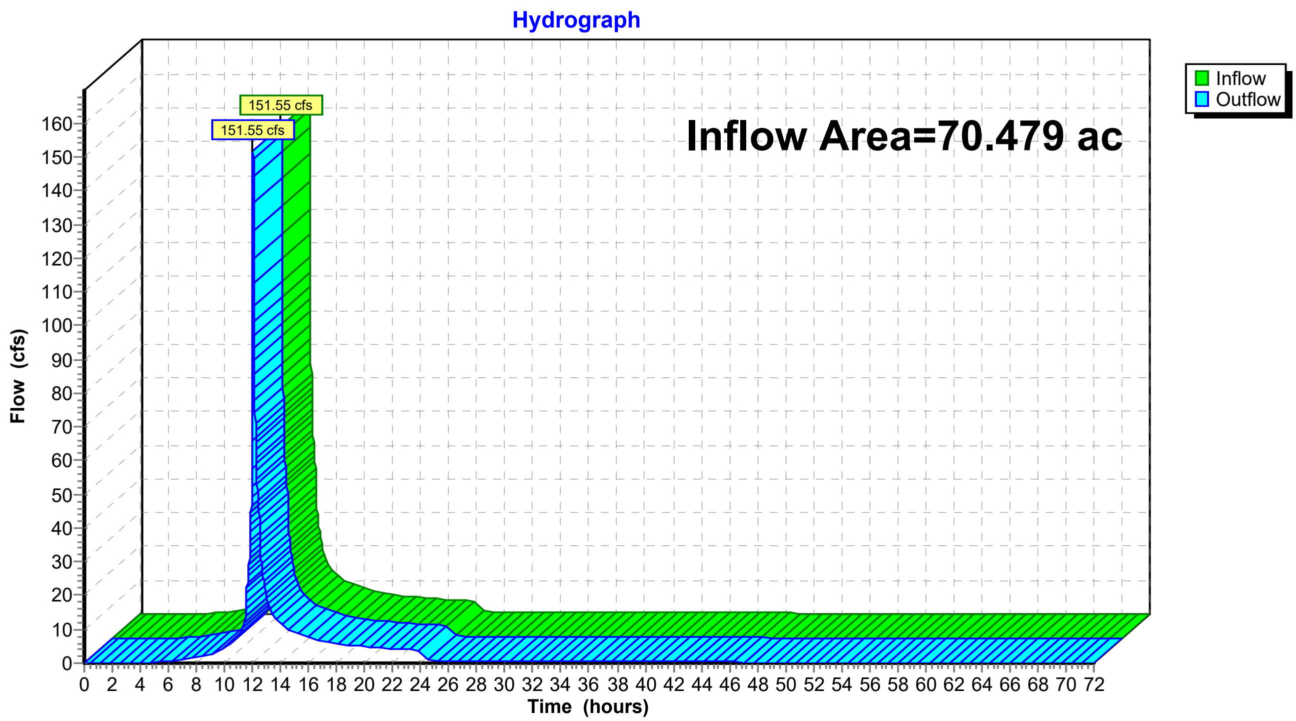


Summary for Reach AP-1: 42" RCP to West Campus

Inflow Area = 70.479 ac, 65.26% Impervious, Inflow Depth > 2.49" for 10-yr event
Inflow = 151.55 cfs @ 12.04 hrs, Volume= 14.612 af
Outflow = 151.55 cfs @ 12.04 hrs, Volume= 14.612 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1R

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-1: 42" RCP to West Campus

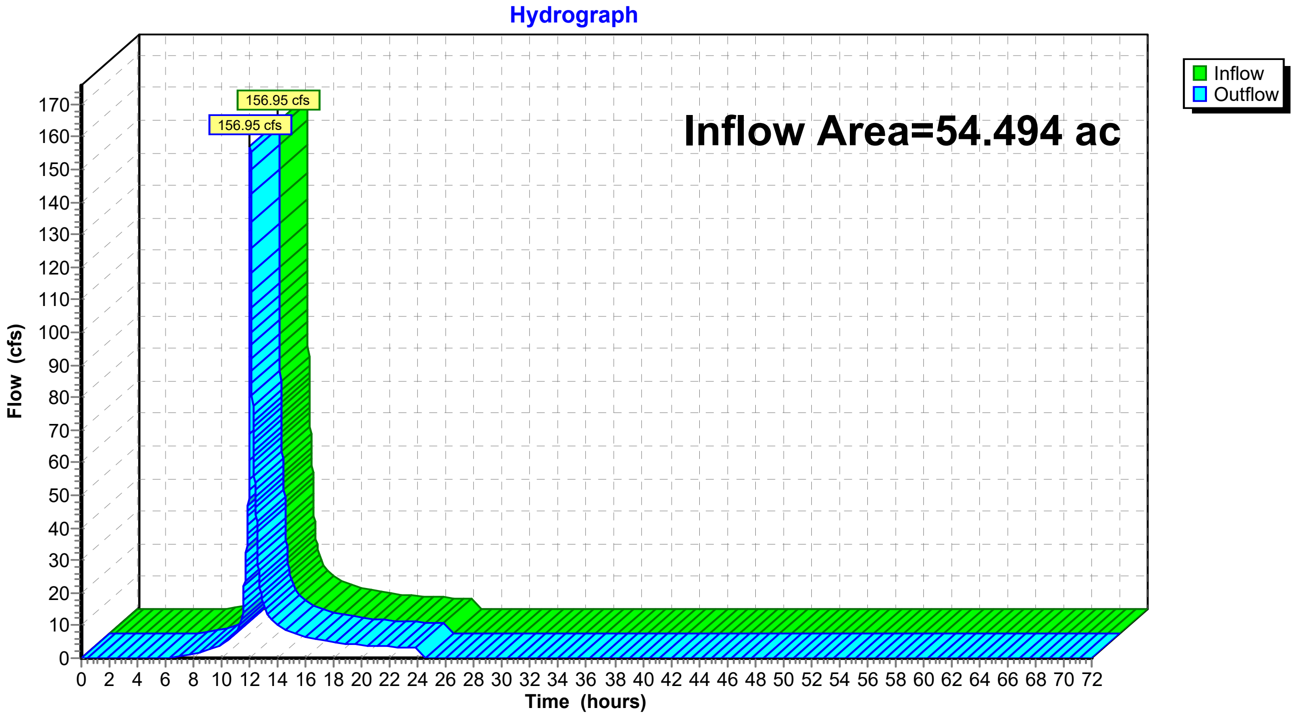


Summary for Reach AP-2: Discharge to Northern Parcel

Inflow Area = 54.494 ac, 64.58% Impervious, Inflow Depth = 2.76" for 10-yr event
Inflow = 156.95 cfs @ 12.04 hrs, Volume= 12.544 af
Outflow = 156.95 cfs @ 12.04 hrs, Volume= 12.544 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1R

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-2: Discharge to Northern Parcel

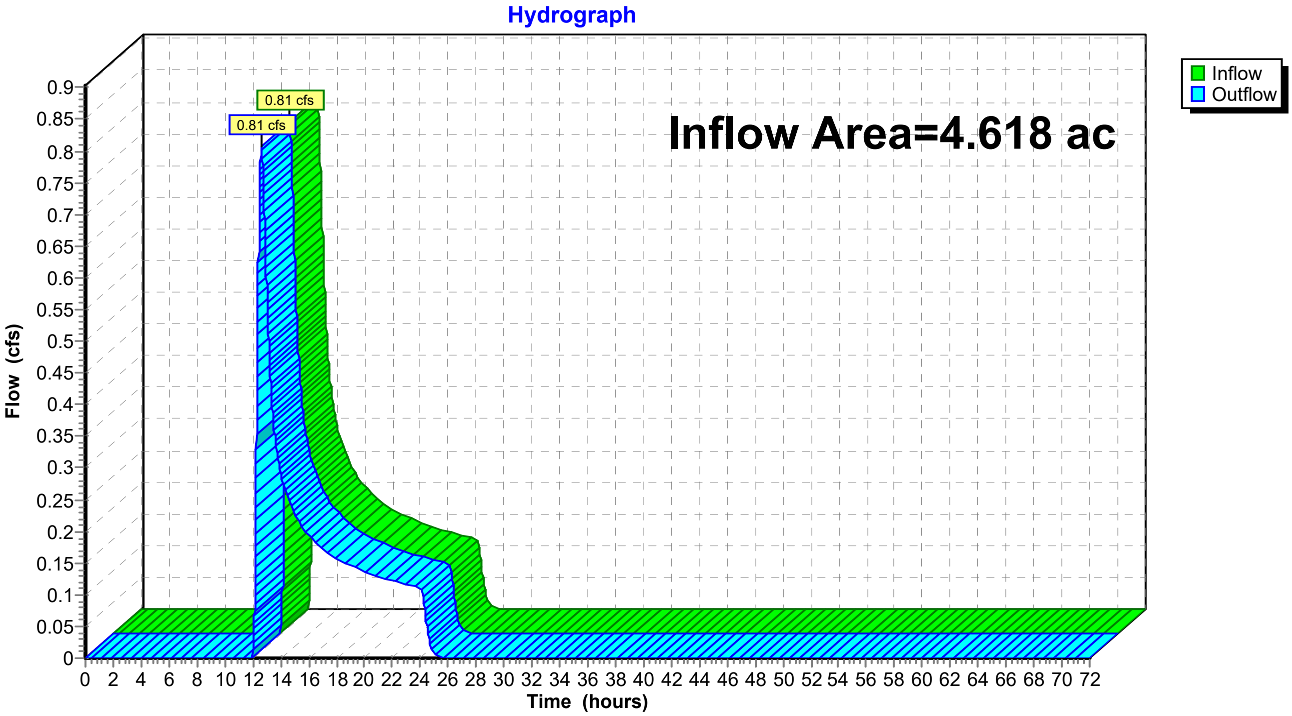


Summary for Reach AP-3: Existing Catch basin onsite

Inflow Area = 4.618 ac, 18.23% Impervious, Inflow Depth = 0.55" for 10-yr event
Inflow = 0.81 cfs @ 12.60 hrs, Volume= 0.213 af
Outflow = 0.81 cfs @ 12.60 hrs, Volume= 0.213 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1R

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-3: Existing Catch basin onsite

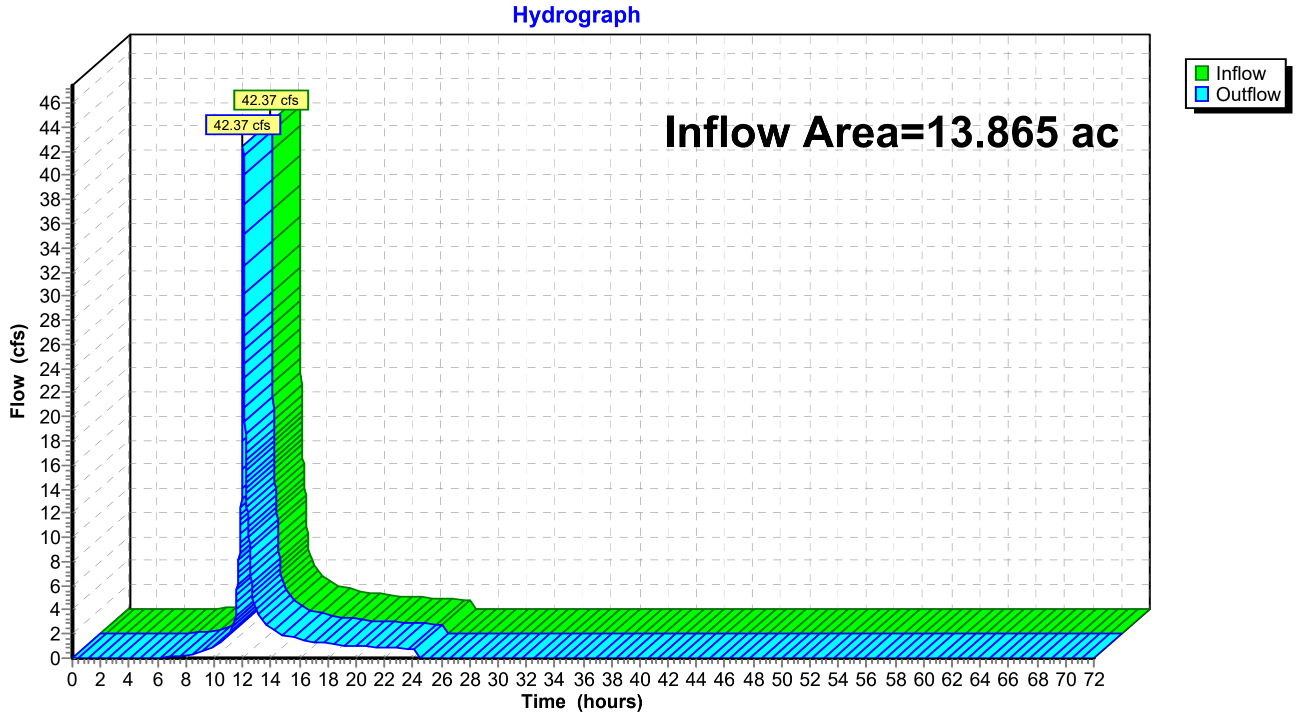


Summary for Reach AP-4: Northern storm pipe to West Campus

Inflow Area = 13.865 ac, 68.02% Impervious, Inflow Depth = 2.63" for 10-yr event
Inflow = 42.37 cfs @ 12.04 hrs, Volume= 3.042 af
Outflow = 42.37 cfs @ 12.04 hrs, Volume= 3.042 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1R

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-4: Northern storm pipe to West Campus

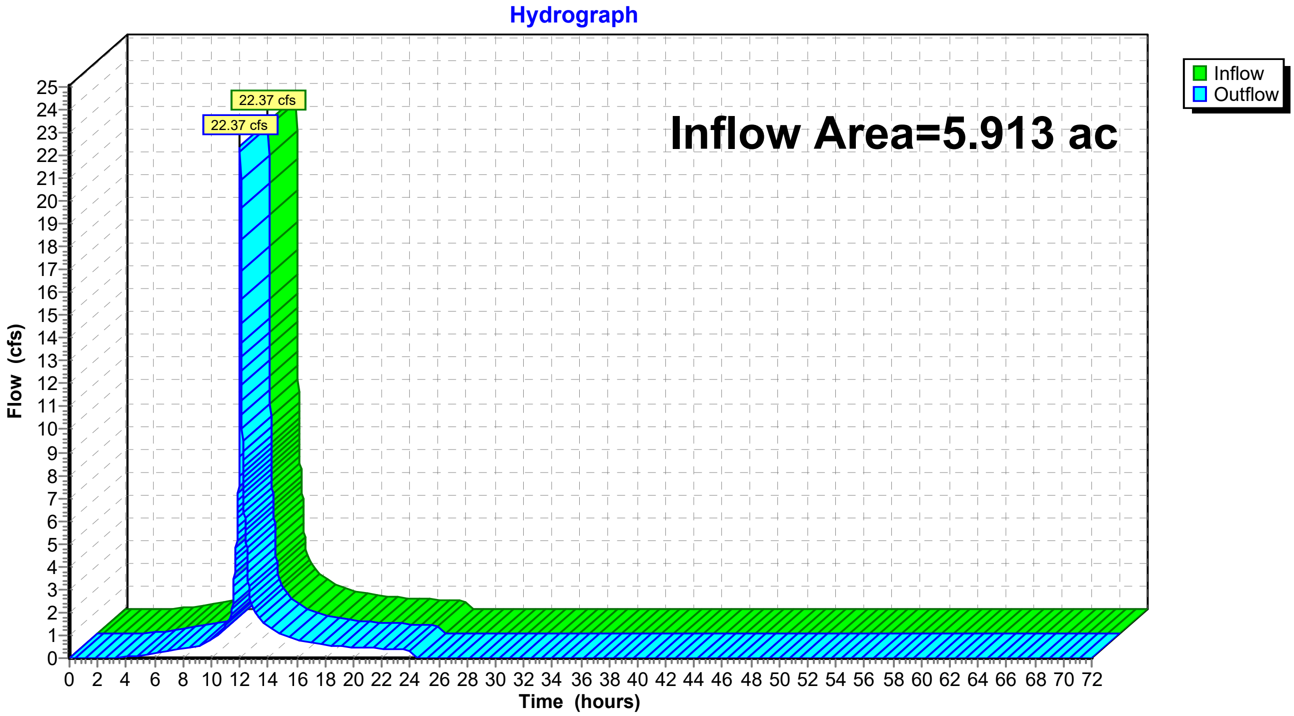


Summary for Reach HYD-1: Hyrdrodynamic 1

Inflow Area = 5.913 ac, 85.66% Impervious, Inflow Depth = 3.54" for 10-yr event
Inflow = 22.37 cfs @ 12.04 hrs, Volume= 1.745 af
Outflow = 22.37 cfs @ 12.04 hrs, Volume= 1.745 af, Atten= 0%, Lag= 0.0 min
Routed to Reach AP-1 : 42" RCP to West Campus

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

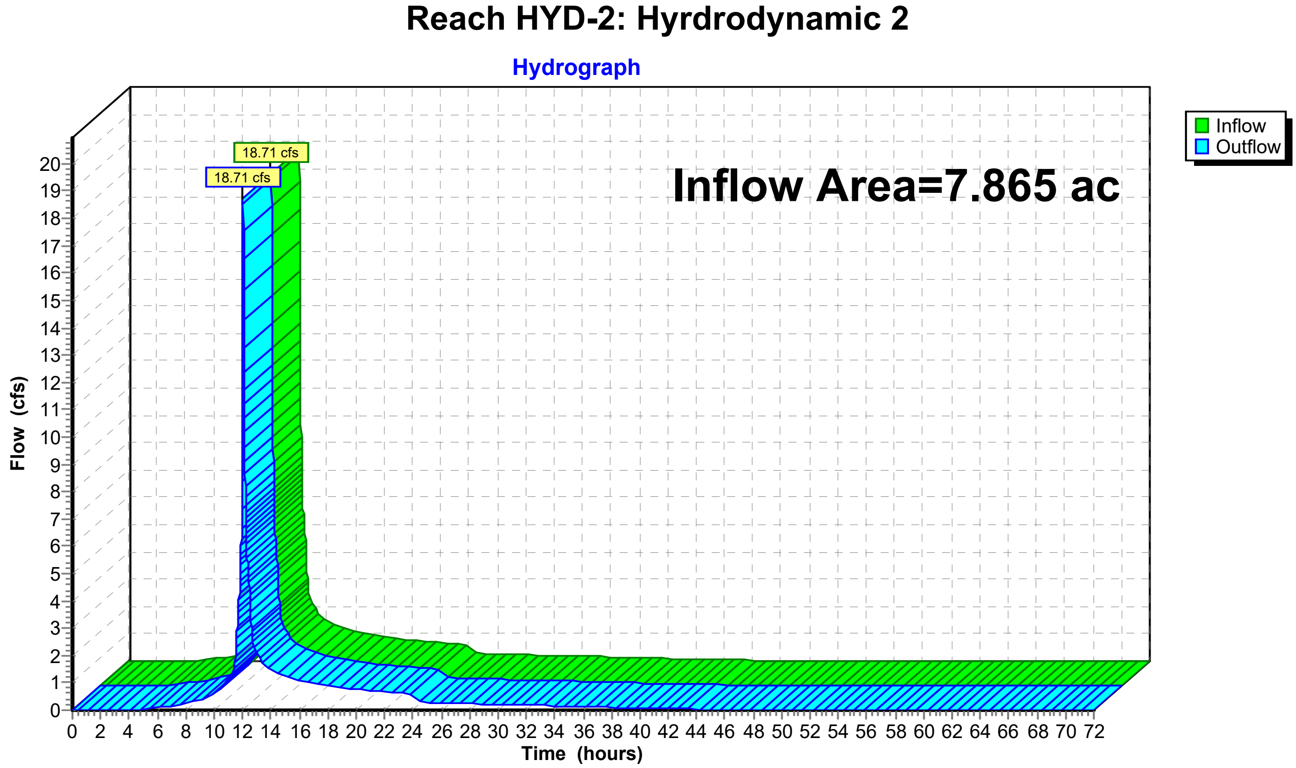
Reach HYD-1: Hyrdrodynamic 1



Summary for Reach HYD-2: Hyrdrodynamic 2

Inflow Area = 7.865 ac, 78.00% Impervious, Inflow Depth = 3.13" for 10-yr event
Inflow = 18.71 cfs @ 12.04 hrs, Volume= 2.048 af
Outflow = 18.71 cfs @ 12.04 hrs, Volume= 2.048 af, Atten= 0%, Lag= 0.0 min
Routed to Reach AP-1 : 42" RCP to West Campus

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

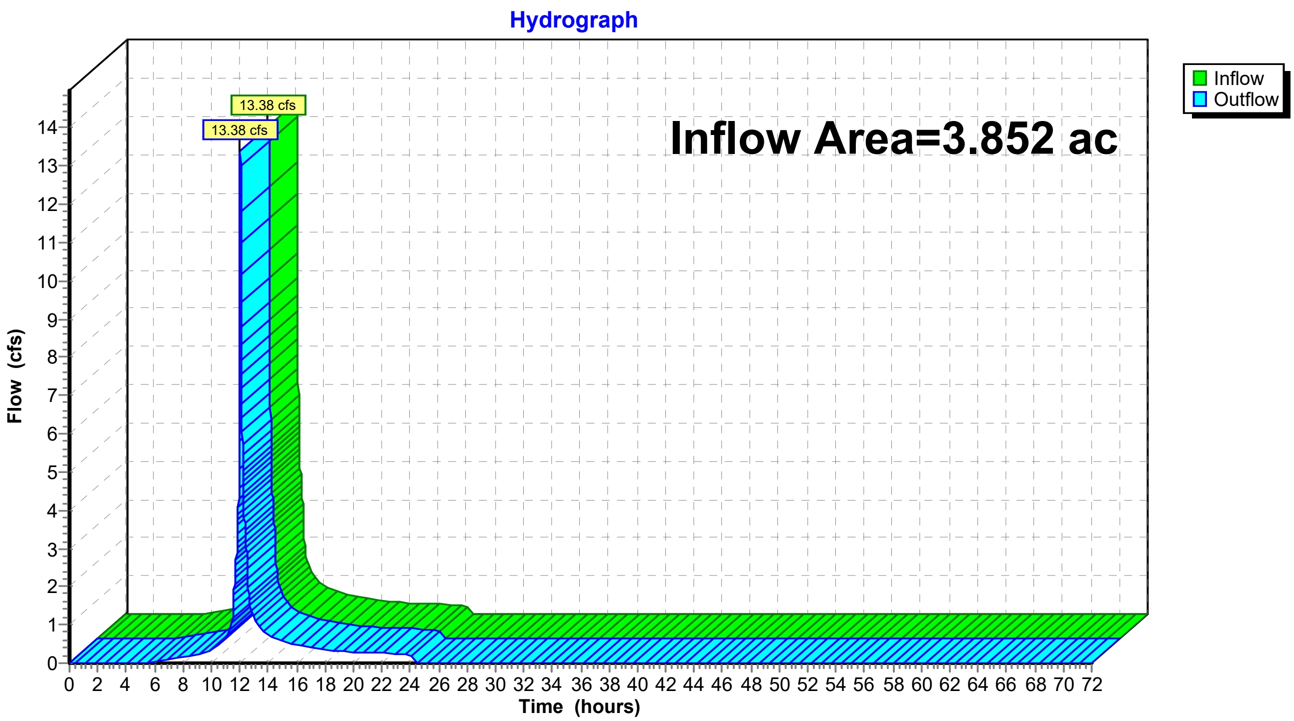


Summary for Reach HYD-3: Hyrdrodynamic 3

Inflow Area = 3.852 ac, 75.50% Impervious, Inflow Depth = 3.00" for 10-yr event
Inflow = 13.38 cfs @ 12.04 hrs, Volume= 0.962 af
Outflow = 13.38 cfs @ 12.04 hrs, Volume= 0.962 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 7P : (new Pond)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach HYD-3: Hyrdrodynamic 3



Summary for Pond 7P: (new Pond)

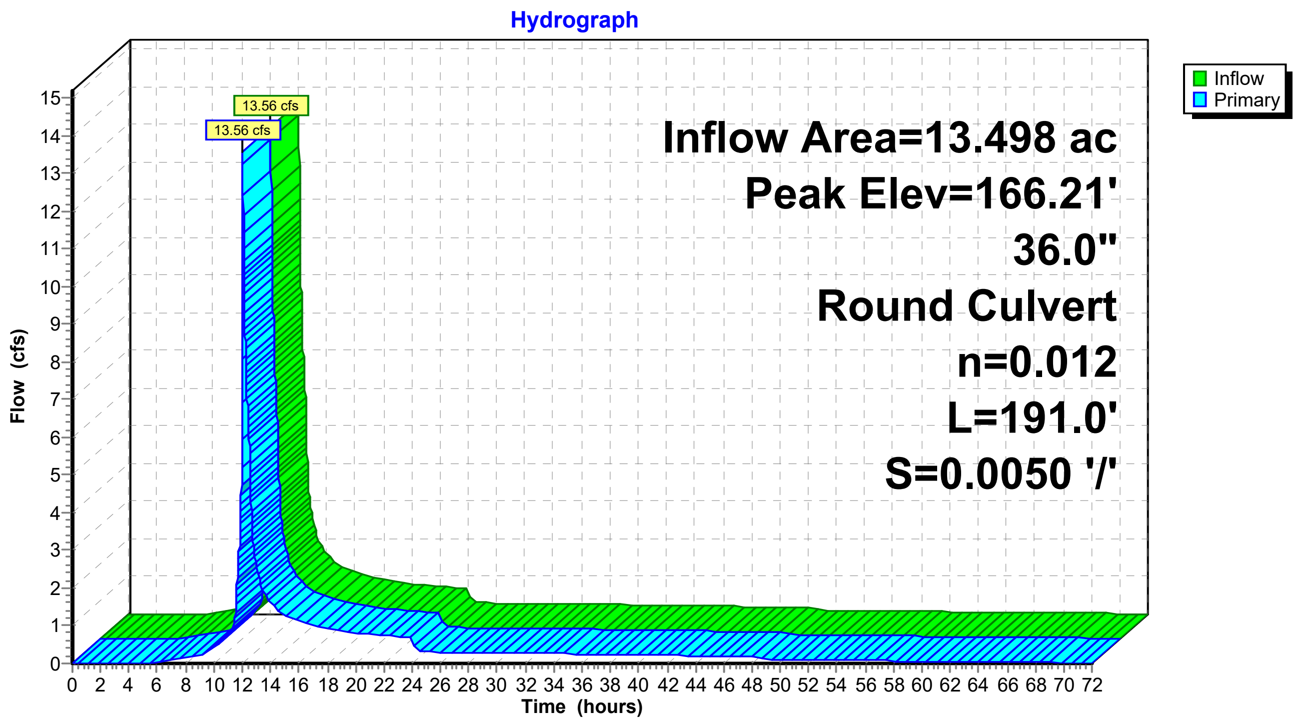
Inflow Area = 13.498 ac, 58.48% Impervious, Inflow Depth > 2.09" for 10-yr event
Inflow = 13.56 cfs @ 12.04 hrs, Volume= 2.355 af
Outflow = 13.56 cfs @ 12.04 hrs, Volume= 2.355 af, Atten= 0%, Lag= 0.0 min
Primary = 13.56 cfs @ 12.04 hrs, Volume= 2.355 af
Routed to Reach AP-1 : 42" RCP to West Campus

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 166.21' @ 12.04 hrs
Flood Elev= 176.88'

Device	Routing	Invert	Outlet Devices
#1	Primary	164.57'	**36.0" Round Culvert** L= 191.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 164.57' / 163.61' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=13.53 cfs @ 12.04 hrs HW=166.20' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 13.53 cfs @ 3.44 fps)

Pond 7P: (new Pond)



Summary for Pond BIO-1: Bioretention 1

Inflow Area = 3.080 ac, 59.26% Impervious, Inflow Depth = 2.13" for 10-yr event
Inflow = 7.50 cfs @ 12.04 hrs, Volume= 0.546 af
Outflow = 4.17 cfs @ 12.15 hrs, Volume= 0.546 af, Atten= 44%, Lag= 6.8 min
Primary = 4.17 cfs @ 12.15 hrs, Volume= 0.546 af
Routed to Reach AP-1 : 42" RCP to West Campus

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 176.33' @ 12.15 hrs Surf.Area= 10,820 sf Storage= 6,008 cf
Flood Elev= 177.00' Surf.Area= 29,686 sf Storage= 16,567 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 290.0 min (1,154.7 - 864.6)

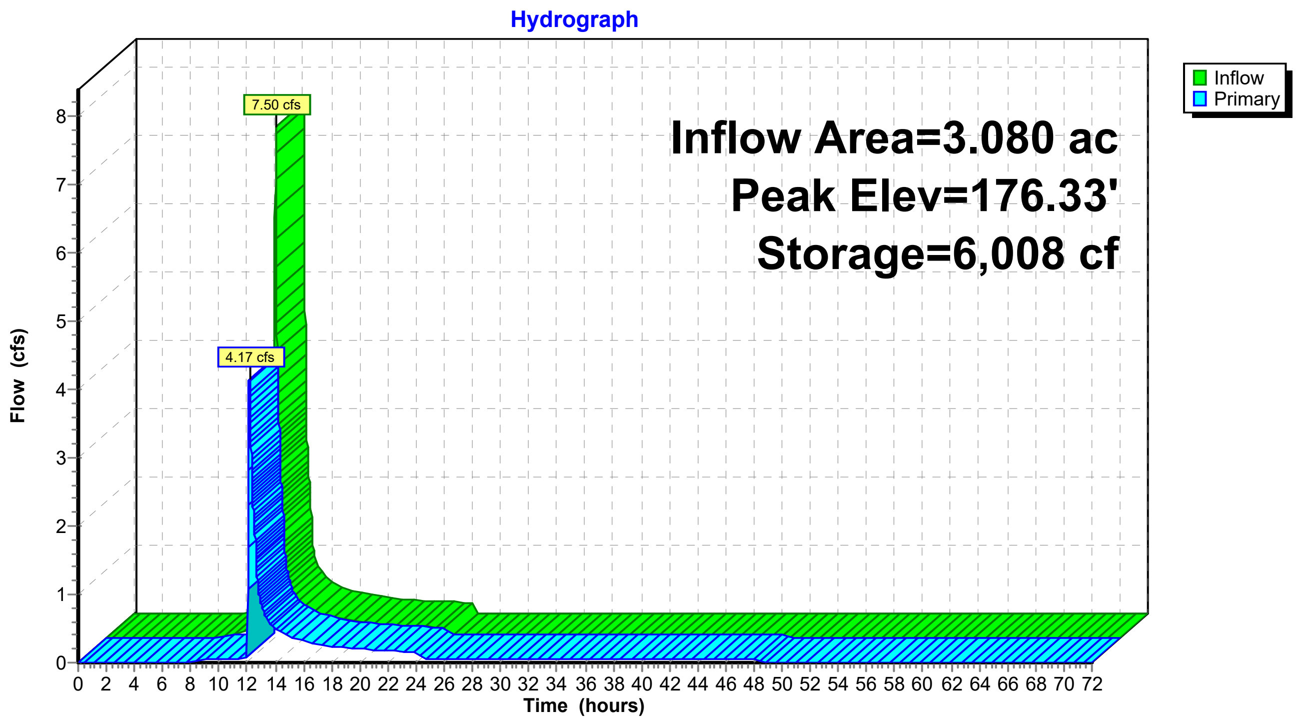
Volume	Invert	Avail.Storage	Storage Description
#1	175.70'	16,567 cf	**Filter (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
175.70	8,149	0	0
176.20	10,251	4,600	4,600
176.70	12,378	5,657	10,257
177.00	29,686	6,310	16,567

Device	Routing	Invert	Outlet Devices
#1	Device 8	175.70'	**0.250 in/hr Exfiltration over Surface area**
#2	Device 8	176.20'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#3	Device 8	176.20'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#4	Device 8	176.20'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#5	Device 8	176.70'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#6	Device 8	176.70'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#7	Device 8	176.70'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#8	Primary	170.60'	**12.0" Round Culvert** L= 209.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 170.60' / 169.90' S= 0.0033 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.16 cfs @ 12.15 hrs HW=176.33' TW=0.00' (Dynamic Tailwater)
8=Culvert (Passes 4.16 cfs of 5.37 cfs potential flow)
1=Exfiltration (Exfiltration Controls 0.06 cfs)
2=Orifice/Grate (Weir Controls 1.37 cfs @ 1.20 fps)
3=Orifice/Grate (Weir Controls 1.37 cfs @ 1.20 fps)
4=Orifice/Grate (Weir Controls 1.37 cfs @ 1.20 fps)
5=Orifice/Grate (Controls 0.00 cfs)
6=Orifice/Grate (Controls 0.00 cfs)
7=Orifice/Grate (Controls 0.00 cfs)

Pond BIO-1: Bioretention 1



Summary for Pond BIO-2: Bioretention 2

Inflow Area = 4.622 ac, 51.49% Impervious, Inflow Depth = 1.74" for 10-yr event
Inflow = 8.94 cfs @ 12.04 hrs, Volume= 0.671 af
Outflow = 3.40 cfs @ 12.26 hrs, Volume= 0.671 af, Atten= 62%, Lag= 13.0 min
Primary = 3.40 cfs @ 12.26 hrs, Volume= 0.671 af
Routed to Pond 7P : (new Pond)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 174.15' @ 12.26 hrs Surf.Area= 15,135 sf Storage= 7,659 cf
Flood Elev= 177.00' Surf.Area= 31,079 sf Storage= 66,076 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 286.0 min (1,167.1 - 881.1)

Volume	Invert	Avail.Storage	Storage Description
#1	174.00'	3,374 cf	**Forebay (Prismatic)** Listed below (Recalc)
#2	173.50'	62,702 cf	**Filter (Prismatic)** Listed below (Recalc)
		66,076 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
174.00	2,923	0	0
175.00	3,825	3,374	3,374

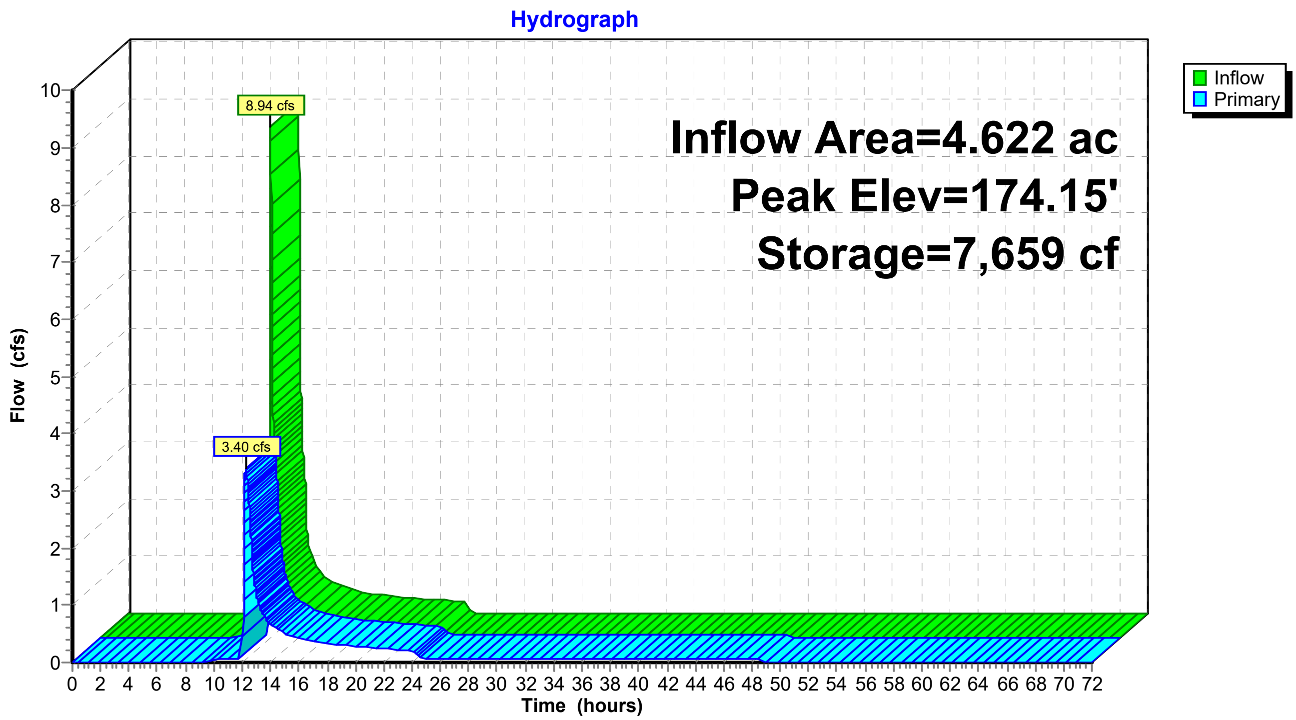
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
173.50	10,039	0	0
174.00	11,592	5,408	5,408
175.00	14,774	13,183	18,591
176.00	23,097	18,936	37,526
177.00	27,254	25,176	62,702

Device	Routing	Invert	Outlet Devices
#1	Device 7	173.50'	**0.250 in/hr Exfiltration over Surface area**
#2	Device 7	174.00'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#3	Device 7	174.00'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#4	Device 7	174.50'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#5	Device 7	174.50'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#6	Device 7	174.50'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads

#7	Primary	169.30'	**12.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 169.30' / 169.10' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.40 cfs @ 12.26 hrs HW=174.15' TW=165.79' (Dynamic Tailwater)
7=Culvert (Passes 3.40 cfs of 6.23 cfs potential flow)
- **1=Exfiltration** (Exfiltration Controls 0.09 cfs)
- **2=Orifice/Grate** (Weir Controls 1.66 cfs @ 1.27 fps)
- **3=Orifice/Grate** (Weir Controls 1.66 cfs @ 1.27 fps)
- **4=Orifice/Grate** (Controls 0.00 cfs)
- **5=Orifice/Grate** (Controls 0.00 cfs)
- **6=Orifice/Grate** (Controls 0.00 cfs)

Pond BIO-2: Bioretention 2



Summary for Pond DET-1: Dry detention pond

Inflow Area = 5.025 ac, 51.87% Impervious, Inflow Depth = 1.82" for 10-yr event
Inflow = 10.21 cfs @ 12.04 hrs, Volume= 0.761 af
Outflow = 0.24 cfs @ 23.31 hrs, Volume= 0.722 af, Atten= 98%, Lag= 676.1 min
Primary = 0.24 cfs @ 23.31 hrs, Volume= 0.722 af
Routed to Pond 7P : (new Pond)
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 7P : (new Pond)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 178.19' @ 23.31 hrs Surf.Area= 21,728 sf Storage= 23,008 cf
Flood Elev= 180.00' Surf.Area= 29,356 sf Storage= 69,185 cf

Plug-Flow detention time= 1,136.1 min calculated for 0.721 af (95% of inflow)
Center-of-Mass det. time= 1,108.8 min (1,986.5 - 877.8)

Volume	Invert	Avail.Storage	Storage Description
#1	177.00'	69,185 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

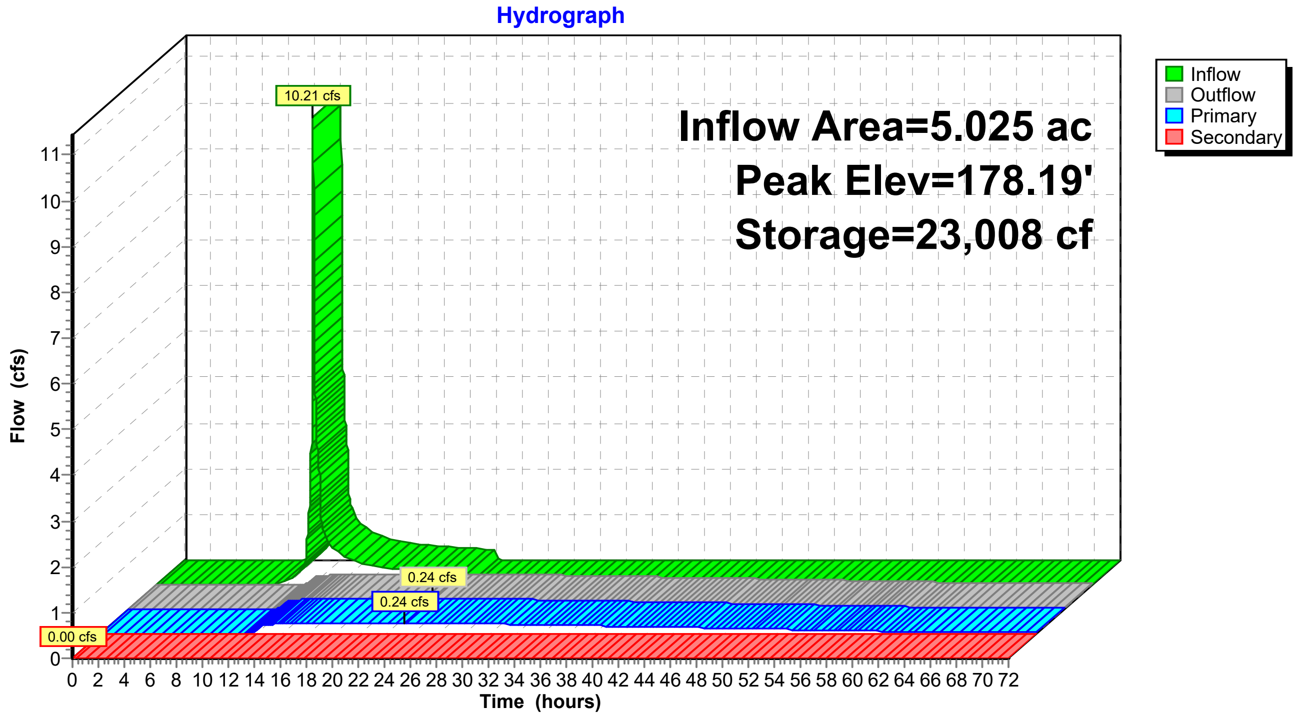
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
177.00	16,977	0	0
178.00	20,946	18,962	18,962
179.00	25,072	23,009	41,971
180.00	29,356	27,214	69,185

Device	Routing	Invert	Outlet Devices
#1	Primary	177.00'	**12.0" Round Culvert** L= 72.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 177.00' / 176.12' S= 0.0122 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	177.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	178.19'	**20.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	179.00'	**48.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Secondary	179.50'	**10.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.24 cfs @ 23.31 hrs HW=178.19' TW=164.91' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.24 cfs of 2.48 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.24 cfs @ 4.97 fps)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  └─**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=177.00' TW=164.57' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DET-1: Dry detention pond



Summary for Pond DET-2: Underground detention

Inflow Area = 0.694 ac, 61.27% Impervious, Inflow Depth = 2.21" for 10-yr event
Inflow = 1.76 cfs @ 12.04 hrs, Volume= 0.128 af
Outflow = 0.21 cfs @ 12.75 hrs, Volume= 0.127 af, Atten= 88%, Lag= 42.7 min
Primary = 0.21 cfs @ 12.75 hrs, Volume= 0.127 af
Routed to Reach HYD-2 : Hyrdrodynamic 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 172.86' @ 12.75 hrs Surf.Area= 2,344 sf Storage= 2,140 cf
Flood Elev= 174.92' Surf.Area= 2,344 sf Storage= 6,819 cf

Plug-Flow detention time= 149.6 min calculated for 0.127 af (100% of inflow)
Center-of-Mass det. time= 148.6 min (1,009.9 - 861.3)

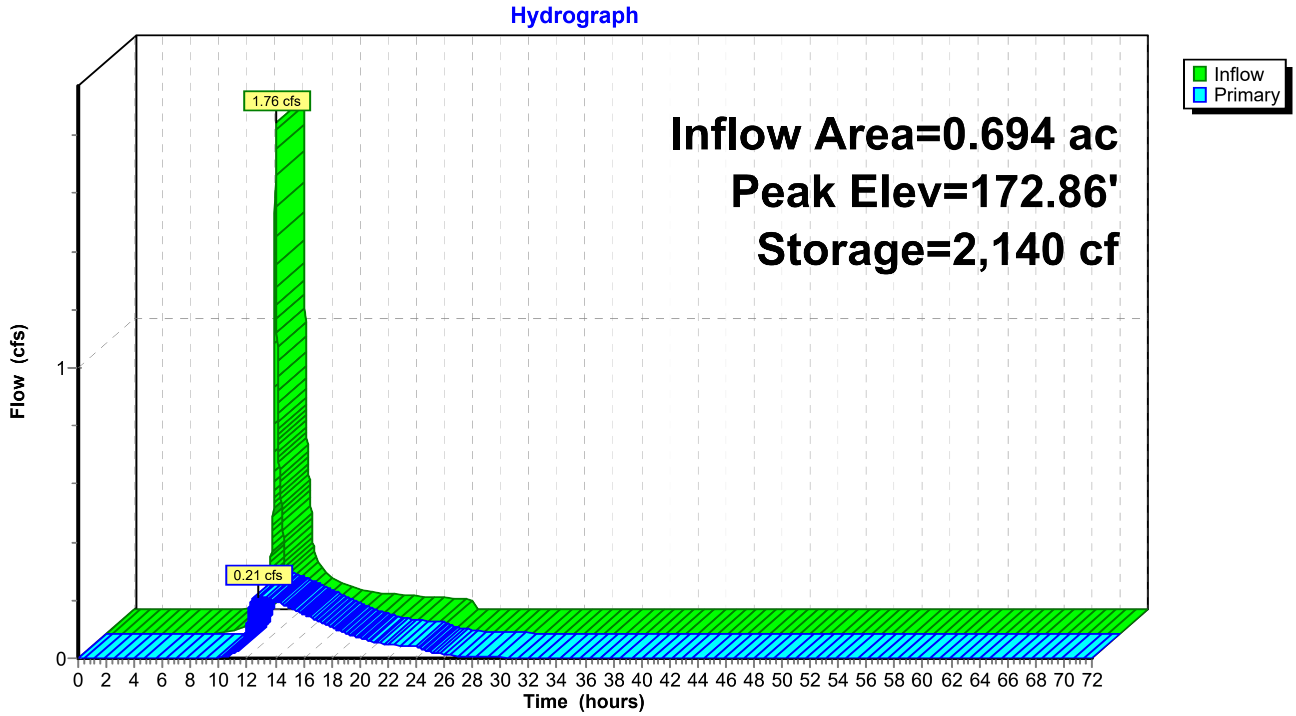
Volume	Invert	Avail.Storage	Storage Description
#1A	171.92'	0 cf	**29.65'W x 79.07'L x 3.00'H Field A** 7,030 cf Overall - 7,030 cf Embedded = 0 cf x 40.0% Voids
#2A	171.92'	6,819 cf	**ACO StormBrixx SD 1** x 300 Inside #1 Inside= 23.7"W x 36.0"H => 5.75 sf x 3.95'L = 22.7 cf Outside= 23.7"W x 36.0"H => 5.93 sf x 3.95'L = 23.4 cf 300 Chambers in 15 Rows
		6,819 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	171.92'	**12.0" Round Culvert** L= 74.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 171.92' / 171.55' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	171.92'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	174.42'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.21 cfs @ 12.75 hrs HW=172.86' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.21 cfs of 1.98 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.21 cfs @ 4.35 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DET-2: Underground detention



Summary for Pond DET-3: Underground detention

Inflow Area = 2.312 ac, 77.37% Impervious, Inflow Depth = 3.09" for 10-yr event
Inflow = 8.27 cfs @ 12.04 hrs, Volume= 0.596 af
Outflow = 0.32 cfs @ 15.31 hrs, Volume= 0.591 af, Atten= 96%, Lag= 196.5 min
Primary = 0.32 cfs @ 15.31 hrs, Volume= 0.591 af
Routed to Reach HYD-2 : Hyrdrodynamic 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 171.93' @ 15.31 hrs Surf.Area= 7,971 sf Storage= 15,149 cf
Flood Elev= 174.47' Surf.Area= 7,971 sf Storage= 34,778 cf

Plug-Flow detention time= 635.7 min calculated for 0.591 af (99% of inflow)
Center-of-Mass det. time= 630.5 min (1,456.3 - 825.8)

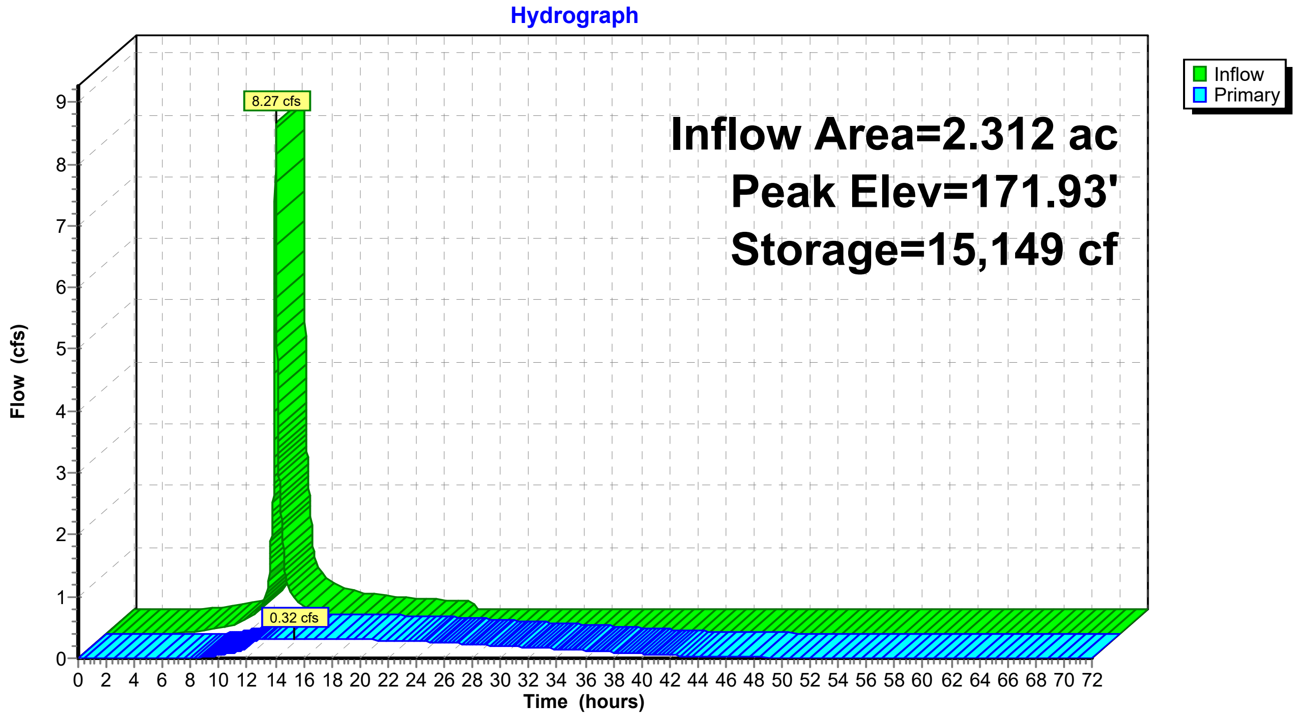
Volume	Invert	Avail.Storage	Storage Description
#1A	169.97'	0 cf	**59.30'W x 134.42'L x 4.50'H Field A** 35,854 cf Overall - 35,854 cf Embedded = 0 cf x 40.0% Voids
#2A	169.97'	34,778 cf	**ACO StormBrixx SD 1.5** x 1020 Inside #1 Inside= 23.7"W x 54.0"H => 8.62 sf x 3.95'L = 34.1 cf Outside= 23.7"W x 54.0"H => 8.89 sf x 3.95'L = 35.2 cf 1020 Chambers in 30 Rows
		34,778 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	169.97'	**18.0" Round Culvert** L= 128.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 169.97' / 169.33' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	169.97'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	173.97'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.32 cfs @ 15.31 hrs HW=171.93' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.32 cfs of 7.39 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.32 cfs @ 6.52 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DET-3: Underground detention



Summary for Pond DET-4: Underground detention

Inflow Area = 0.333 ac,100.00% Impervious, Inflow Depth = 4.46" for 10-yr event
Inflow = 1.53 cfs @ 12.04 hrs, Volume= 0.124 af
Outflow = 0.27 cfs @ 12.55 hrs, Volume= 0.124 af, Atten= 82%, Lag= 30.8 min
Primary = 0.27 cfs @ 12.55 hrs, Volume= 0.124 af
Routed to Reach HYD-1 : Hyrdrodynamic 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 171.93' @ 12.55 hrs Surf.Area= 1,125 sf Storage= 1,595 cf
Flood Elev= 173.47' Surf.Area= 1,125 sf Storage= 3,273 cf

Plug-Flow detention time= 77.9 min calculated for 0.124 af (100% of inflow)
Center-of-Mass det. time= 77.8 min (828.2 - 750.4)

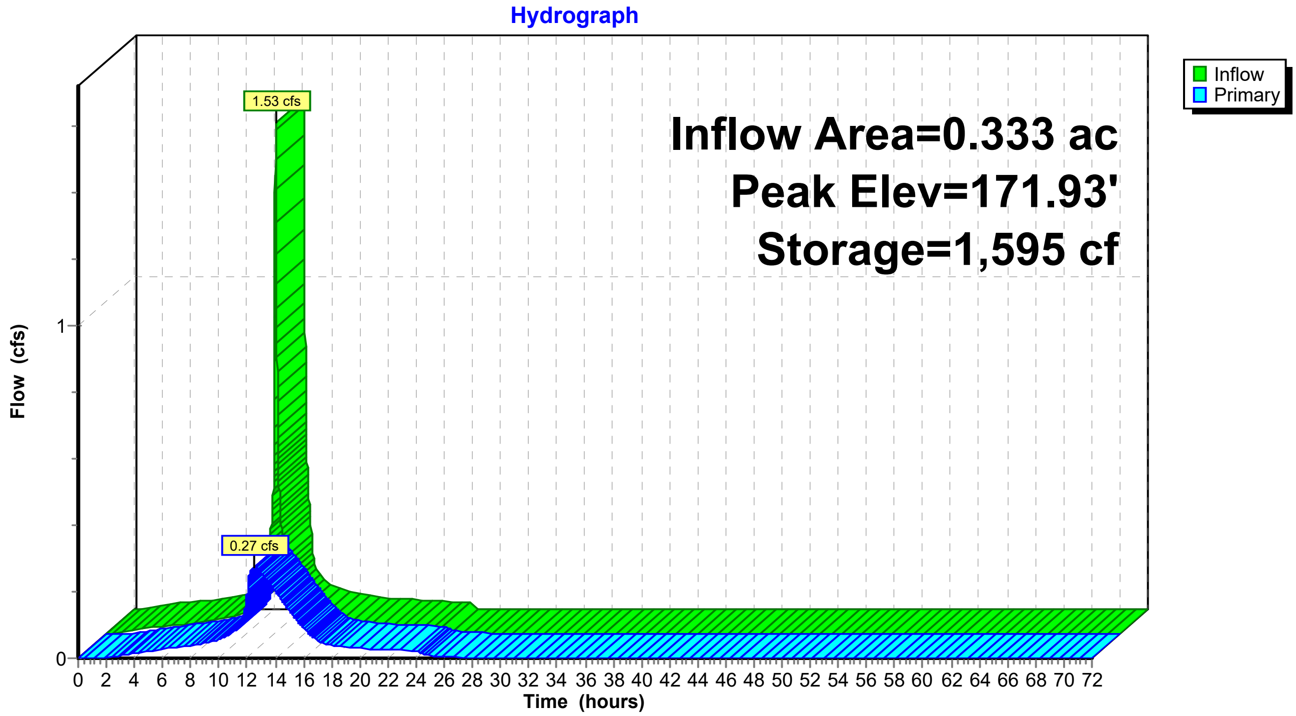
Volume	Invert	Avail.Storage	Storage Description
#1A	170.47'	0 cf	**23.72'W x 47.44'L x 3.00'H Field A** 3,374 cf Overall - 3,374 cf Embedded = 0 cf x 40.0% Voids
#2A	170.47'	3,273 cf	**ACO StormBrixx SD 1** x 144 Inside #1 Inside= 23.7"W x 36.0"H => 5.75 sf x 3.95'L = 22.7 cf Outside= 23.7"W x 36.0"H => 5.93 sf x 3.95'L = 23.4 cf 144 Chambers in 12 Rows
		3,273 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	170.47'	**12.0" Round Culvert** L= 71.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 170.47' / 170.12' S= 0.0049 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	170.47'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	172.97'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.27 cfs @ 12.55 hrs HW=171.93' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.27 cfs of 2.91 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.27 cfs @ 5.57 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DET-4: Underground detention



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPS-1A: Southern half of Runoff Area=1,237,610 sf 74.45% Impervious Runoff Depth=6.29"
Tc=6.0 min CN=83 Runoff=181.31 cfs 14.900 af

SubcatchmentPS-1B: Enterprise Dr Runoff Area=510,169 sf 33.48% Impervious Runoff Depth=3.47"
Flow Length=589' Tc=36.5 min CN=59 Runoff=19.50 cfs 3.385 af

SubcatchmentPS-1C: remaining BLDG 2, Runoff Area=243,057 sf 84.80% Impervious Runoff Depth=7.01"
Tc=6.0 min CN=89 Runoff=38.45 cfs 3.260 af

SubcatchmentPS-1D: BLDG 2 9-12 Runoff Area=14,520 sf 100.00% Impervious Runoff Depth=8.09"
Tc=6.0 min CN=98 Runoff=2.44 cfs 0.225 af

SubcatchmentPS-1E: BLDG 1A1-4, Runoff Area=30,231 sf 61.27% Impervious Runoff Depth=5.34"
Tc=6.0 min CN=75 Runoff=3.84 cfs 0.309 af

SubcatchmentPS-1F: BLDG 1C-1, 1E-1, Runoff Area=100,730 sf 77.37% Impervious Runoff Depth=6.53"
Tc=6.0 min CN=85 Runoff=15.19 cfs 1.259 af

SubcatchmentPS-1G: remaining BLDG Runoff Area=211,633 sf 80.68% Impervious Runoff Depth=6.77"
Tc=6.0 min CN=87 Runoff=32.73 cfs 2.741 af

SubcatchmentPS-1H: Hotel parking and Runoff Area=134,145 sf 59.26% Impervious Runoff Depth=5.22"
Tc=6.0 min CN=74 Runoff=16.66 cfs 1.340 af

SubcatchmentPS-1I: Plaza Runoff Area=167,791 sf 75.50% Impervious Runoff Depth=6.41"
Tc=6.0 min CN=84 Runoff=24.94 cfs 2.058 af

SubcatchmentPS-1J: BLDG 4A,4B, and Runoff Area=201,327 sf 51.49% Impervious Runoff Depth=4.63"
Tc=6.0 min CN=69 Runoff=22.20 cfs 1.784 af

SubcatchmentPS-1K: BLDG 4A,4C Runoff Area=218,869 sf 51.87% Impervious Runoff Depth=4.75"
Tc=6.0 min CN=70 Runoff=24.76 cfs 1.989 af

SubcatchmentPS-2A: Northern Entrance Runoff Area=141,498 sf 27.01% Impervious Runoff Depth=6.17"
Flow Length=227' Slope=0.0150 '/' Tc=13.6 min CN=82 Runoff=15.17 cfs 1.671 af

SubcatchmentPS-2B: Northern Lawn & Runoff Area=270,919 sf 27.69% Impervious Runoff Depth=5.58"
Flow Length=449' Tc=20.8 min CN=77 Runoff=22.13 cfs 2.891 af

SubcatchmentPS-2C: Northern Parking Runoff Area=1,961,346 sf 72.39% Impervious Runoff Depth=6.17"
Tc=6.0 min CN=82 Runoff=282.95 cfs 23.165 af

SubcatchmentPS-3A: Soccer fields & Runoff Area=133,805 sf 22.65% Impervious Runoff Depth=2.68"
Flow Length=1,107' Tc=36.0 min CN=52 Runoff=3.78 cfs 0.685 af

SubcatchmentPS-3B: Wood/Lawn Runoff Area=67,376 sf 9.46% Impervious Runoff Depth=1.81"
Flow Length=422' Tc=18.7 min CN=44 Runoff=1.51 cfs 0.233 af

Subcatchment PS-4: East Campus Main Runoff Area=603,956 sf 68.02% Impervious Runoff Depth=5.94"
Tc=6.0 min CN=80 Runoff=84.30 cfs 6.857 af

Reach AP-1: 42" RCP to West Campus Inflow=296.48 cfs 33.196 af
Outflow=296.48 cfs 33.196 af

Reach AP-2: Discharge to Northern Parcel Inflow=305.16 cfs 27.727 af
Outflow=305.16 cfs 27.727 af

Reach AP-3: Existing Catch basin onsite Inflow=4.93 cfs 0.918 af
Outflow=4.93 cfs 0.918 af

Reach AP-4: Northern storm pipe to West Campus Inflow=84.30 cfs 6.857 af
Outflow=84.30 cfs 6.857 af

Reach HYD-1: Hyrdrodynamic1 Inflow=38.75 cfs 3.485 af
Outflow=38.75 cfs 3.485 af

Reach HYD-2: Hyrdrodynamic2 Inflow=33.34 cfs 4.301 af
Outflow=33.34 cfs 4.301 af

Reach HYD-3: Hyrdrodynamic3 Inflow=24.94 cfs 2.058 af
Outflow=24.94 cfs 2.058 af

Pond 7P: (new Pond) Peak Elev=167.44' Inflow=31.65 cfs 5.787 af
36.0" Round Culvert n=0.012 L=191.0' S=0.0050 '/' Outflow=31.65 cfs 5.787 af

Pond BIO-1: Bioretention 1 Peak Elev=176.84' Storage=12,467 cf Inflow=16.66 cfs 1.340 af
Outflow=5.61 cfs 1.340 af

Pond BIO-2: Bioretention 2 Peak Elev=174.80' Storage=18,332 cf Inflow=22.20 cfs 1.784 af
Outflow=6.68 cfs 1.784 af

Pond DET-1: Dry detention pond Peak Elev=179.02' Storage=42,500 cf Inflow=24.76 cfs 1.989 af
Primary=2.49 cfs 1.944 af Secondary=0.00 cfs 0.000 af Outflow=2.49 cfs 1.944 af

Pond DET-2: Underground detention Peak Elev=174.41' Storage=5,666 cf Inflow=3.84 cfs 0.309 af
Outflow=0.36 cfs 0.309 af

Pond DET-3: Underground detention Peak Elev=174.25' Storage=33,109 cf Inflow=15.19 cfs 1.259 af
Outflow=0.69 cfs 1.251 af

Pond DET-4: Underground detention Peak Elev=173.16' Storage=2,939 cf Inflow=2.44 cfs 0.225 af
Outflow=0.48 cfs 0.225 af

Total Runoff Area = 143.457 ac Runoff Volume = 68.750 af Average Runoff Depth = 5.75"
36.25% Pervious = 51.998 ac 63.75% Impervious = 91.459 ac

Summary for Subcatchment PS-1A: Southern half of Industrial Buildings & Parking

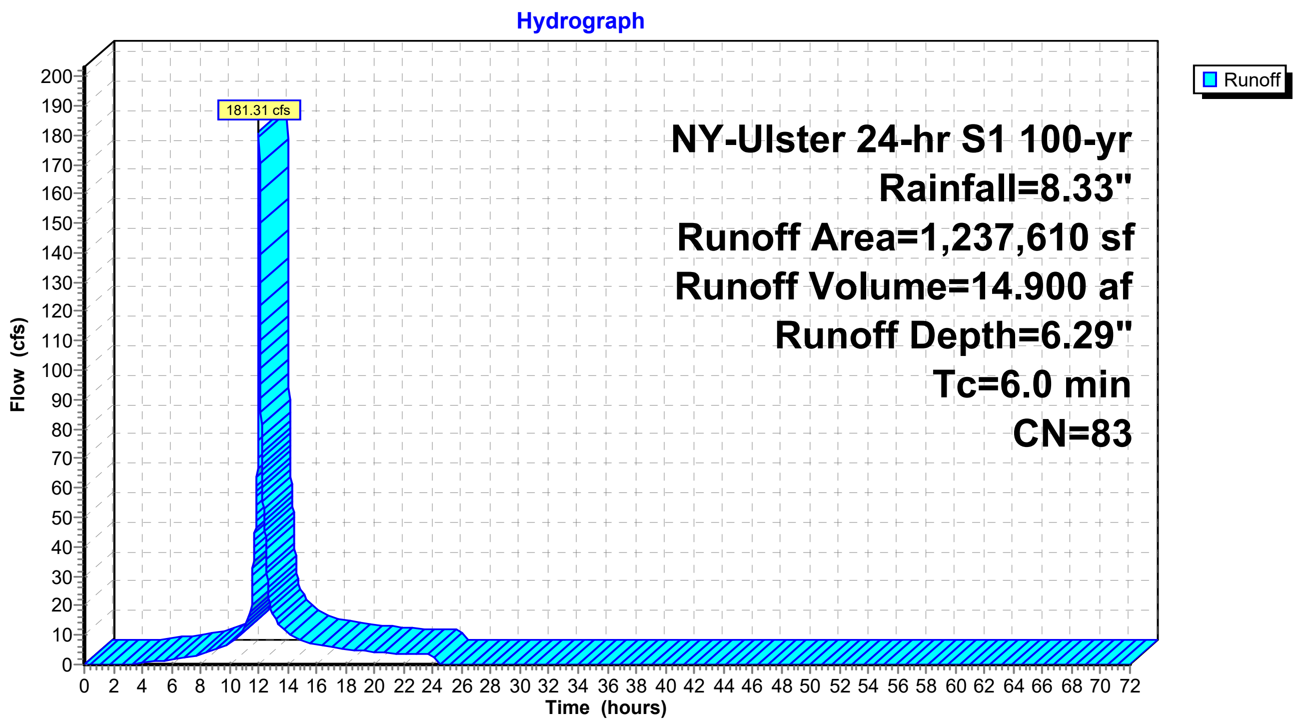
Runoff = 181.31 cfs @ 12.04 hrs, Volume= 14.900 af, Depth= 6.29"
Routed to Reach AP-1 : 42" RCP to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
456,406	98	Paved parking, HSG A
465,018	98	Roofs, HSG A
313,400	39	>75% Grass cover, Good, HSG A
2,786	32	Woods/grass comb., Good, HSG A
1,237,610	83	Weighted Average
316,186		25.55% Pervious Area
921,424		74.45% Impervious Area

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

Subcatchment PS-1A: Southern half of Industrial Buildings & Parking



Summary for Subcatchment PS-1B: Enterprise Dr Entrance and Boices Lane ROW

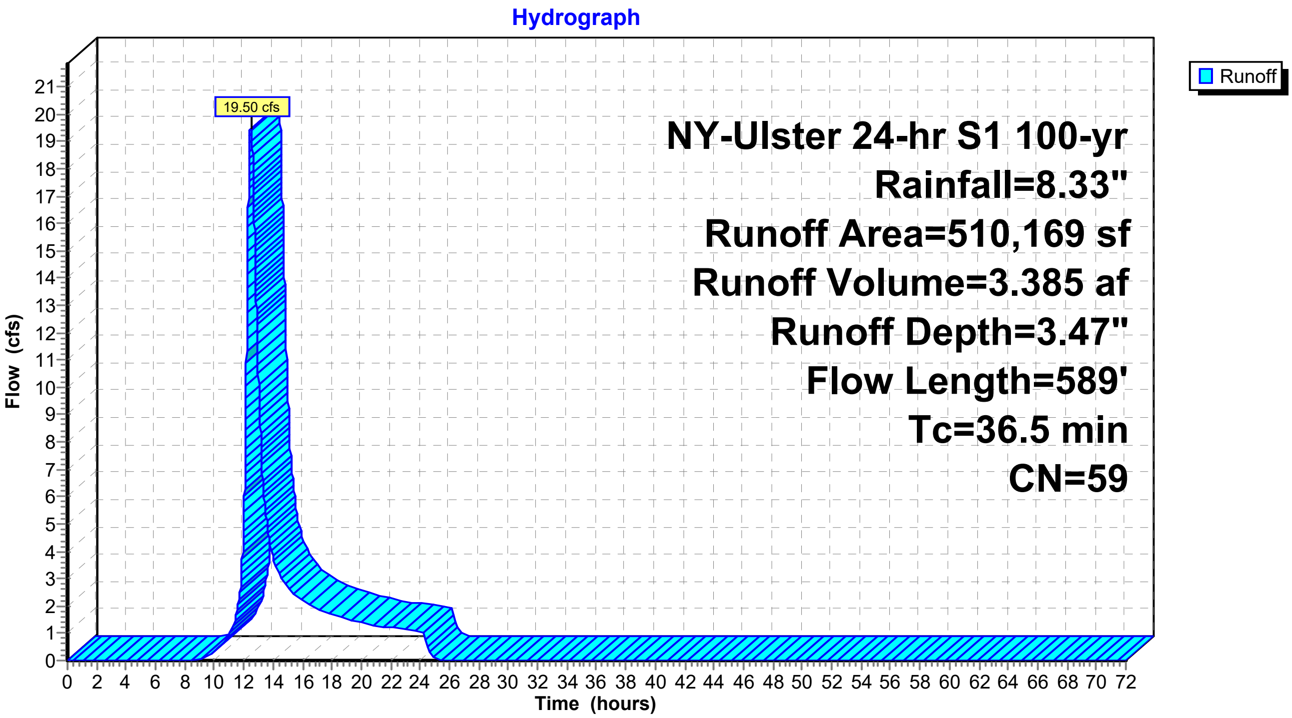
Runoff = 19.50 cfs @ 12.46 hrs, Volume= 3.385 af, Depth= 3.47"
Routed to Reach AP-1 : 42" RCP to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
170,783	98	Paved parking, HSG A
339,386	39	>75% Grass cover, Good, HSG A
510,169	59	Weighted Average
339,386		66.52% Pervious Area
170,783		33.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.1	150	0.0030	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
6.7	155	0.0030	0.38		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.7	284	0.0050	7.23	51.09	**Pipe Channel,** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.012 Corrugated PE, smooth interior
36.5	589	Total			

Subcatchment PS-1B: Enterprise Dr Entrance and Boices Lane ROW



Summary for Subcatchment PS-1C: remaining BLDG 2, 3A, 3B, parking

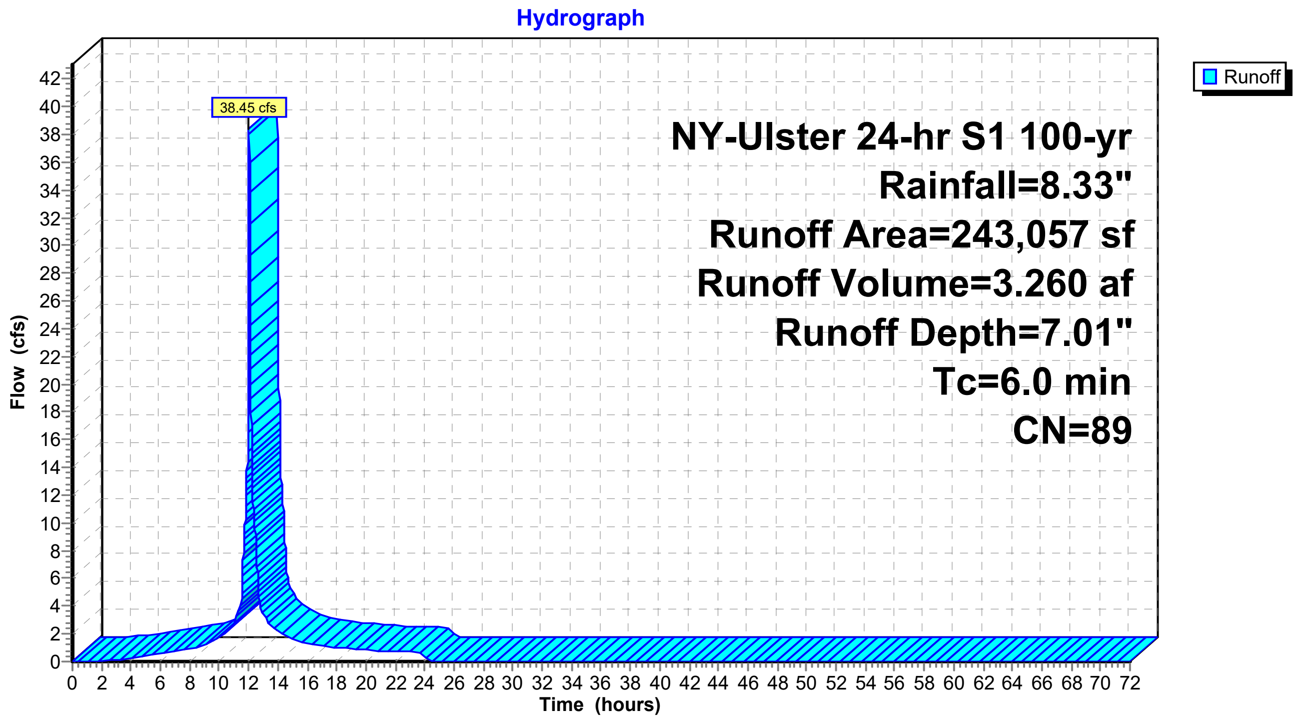
Runoff = 38.45 cfs @ 12.04 hrs, Volume= 3.260 af, Depth= 7.01"
Routed to Reach HYD-1 : Hyrdrodynamic 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

	Area (sf)	CN	Description
*	206,118	98	Paved parking & Roofs, HSG A
	36,939	39	>75% Grass cover, Good, HSG A
	243,057	89	Weighted Average
	36,939		15.20% Pervious Area
	206,118		84.80% Impervious Area

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

Subcatchment PS-1C: remaining BLDG 2, 3A, 3B, parking



Summary for Subcatchment PS-1D: BLDG 2 9-12

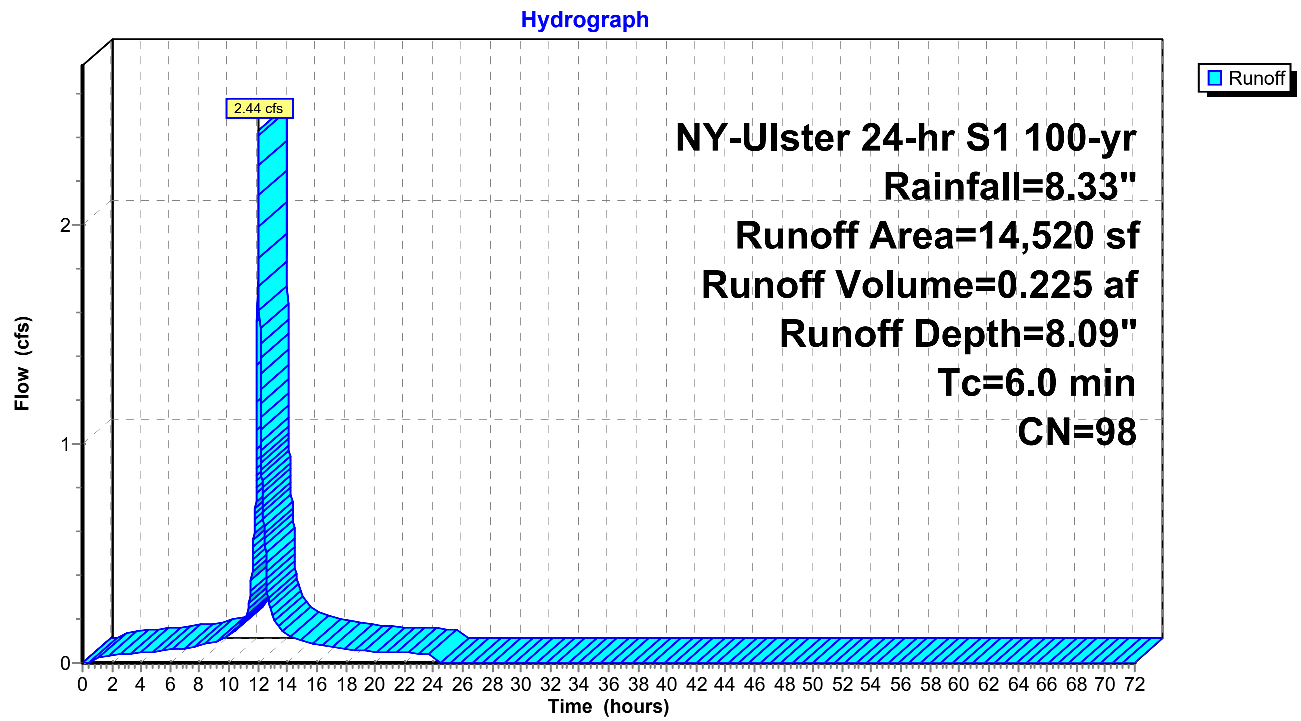
Runoff = 2.44 cfs @ 12.04 hrs, Volume= 0.225 af, Depth= 8.09"
Routed to Pond DET-4 : Underground detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
14,520	98	Roofs, HSG A
14,520		100.00% Impervious Area

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

Subcatchment PS-1D: BLDG 2 9-12



Summary for Subcatchment PS-1E: BLDG 1A1-4, parking to underground detention

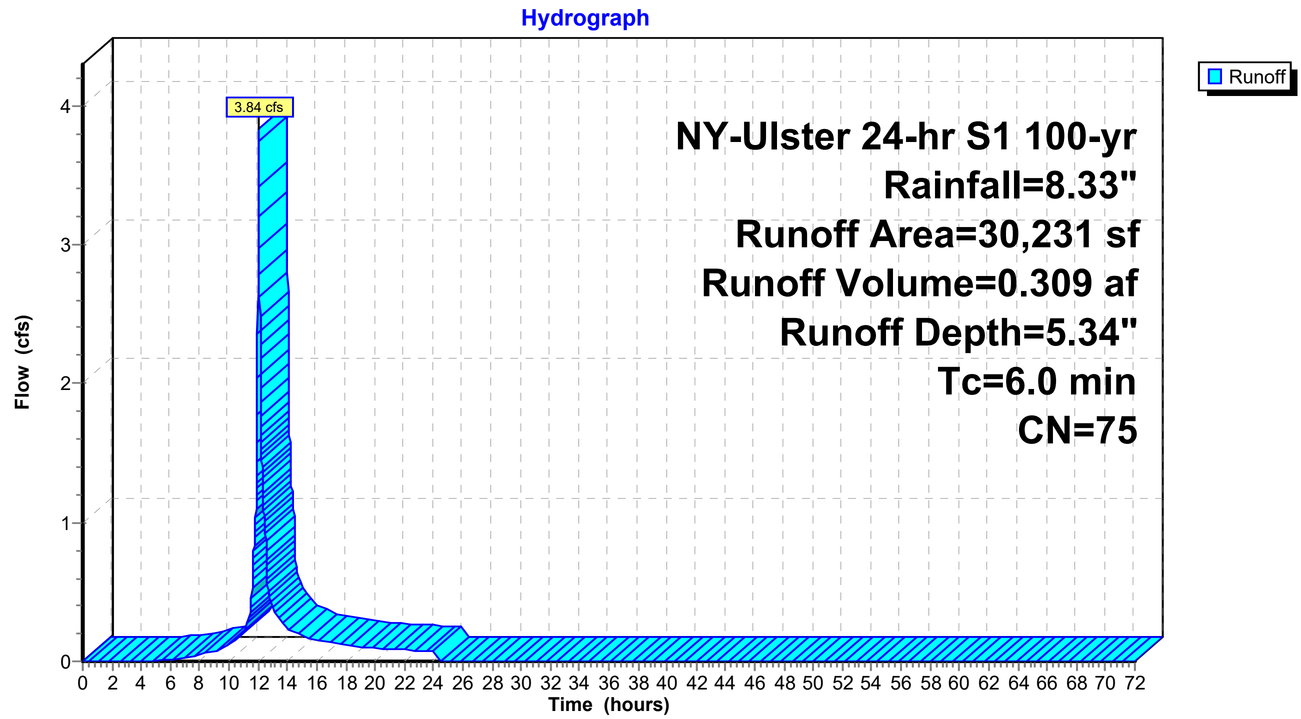
Runoff = 3.84 cfs @ 12.04 hrs, Volume= 0.309 af, Depth= 5.34"
Routed to Pond DET-2 : Underground detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
10,577	98	Paved parking, HSG A
11,709	39	>75% Grass cover, Good, HSG A
7,945	98	Roofs, HSG A
30,231	75	Weighted Average
11,709		38.73% Pervious Area
18,522		61.27% Impervious Area

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

Subcatchment PS-1E: BLDG 1A1-4, parking to underground detention



Summary for Subcatchment PS-1F: BLDG 1C-1, 1E-1, parking to underground detention

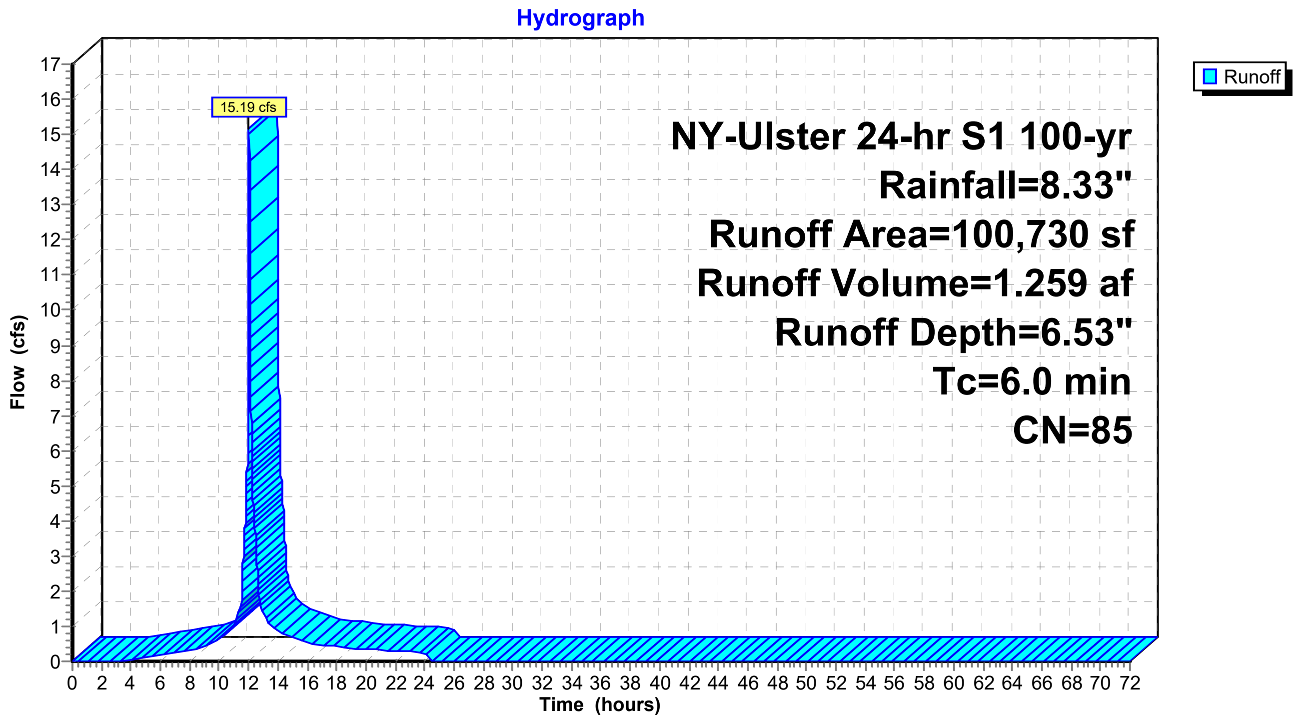
Runoff = 15.19 cfs @ 12.04 hrs, Volume= 1.259 af, Depth= 6.53"
Routed to Pond DET-3 : Underground detention

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
27,131	98	Roofs, HSG A
50,806	98	Paved parking, HSG A
22,793	39	>75% Grass cover, Good, HSG A
100,730	85	Weighted Average
22,793		22.63% Pervious Area
77,937		77.37% Impervious Area

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

Subcatchment PS-1F: BLDG 1C-1, 1E-1, parking to underground detention



Summary for Subcatchment PS-1G: remaining BLDG 1A-1E, parking

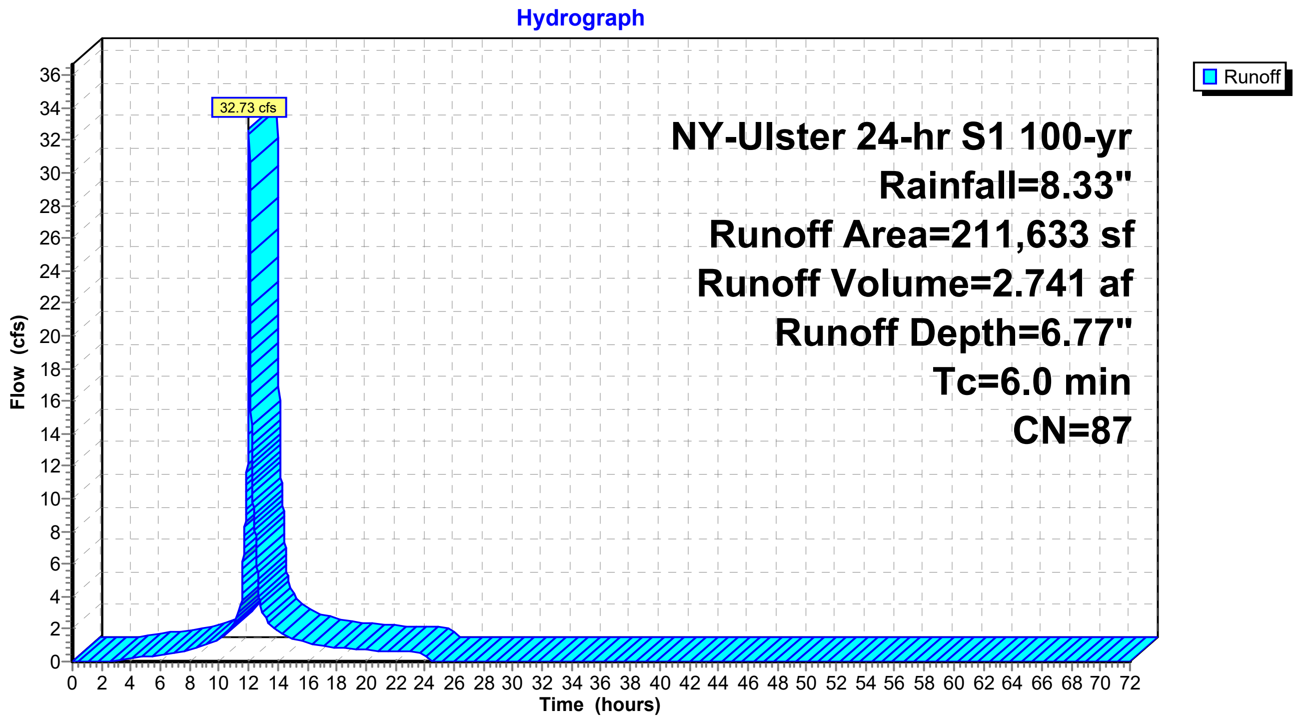
Runoff = 32.73 cfs @ 12.04 hrs, Volume= 2.741 af, Depth= 6.77"
Routed to Reach HYD-2 : Hyrdrodynamic 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

	Area (sf)	CN	Description
*	170,756	98	Paved parking & Roofs, HSG A
	40,877	39	>75% Grass cover, Good, HSG A
	211,633	87	Weighted Average
	40,877		19.32% Pervious Area
	170,756		80.68% Impervious Area

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

Subcatchment PS-1G: remaining BLDG 1A-1E, parking



Summary for Subcatchment PS-1H: Hotel parking and bioretention

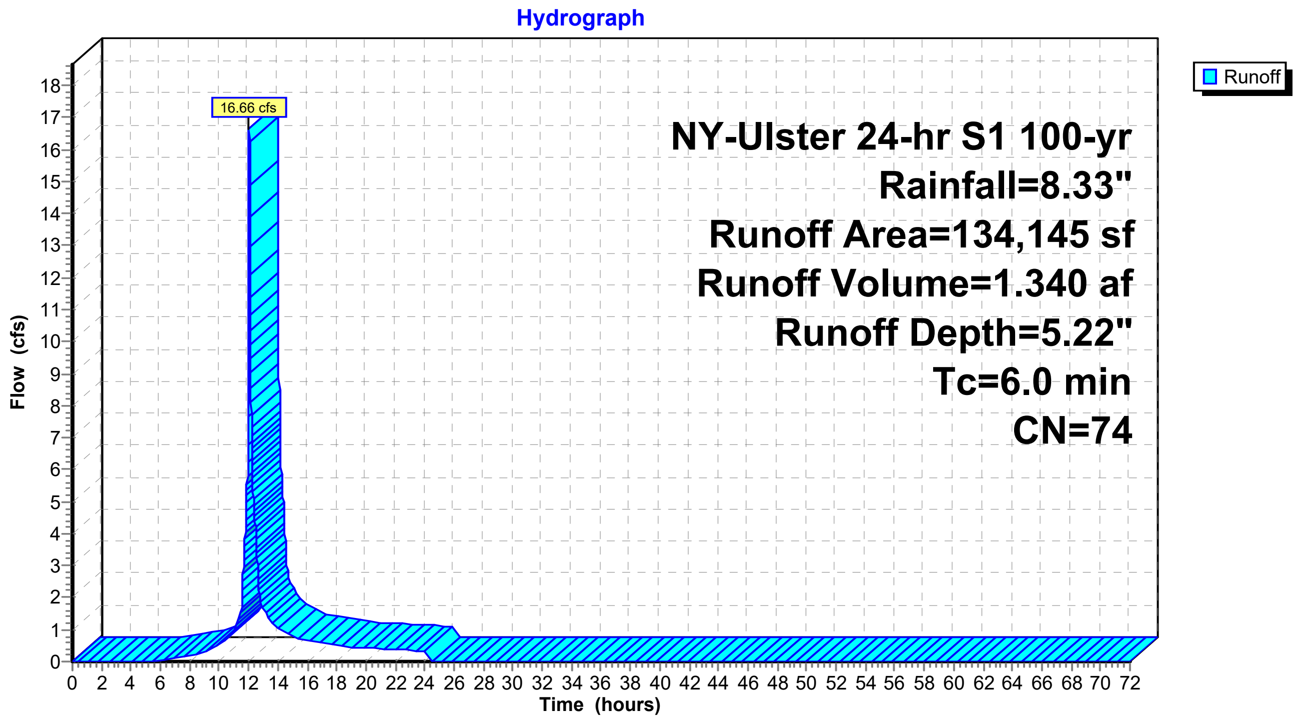
Runoff = 16.66 cfs @ 12.04 hrs, Volume= 1.340 af, Depth= 5.22"
Routed to Pond BIO-1 : Bioretention 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
79,488	98	Paved parking, HSG A
54,657	39	>75% Grass cover, Good, HSG A
134,145	74	Weighted Average
54,657		40.74% Pervious Area
79,488		59.26% Impervious Area

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

Subcatchment PS-1H: Hotel parking and bioretention



Summary for Subcatchment PS-1I: Plaza

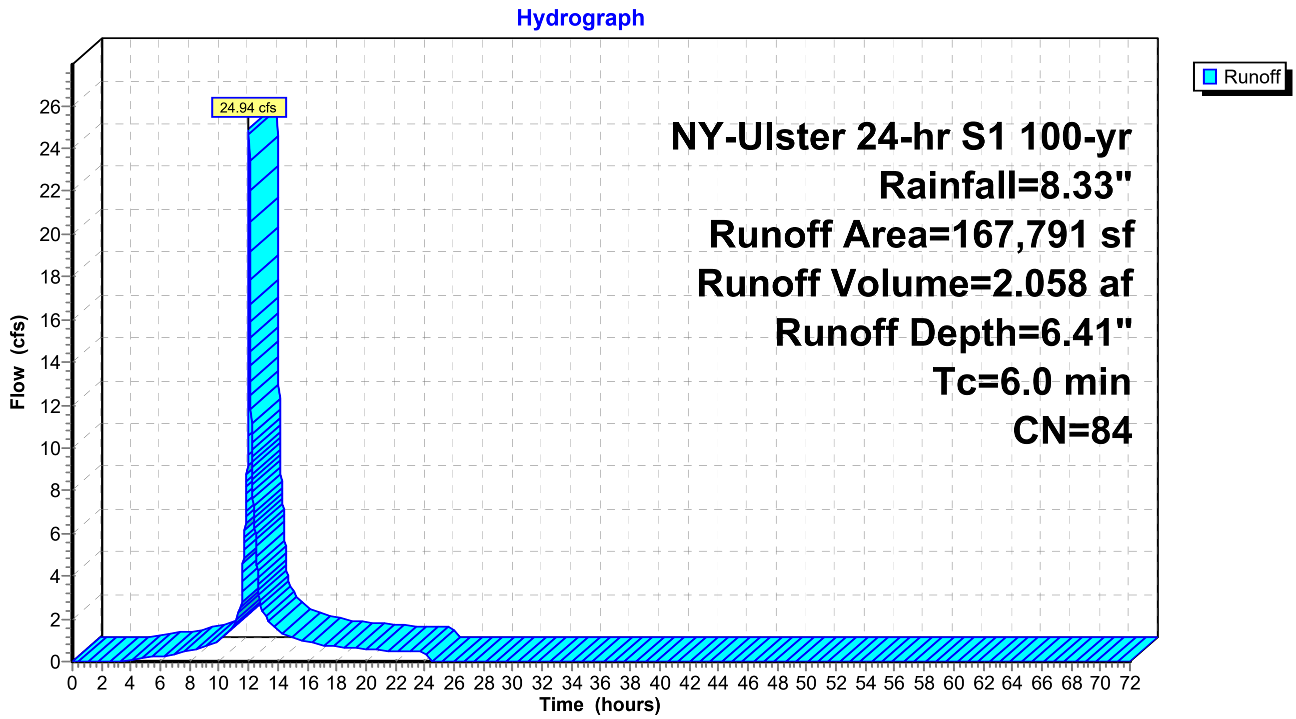
Runoff = 24.94 cfs @ 12.04 hrs, Volume= 2.058 af, Depth= 6.41"
Routed to Reach HYD-3 : Hyrdrodynamic 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

	Area (sf)	CN	Description
*	126,677	98	Paved parking & Roofs, HSG A
	41,114	39	>75% Grass cover, Good, HSG A
	167,791	84	Weighted Average
	41,114		24.50% Pervious Area
	126,677		75.50% Impervious Area

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

Subcatchment PS-1I: Plaza



Summary for Subcatchment PS-1J: BLDG 4A,4B, and bioretention

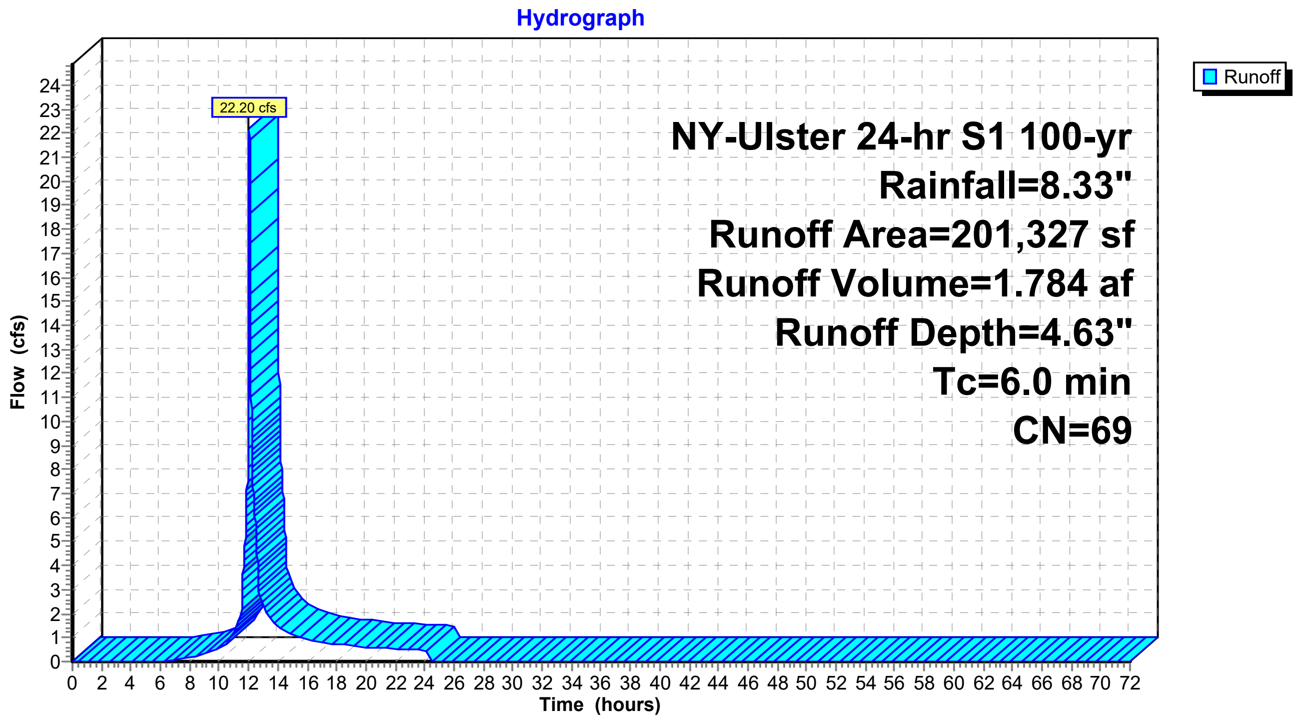
Runoff = 22.20 cfs @ 12.04 hrs, Volume= 1.784 af, Depth= 4.63"
Routed to Pond BIO-2 : Bioretention 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

	Area (sf)	CN	Description
*	103,655	98	Paved parking & Roofs, HSG A
	97,672	39	>75% Grass cover, Good, HSG A
	201,327	69	Weighted Average
	97,672		48.51% Pervious Area
	103,655		51.49% Impervious Area

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

Subcatchment PS-1J: BLDG 4A,4B, and bioretention



Summary for Subcatchment PS-1K: BLDG 4A,4C

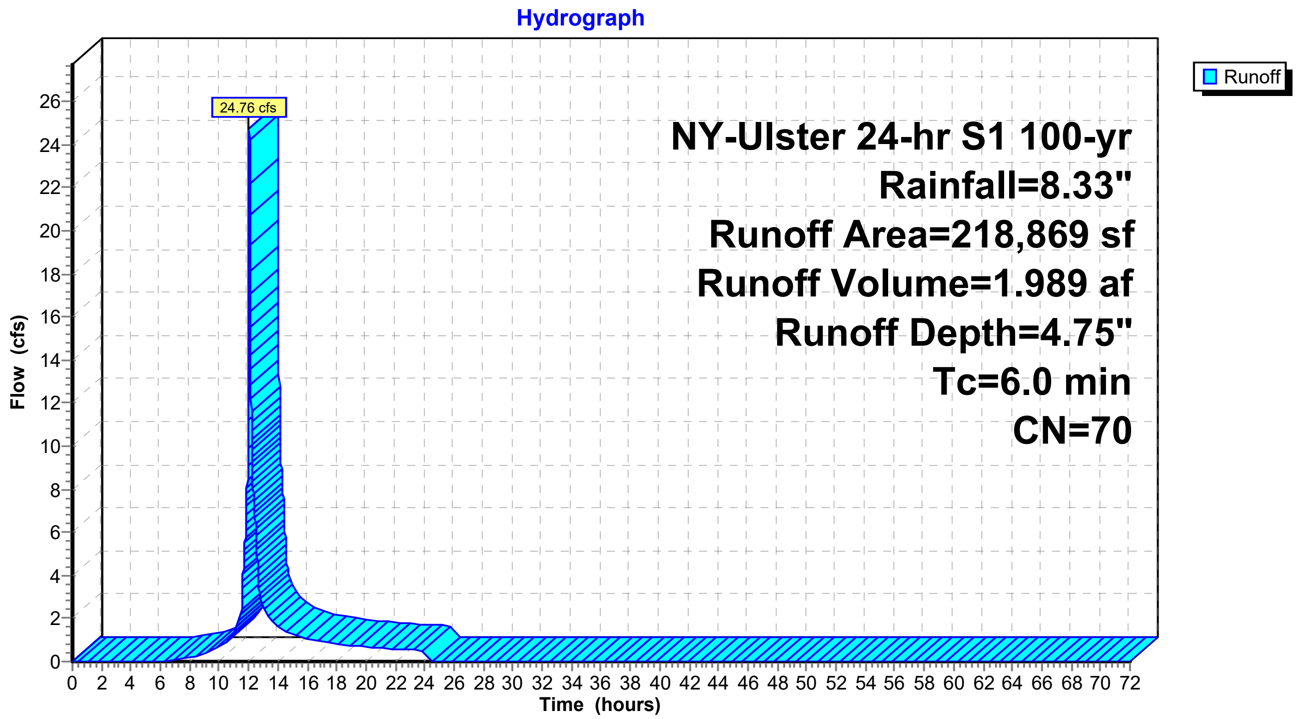
Runoff = 24.76 cfs @ 12.04 hrs, Volume= 1.989 af, Depth= 4.75"
Routed to Pond DET-1 : Dry detention pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

	Area (sf)	CN	Description
*	113,536	98	Paved parking & Roofs, HSG A
	105,333	39	>75% Grass cover, Good, HSG A
	218,869	70	Weighted Average
	105,333		48.13% Pervious Area
	113,536		51.87% Impervious Area

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

Subcatchment PS-1K: BLDG 4A,4C



Summary for Subcatchment PS-2A: Northern Entrance

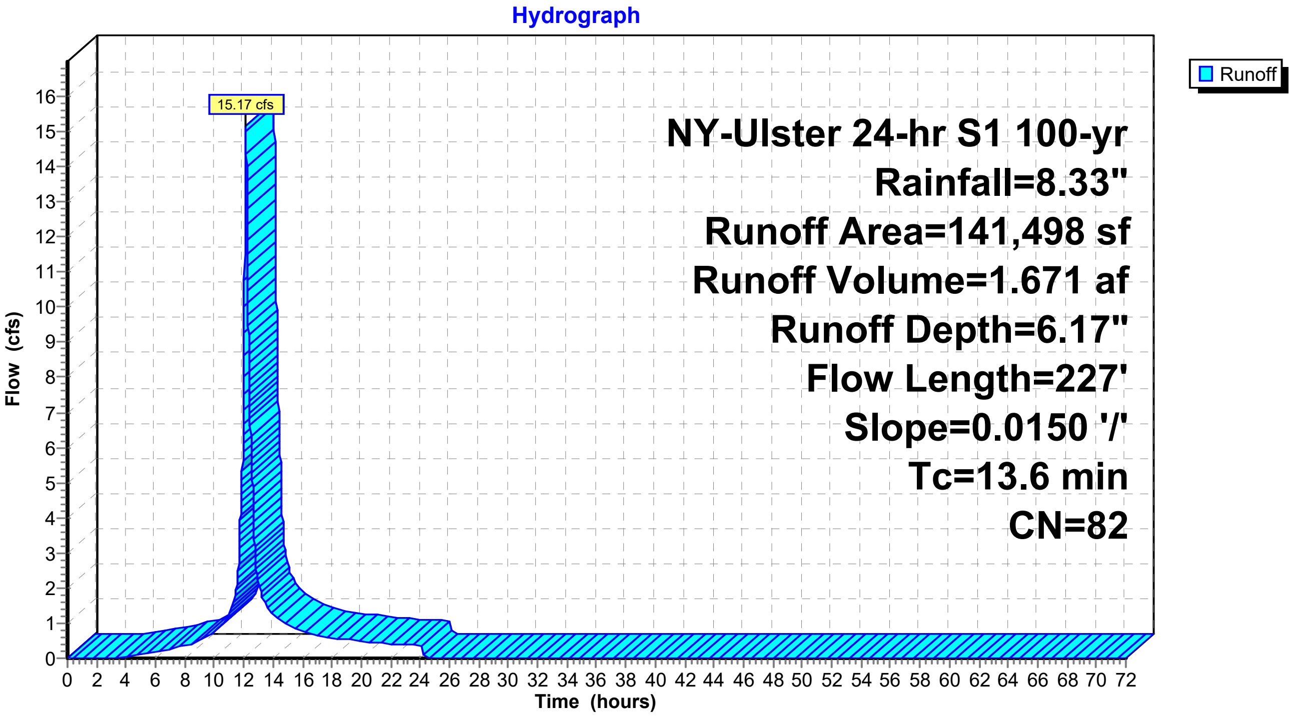
Runoff = 15.17 cfs @ 12.13 hrs, Volume= 1.671 af, Depth= 6.17"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
4,821	98	Paved parking, HSG A
32,718	98	Paved parking, HSG D
682	98	Roofs, HSG D
4,958	32	Woods/grass comb., Good, HSG A
11,275	79	Woods/grass comb., Good, HSG D
4,843	39	>75% Grass cover, Good, HSG A
82,201	80	>75% Grass cover, Good, HSG D
141,498	82	Weighted Average
103,277		72.99% Pervious Area
38,221		27.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	100	0.0150	0.15		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
2.5	127	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.6	227	Total			

Subcatchment PS-2A: Northern Entrance



Summary for Subcatchment PS-2B: Northern Lawn & Helipad

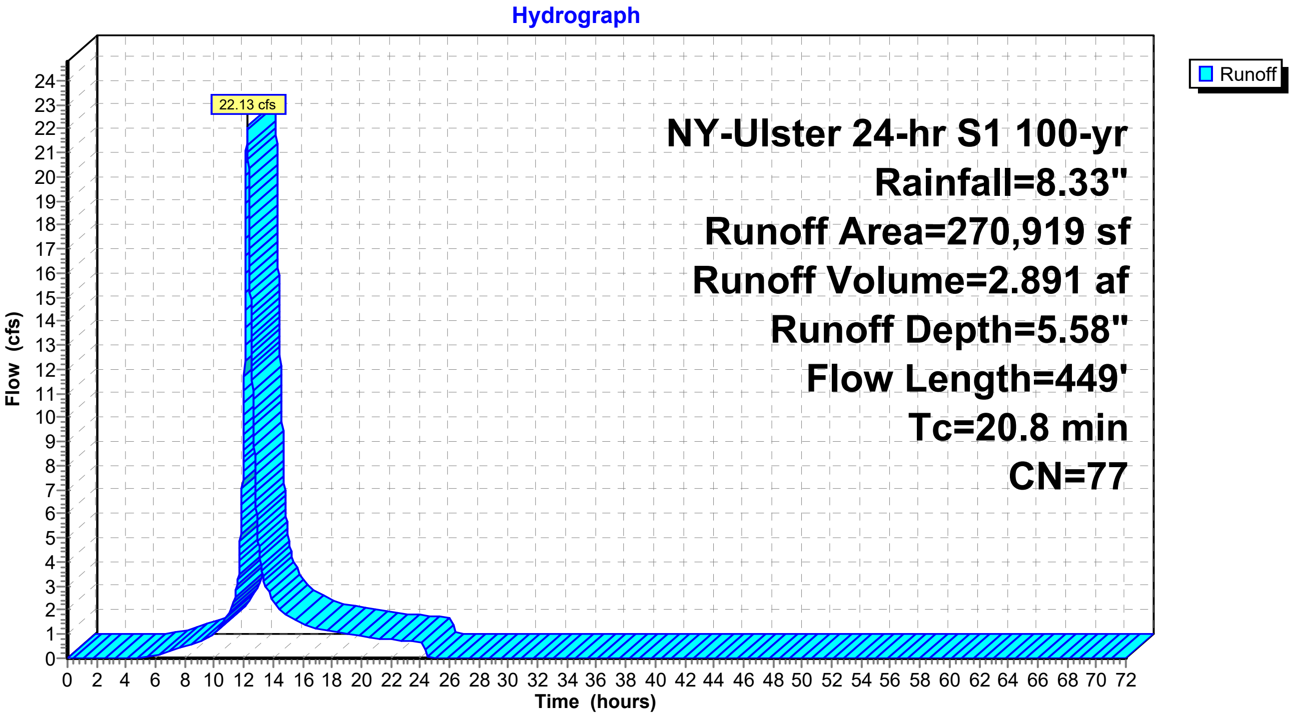
Runoff = 22.13 cfs @ 12.23 hrs, Volume= 2.891 af, Depth= 5.58"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
35,226	98	Paved parking, HSG A
39,420	98	Paved parking, HSG D
374	98	Roofs, HSG D
50,804	39	>75% Grass cover, Good, HSG A
145,095	80	>75% Grass cover, Good, HSG D
270,919	77	Weighted Average
195,899		72.31% Pervious Area
75,020		27.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	100	0.0080	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
0.1	14	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.4	102	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.1	233	0.0180	0.94		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.8	449	Total			

Subcatchment PS-2B: Northern Lawn & Helipad



Summary for Subcatchment PS-2C: Northern Parking & Warehouses

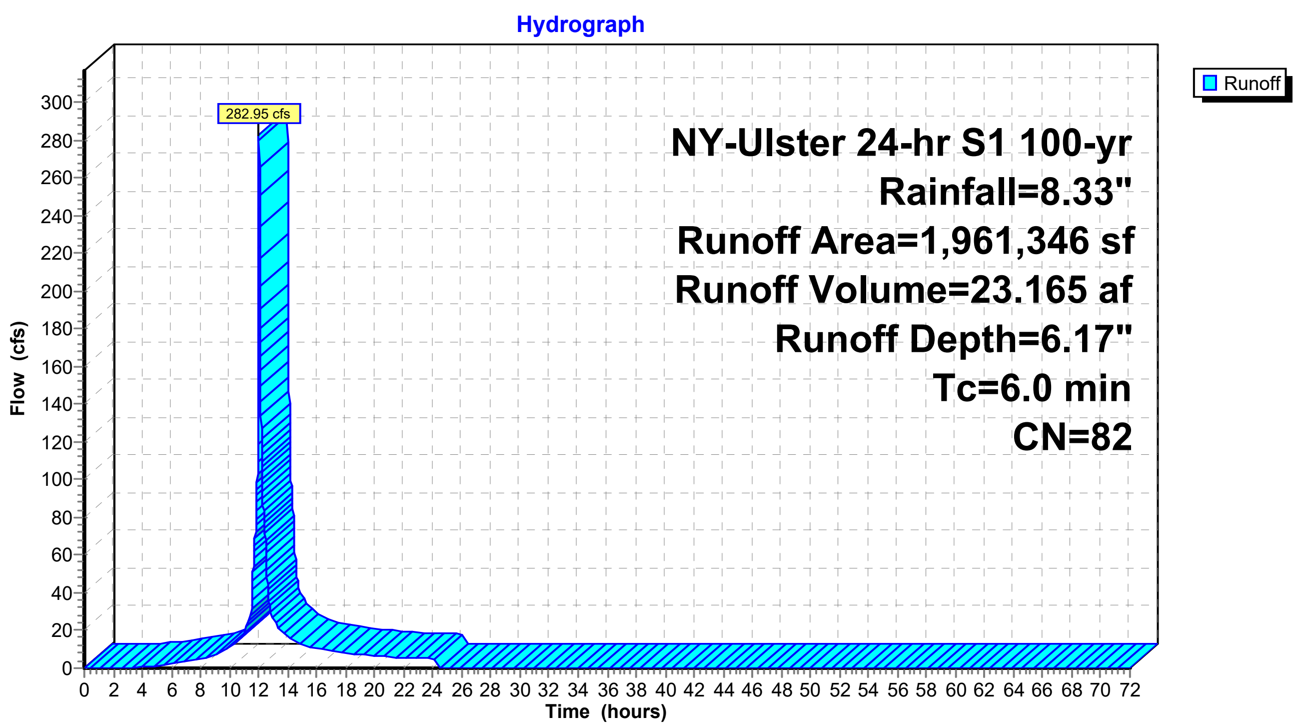
Runoff = 282.95 cfs @ 12.04 hrs, Volume= 23.165 af, Depth= 6.17"
Routed to Reach AP-2 : Discharge to Northern Parcel

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
872,867	98	Paved parking, HSG A
87,604	98	Paved parking, HSG D
459,315	98	Roofs, HSG A
22,924	32	Woods/grass comb., Good, HSG A
1,554	79	Woods/grass comb., Good, HSG D
477,620	39	>75% Grass cover, Good, HSG A
29,747	80	>75% Grass cover, Good, HSG D
9,715	30	Brush, Good, HSG A
1,961,346	82	Weighted Average
541,560		27.61% Pervious Area
1,419,786		72.39% Impervious Area

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

Subcatchment PS-2C: Northern Parking & Warehouses



Summary for Subcatchment PS-3A: Soccer fields & Boices Ln Entrance

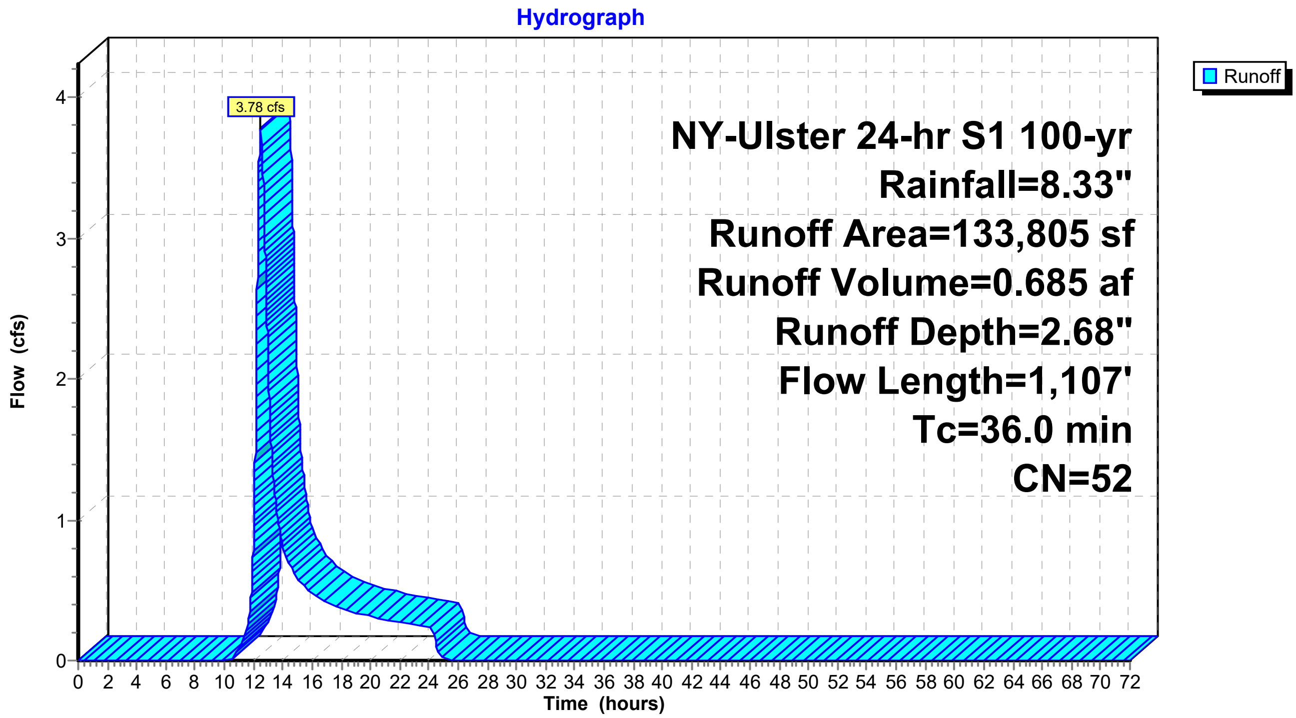
Runoff = 3.78 cfs @ 12.49 hrs, Volume= 0.685 af, Depth= 2.68"
Routed to Reach AP-3 : Existing Catch basin onsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
30,306	98	Paved parking, HSG A
103,499	39	>75% Grass cover, Good, HSG A
133,805	52	Weighted Average
103,499		77.35% Pervious Area
30,306		22.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.3	100	0.0026	0.07		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
10.7	376	0.0070	0.59		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.0	631	0.0050	3.47	2.73	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PE, smooth interior
36.0	1,107	Total			

Subcatchment PS-3A: Soccer fields & Boices Ln Entrance



Summary for Subcatchment PS-3B: Wood/Lawn

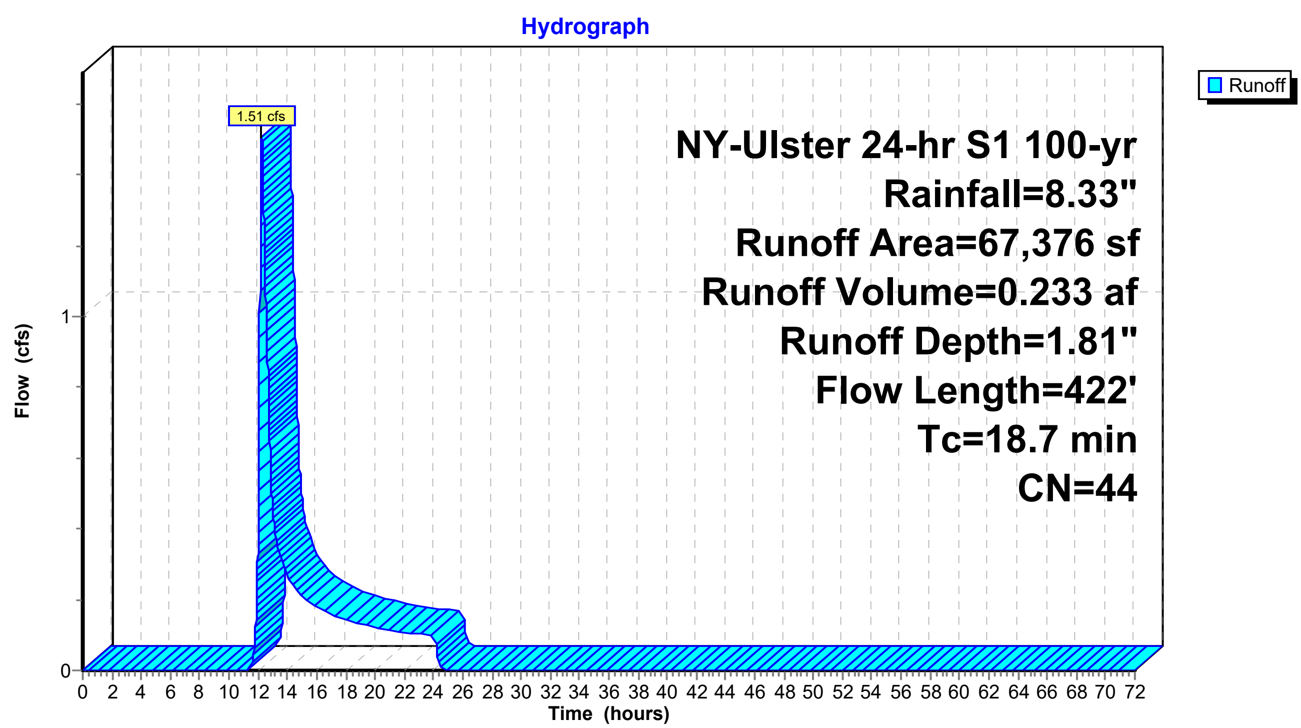
Runoff = 1.51 cfs @ 12.24 hrs, Volume= 0.233 af, Depth= 1.81"
Routed to Reach AP-3 : Existing Catch basin onsite

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
5,931	32	Woods/grass comb., Good, HSG A
55,072	39	>75% Grass cover, Good, HSG A
6,373	98	Paved parking, HSG A
67,376	44	Weighted Average
61,003		90.54% Pervious Area
6,373		9.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.0190	0.17		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.16"
8.6	322	0.0080	0.63		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
18.7	422	Total			

Subcatchment PS-3B: Wood/Lawn



Summary for Subcatchment PS-4: East Campus Main Entrance

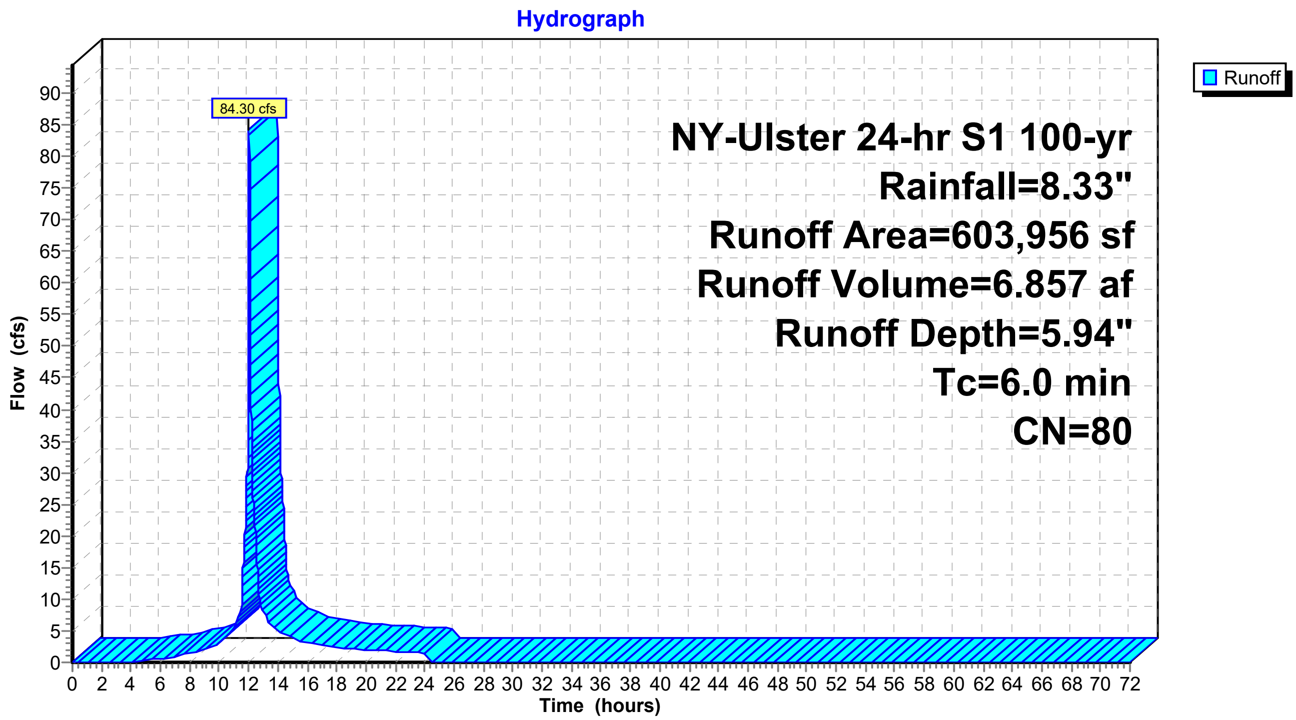
Runoff = 84.30 cfs @ 12.04 hrs, Volume= 6.857 af, Depth= 5.94"
Routed to Reach AP-4 : Northern storm pipe to West Campus

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NY-Ulster 24-hr S1 100-yr Rainfall=8.33"

Area (sf)	CN	Description
214,844	98	Paved parking, HSG A
14,814	98	Paved parking, HSG D
181,172	98	Roofs, HSG A
187,091	39	>75% Grass cover, Good, HSG A
6,035	80	>75% Grass cover, Good, HSG D
603,956	80	Weighted Average
193,126		31.98% Pervious Area
410,830		68.02% Impervious Area

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

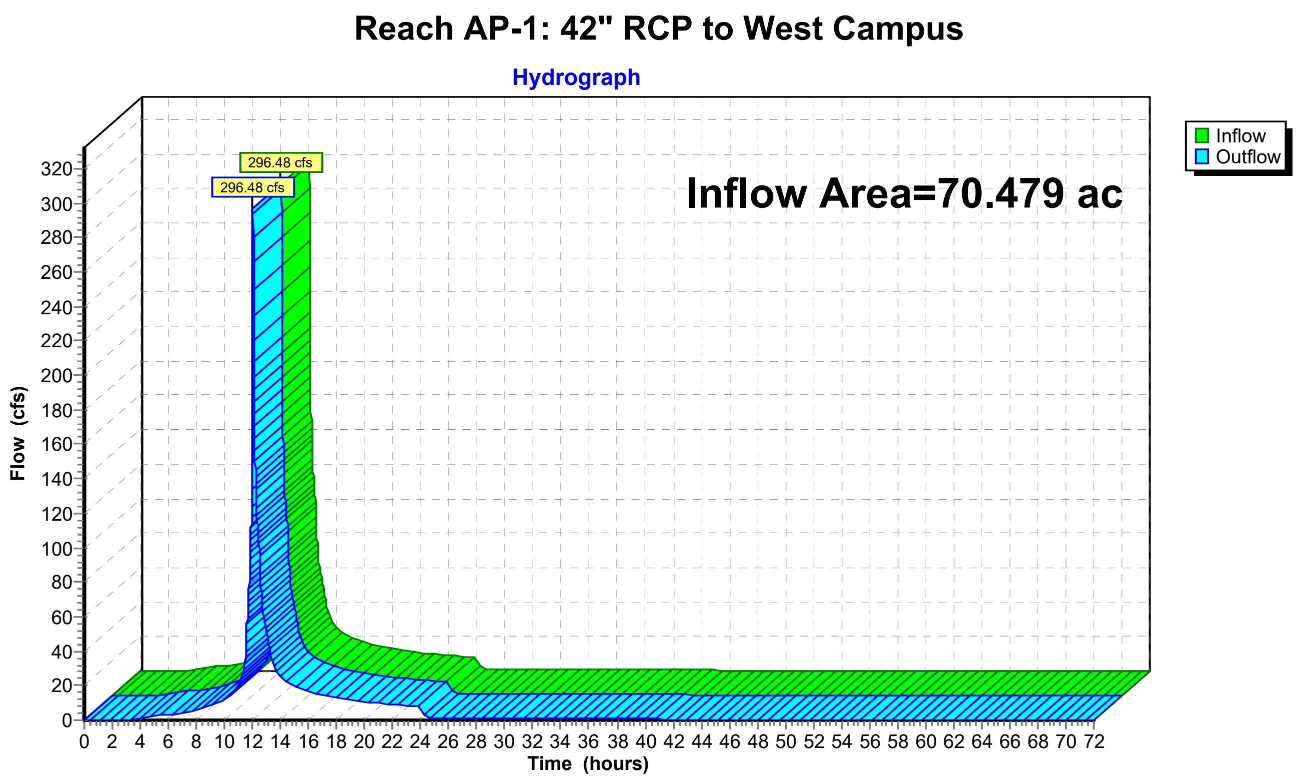
Subcatchment PS-4: East Campus Main Entrance



Summary for Reach AP-1: 42" RCP to West Campus

Inflow Area = 70.479 ac, 65.26% Impervious, Inflow Depth = 5.65" for 100-yr event
Inflow = 296.48 cfs @ 12.04 hrs, Volume= 33.196 af
Outflow = 296.48 cfs @ 12.04 hrs, Volume= 33.196 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1R

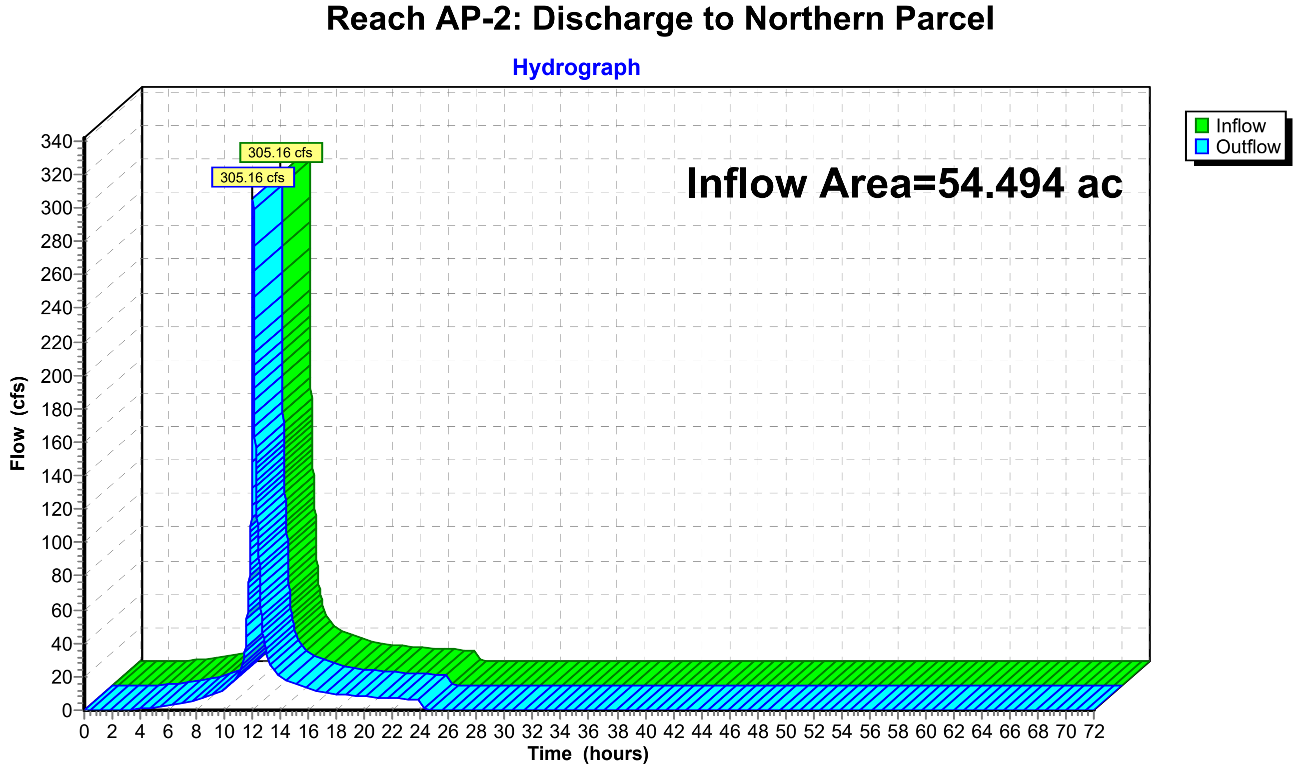
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs



Summary for Reach AP-2: Discharge to Northern Parcel

Inflow Area = 54.494 ac, 64.58% Impervious, Inflow Depth = 6.11" for 100-yr event
Inflow = 305.16 cfs @ 12.04 hrs, Volume= 27.727 af
Outflow = 305.16 cfs @ 12.04 hrs, Volume= 27.727 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1R

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

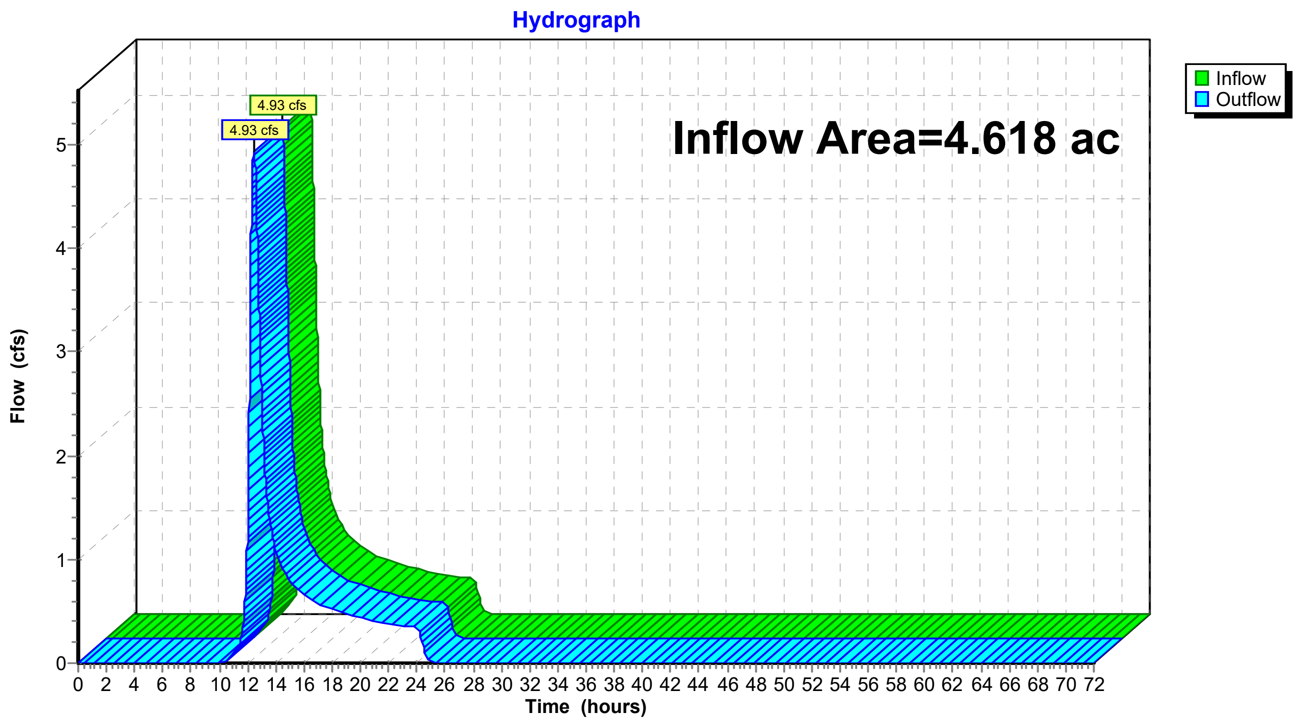


Summary for Reach AP-3: Existing Catch basin onsite

Inflow Area = 4.618 ac, 18.23% Impervious, Inflow Depth = 2.38" for 100-yr event
Inflow = 4.93 cfs @ 12.44 hrs, Volume= 0.918 af
Outflow = 4.93 cfs @ 12.44 hrs, Volume= 0.918 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1R

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-3: Existing Catch basin onsite

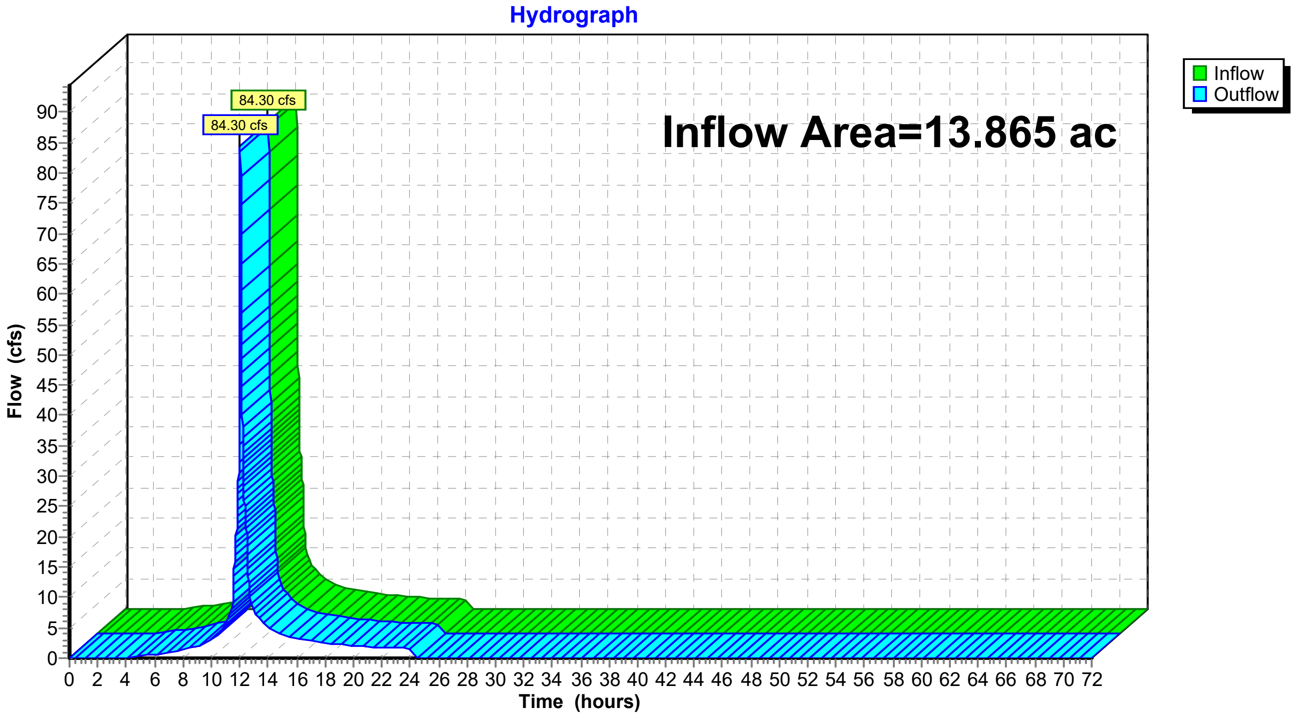


Summary for Reach AP-4: Northern storm pipe to West Campus

Inflow Area = 13.865 ac, 68.02% Impervious, Inflow Depth = 5.94" for 100-yr event
Inflow = 84.30 cfs @ 12.04 hrs, Volume= 6.857 af
Outflow = 84.30 cfs @ 12.04 hrs, Volume= 6.857 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1R

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach AP-4: Northern storm pipe to West Campus

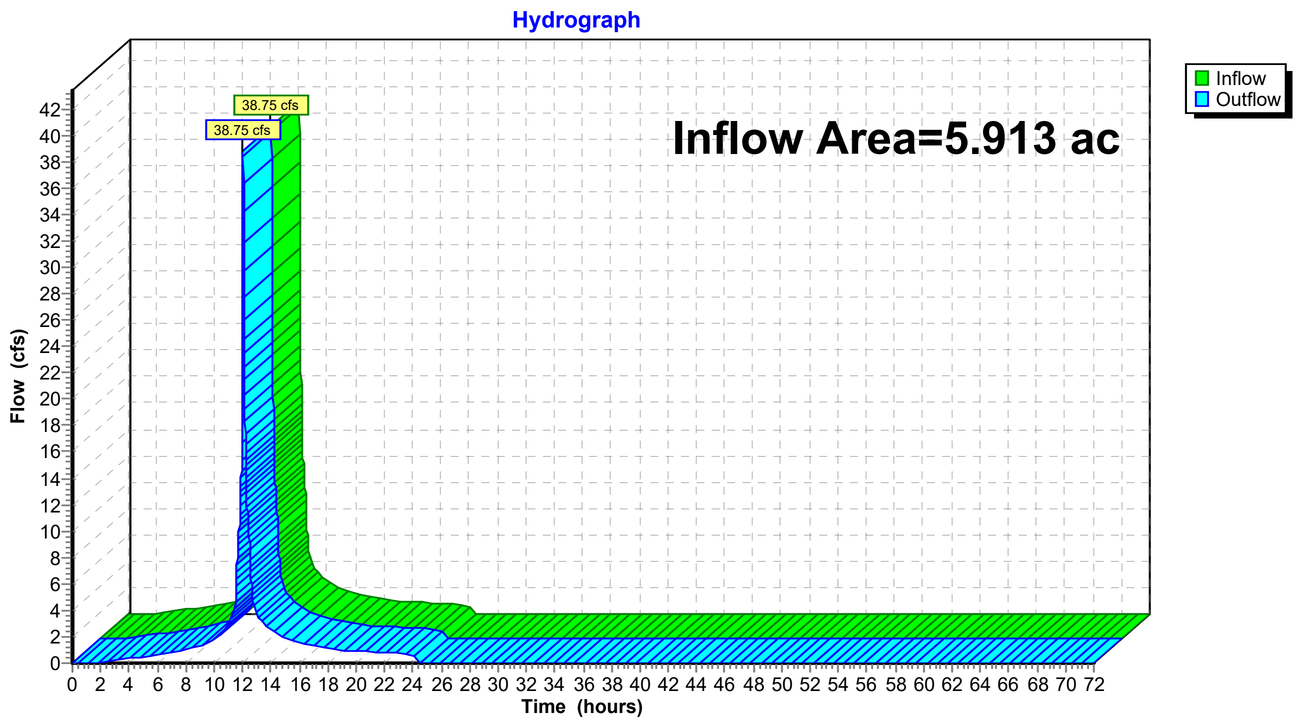


Summary for Reach HYD-1: Hyrdrodynamic 1

Inflow Area = 5.913 ac, 85.66% Impervious, Inflow Depth = 7.07" for 100-yr event
Inflow = 38.75 cfs @ 12.04 hrs, Volume= 3.485 af
Outflow = 38.75 cfs @ 12.04 hrs, Volume= 3.485 af, Atten= 0%, Lag= 0.0 min
Routed to Reach AP-1 : 42" RCP to West Campus

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Reach HYD-1: Hyrdrodynamic 1

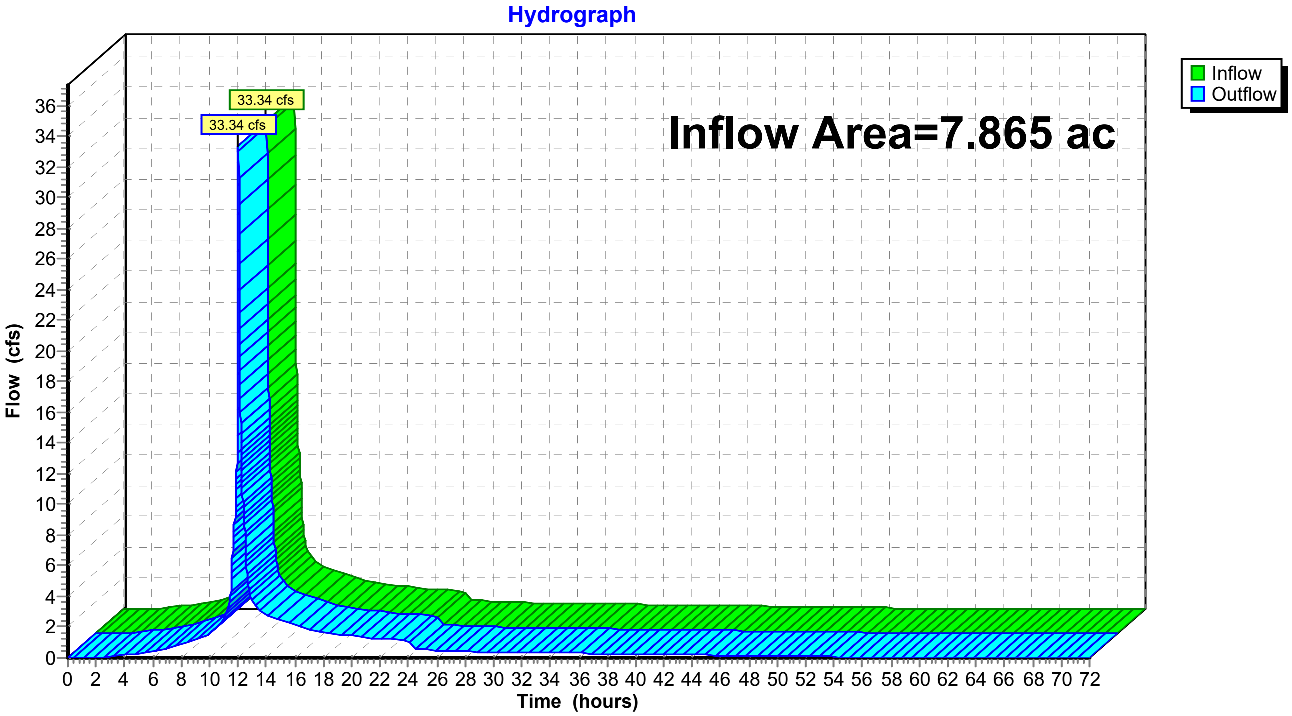


Summary for Reach HYD-2: Hyrdrodynamic 2

Inflow Area = 7.865 ac, 78.00% Impervious, Inflow Depth > 6.56" for 100-yr event
Inflow = 33.34 cfs @ 12.04 hrs, Volume= 4.301 af
Outflow = 33.34 cfs @ 12.04 hrs, Volume= 4.301 af, Atten= 0%, Lag= 0.0 min
Routed to Reach AP-1 : 42" RCP to West Campus

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

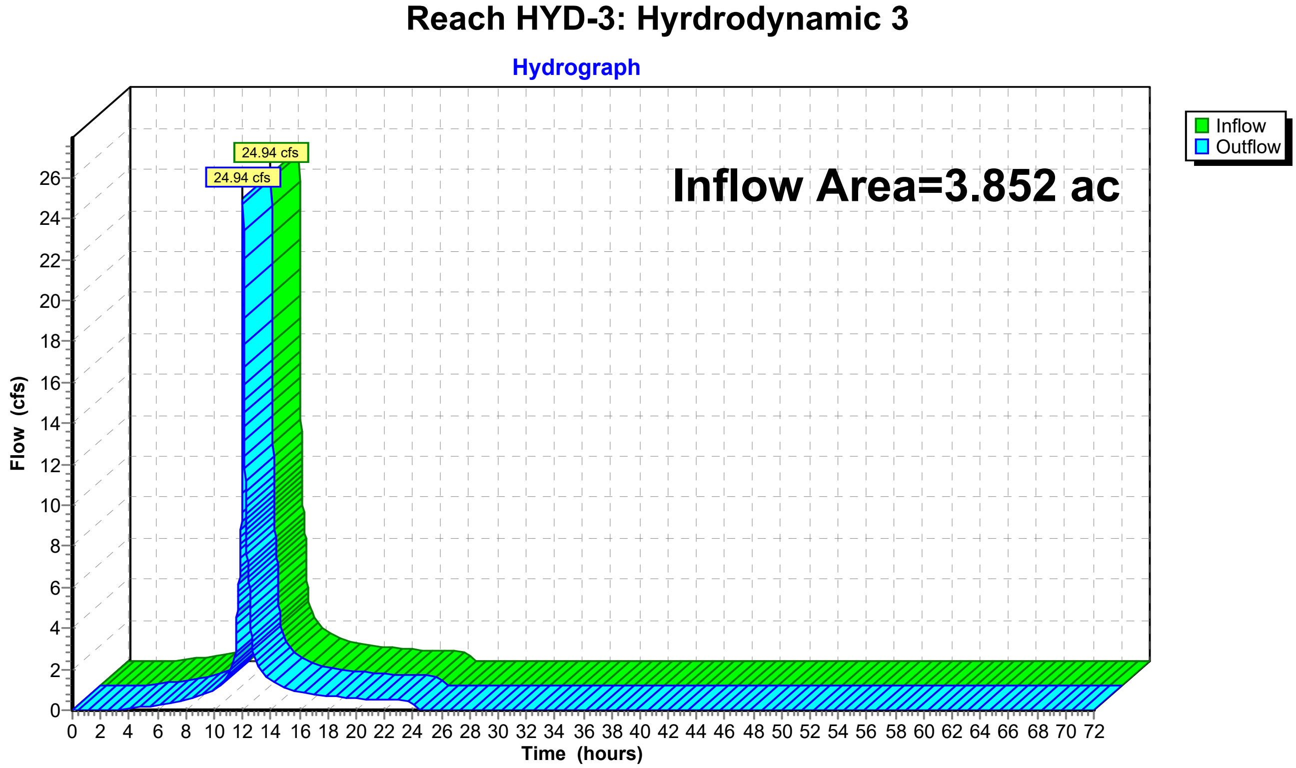
Reach HYD-2: Hyrdrodynamic 2



Summary for Reach HYD-3: Hyrdrodynamic 3

Inflow Area = 3.852 ac, 75.50% Impervious, Inflow Depth = 6.41" for 100-yr event
Inflow = 24.94 cfs @ 12.04 hrs, Volume= 2.058 af
Outflow = 24.94 cfs @ 12.04 hrs, Volume= 2.058 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 7P : (new Pond)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs



Summary for Pond 7P: (new Pond)

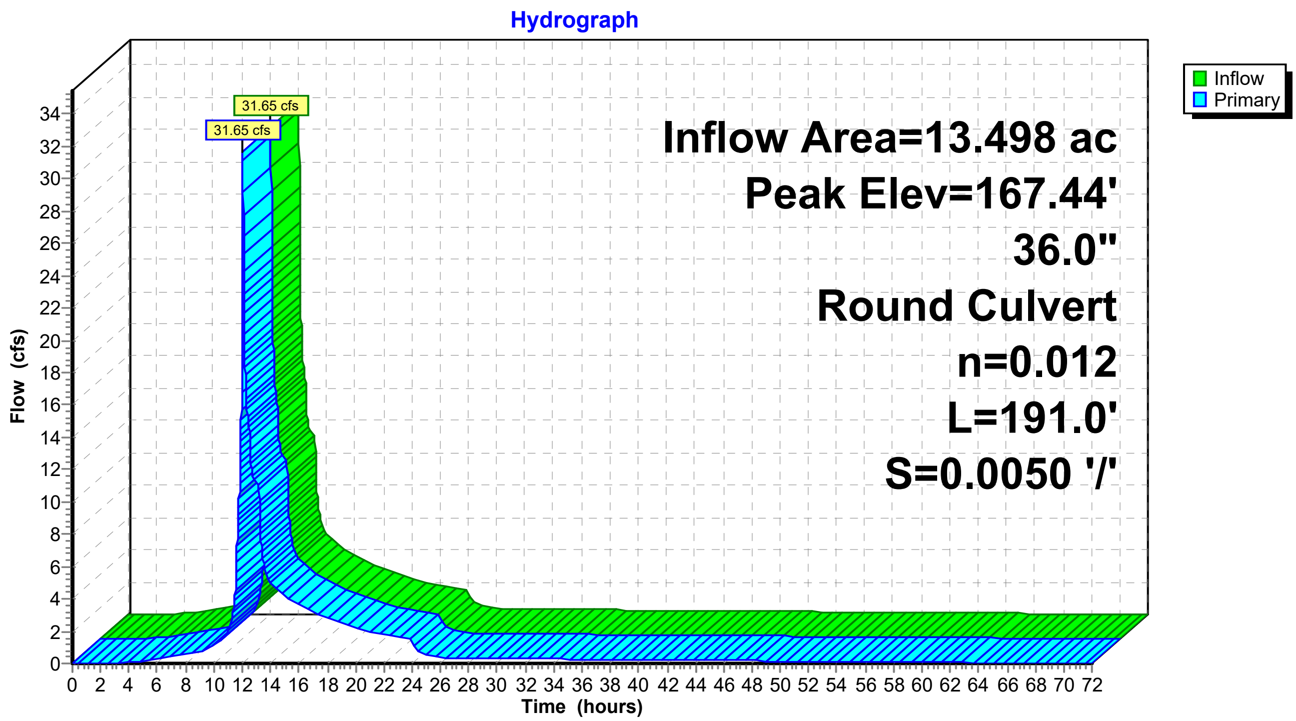
Inflow Area = 13.498 ac, 58.48% Impervious, Inflow Depth > 5.14" for 100-yr event
Inflow = 31.65 cfs @ 12.04 hrs, Volume= 5.787 af
Outflow = 31.65 cfs @ 12.04 hrs, Volume= 5.787 af, Atten= 0%, Lag= 0.0 min
Primary = 31.65 cfs @ 12.04 hrs, Volume= 5.787 af
Routed to Reach AP-1 : 42" RCP to West Campus

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 167.44' @ 12.04 hrs
Flood Elev= 176.88'

Device	Routing	Invert	Outlet Devices
#1	Primary	164.57'	**36.0" Round Culvert** L= 191.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 164.57' / 163.61' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=31.61 cfs @ 12.04 hrs HW=167.43' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 31.61 cfs @ 4.55 fps)

Pond 7P: (new Pond)



Summary for Pond BIO-1: Bioretention 1

Inflow Area = 3.080 ac, 59.26% Impervious, Inflow Depth = 5.22" for 100-yr event
Inflow = 16.66 cfs @ 12.04 hrs, Volume= 1.340 af
Outflow = 5.61 cfs @ 12.29 hrs, Volume= 1.340 af, Atten= 66%, Lag= 15.1 min
Primary = 5.61 cfs @ 12.29 hrs, Volume= 1.340 af
Routed to Reach AP-1 : 42" RCP to West Campus

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 176.84' @ 12.29 hrs Surf.Area= 20,204 sf Storage= 12,467 cf
Flood Elev= 177.00' Surf.Area= 29,686 sf Storage= 16,567 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 136.4 min (970.6 - 834.2)

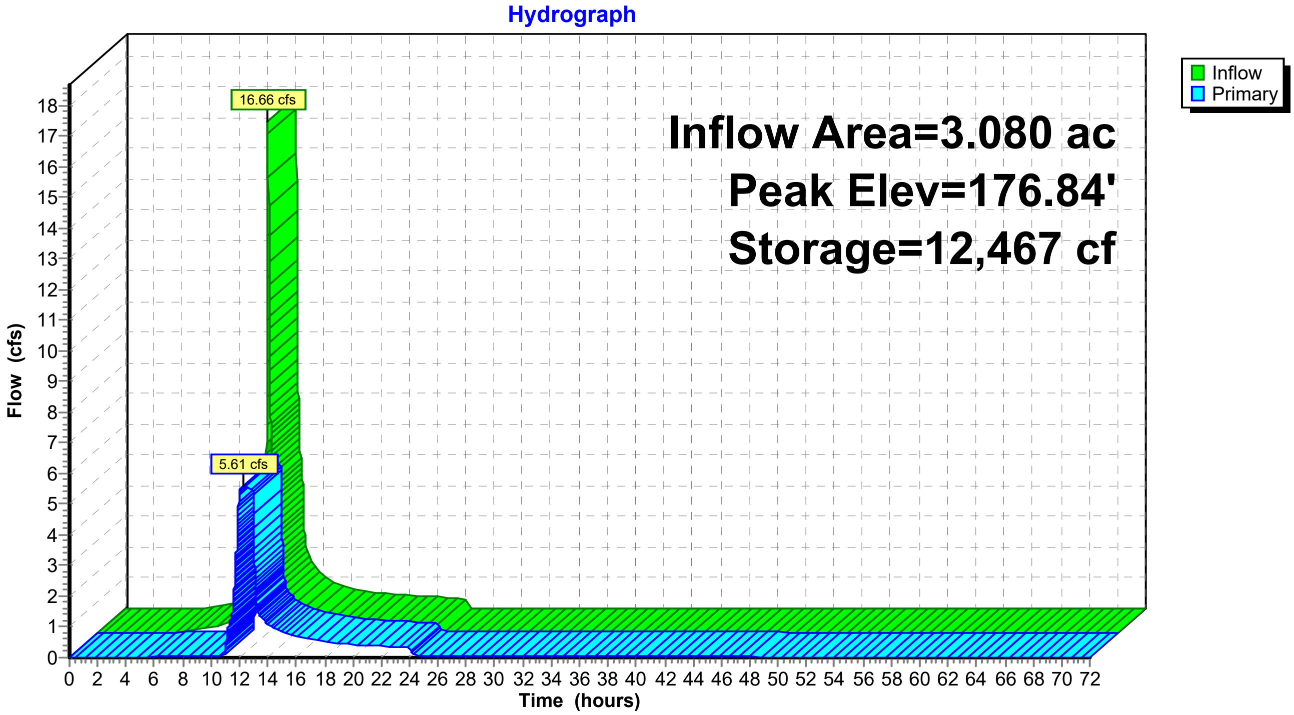
Volume	Invert	Avail.Storage	Storage Description
#1	175.70'	16,567 cf	**Filter (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
175.70	8,149	0	0
176.20	10,251	4,600	4,600
176.70	12,378	5,657	10,257
177.00	29,686	6,310	16,567

Device	Routing	Invert	Outlet Devices
#1	Device 8	175.70'	**0.250 in/hr Exfiltration over Surface area**
#2	Device 8	176.20'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#3	Device 8	176.20'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#4	Device 8	176.20'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#5	Device 8	176.70'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#6	Device 8	176.70'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#7	Device 8	176.70'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#8	Primary	170.60'	**12.0" Round Culvert** L= 209.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 170.60' / 169.90' S= 0.0033 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=5.61 cfs @ 12.29 hrs HW=176.84' TW=0.00' (Dynamic Tailwater)
└─**8=Culvert** (Barrel Controls 5.61 cfs @ 7.14 fps)
  ├─**1=Exfiltration** (Passes < 0.12 cfs potential flow)
  ├─**2=Orifice/Grate** (Passes < 7.60 cfs potential flow)
  ├─**3=Orifice/Grate** (Passes < 7.60 cfs potential flow)
  ├─**4=Orifice/Grate** (Passes < 7.60 cfs potential flow)
  ├─**5=Orifice/Grate** (Passes < 1.40 cfs potential flow)
  ├─**6=Orifice/Grate** (Passes < 1.40 cfs potential flow)
  └─**7=Orifice/Grate** (Passes < 1.40 cfs potential flow)

Pond BIO-1: Bioretention 1



Summary for Pond BIO-2: Bioretention 2

Inflow Area = 4.622 ac, 51.49% Impervious, Inflow Depth = 4.63" for 100-yr event
Inflow = 22.20 cfs @ 12.04 hrs, Volume= 1.784 af
Outflow = 6.68 cfs @ 12.37 hrs, Volume= 1.784 af, Atten= 70%, Lag= 19.8 min
Primary = 6.68 cfs @ 12.37 hrs, Volume= 1.784 af
Routed to Pond 7P : (new Pond)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 174.80' @ 12.37 hrs Surf.Area= 17,784 sf Storage= 18,332 cf
Flood Elev= 177.00' Surf.Area= 31,079 sf Storage= 66,076 cf

Plug-Flow detention time= 128.3 min calculated for 1.784 af (100% of inflow)
Center-of-Mass det. time= 128.4 min (976.5 - 848.1)

Volume	Invert	Avail.Storage	Storage Description
#1	174.00'	3,374 cf	**Forebay (Prismatic)**Listed below (Recalc)
#2	173.50'	62,702 cf	**Filter (Prismatic)**Listed below (Recalc)
		66,076 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
174.00	2,923	0	0
175.00	3,825	3,374	3,374

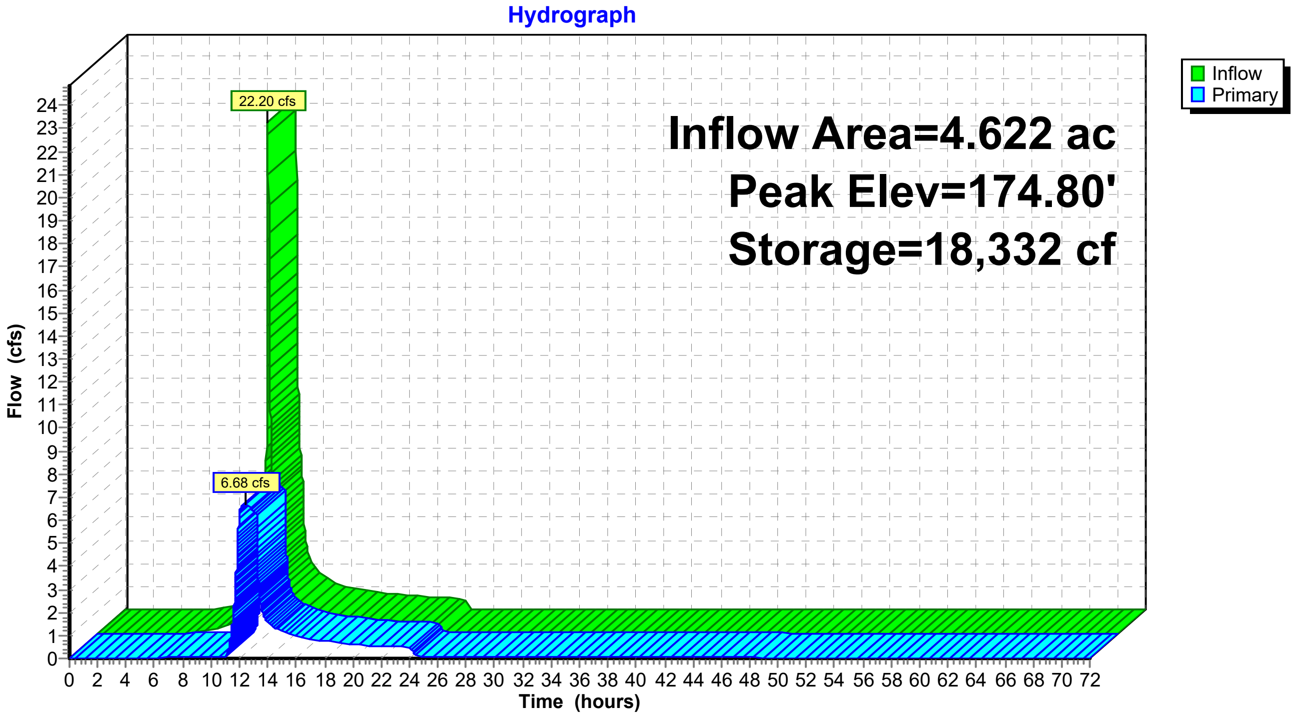
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
173.50	10,039	0	0
174.00	11,592	5,408	5,408
175.00	14,774	13,183	18,591
176.00	23,097	18,936	37,526
177.00	27,254	25,176	62,702

Device	Routing	Invert	Outlet Devices
#1	Device 7	173.50'	**0.250 in/hr Exfiltration over Surface area**
#2	Device 7	174.00'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#3	Device 7	174.00'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#4	Device 7	174.50'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#5	Device 7	174.50'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads
#6	Device 7	174.50'	**1.2" x 7.2" Horiz. Orifice/Grate X 11.00 columns** X 3 rows C= 0.600 in 25.7" x 25.7" Grate (43% open area) Limited to weir flow at low heads

#7	Primary	169.30'	**12.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 169.30' / 169.10' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=6.68 cfs @ 12.37 hrs HW=174.80' TW=166.33' (Dynamic Tailwater)
└─**7=Culvert** (Inlet Controls 6.68 cfs @ 8.50 fps)
  ├─**1=Exfiltration** (Passes < 0.10 cfs potential flow)
  ├─**2=Orifice/Grate** (Passes < 8.53 cfs potential flow)
  ├─**3=Orifice/Grate** (Passes < 8.53 cfs potential flow)
  ├─**4=Orifice/Grate** (Passes < 4.61 cfs potential flow)
  ├─**5=Orifice/Grate** (Passes < 4.61 cfs potential flow)
  └─**6=Orifice/Grate** (Passes < 4.61 cfs potential flow)

Pond BIO-2: Bioretention 2



Summary for Pond DET-1: Dry detention pond

Inflow Area = 5.025 ac, 51.87% Impervious, Inflow Depth = 4.75" for 100-yr event
Inflow = 24.76 cfs @ 12.04 hrs, Volume= 1.989 af
Outflow = 2.49 cfs @ 13.04 hrs, Volume= 1.944 af, Atten= 90%, Lag= 60.2 min
Primary = 2.49 cfs @ 13.04 hrs, Volume= 1.944 af
Routed to Pond 7P : (new Pond)
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 7P : (new Pond)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 179.02' @ 13.04 hrs Surf.Area= 25,162 sf Storage= 42,500 cf
Flood Elev= 180.00' Surf.Area= 29,356 sf Storage= 69,185 cf

Plug-Flow detention time= 578.9 min calculated for 1.944 af (98% of inflow)
Center-of-Mass det. time= 566.3 min (1,411.6 - 845.3)

Volume	Invert	Avail.Storage	Storage Description
#1	177.00'	69,185 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

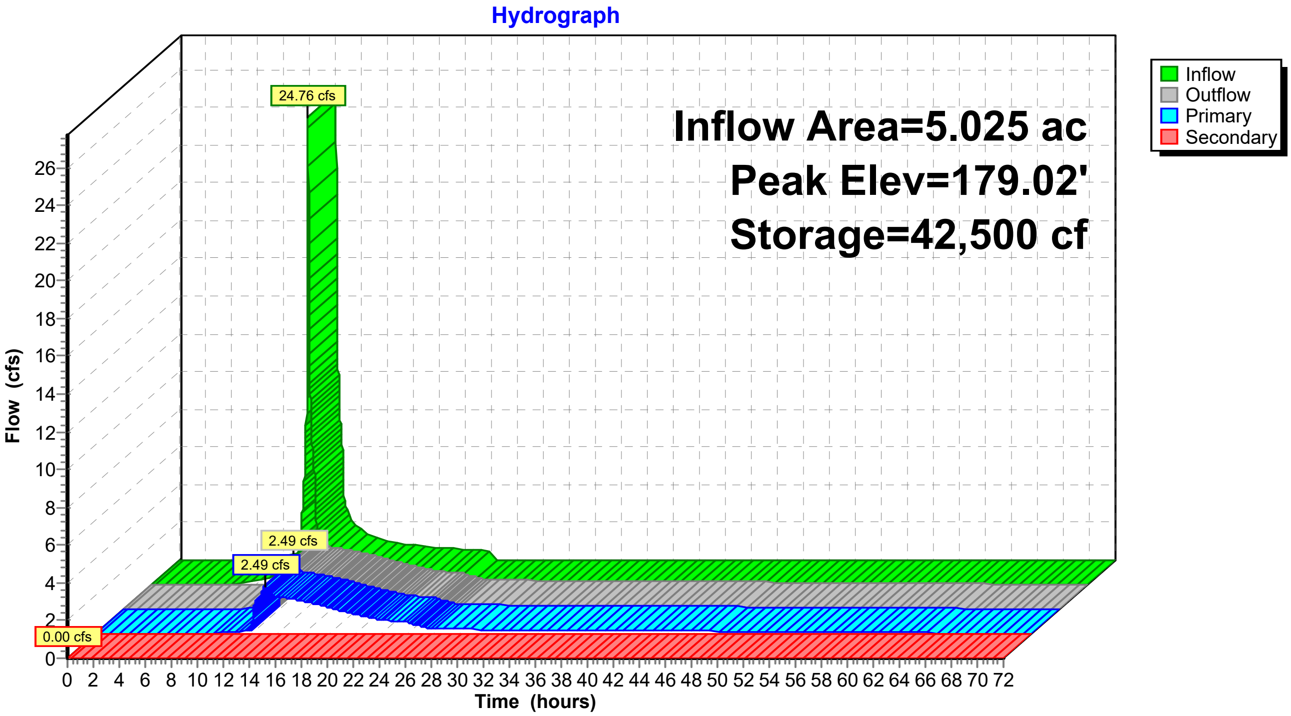
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
177.00	16,977	0	0
178.00	20,946	18,962	18,962
179.00	25,072	23,009	41,971
180.00	29,356	27,214	69,185

Device	Routing	Invert	Outlet Devices
#1	Primary	177.00'	**12.0" Round Culvert** L= 72.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 177.00' / 176.12' S= 0.0122 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	177.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	178.19'	**20.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	179.00'	**48.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)
#5	Secondary	179.50'	**10.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.49 cfs @ 13.04 hrs HW=179.02' TW=166.03' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.49 cfs of 3.68 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.33 cfs @ 6.63 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 1.68 cfs @ 4.04 fps)
  └─**4=Sharp-Crested Rectangular Weir** (Weir Controls 0.48 cfs @ 0.47 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=177.00' TW=164.57' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DET-1: Dry detention pond



Summary for Pond DET-2: Underground detention

Inflow Area = 0.694 ac, 61.27% Impervious, Inflow Depth = 5.34" for 100-yr event
Inflow = 3.84 cfs @ 12.04 hrs, Volume= 0.309 af
Outflow = 0.36 cfs @ 13.07 hrs, Volume= 0.309 af, Atten= 91%, Lag= 61.7 min
Primary = 0.36 cfs @ 13.07 hrs, Volume= 0.309 af
Routed to Reach HYD-2 : Hyrdrodynamic 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 174.41' @ 13.07 hrs Surf.Area= 2,344 sf Storage= 5,666 cf
Flood Elev= 174.92' Surf.Area= 2,344 sf Storage= 6,819 cf

Plug-Flow detention time= 200.3 min calculated for 0.308 af (100% of inflow)
Center-of-Mass det. time= 200.0 min (1,031.4 - 831.4)

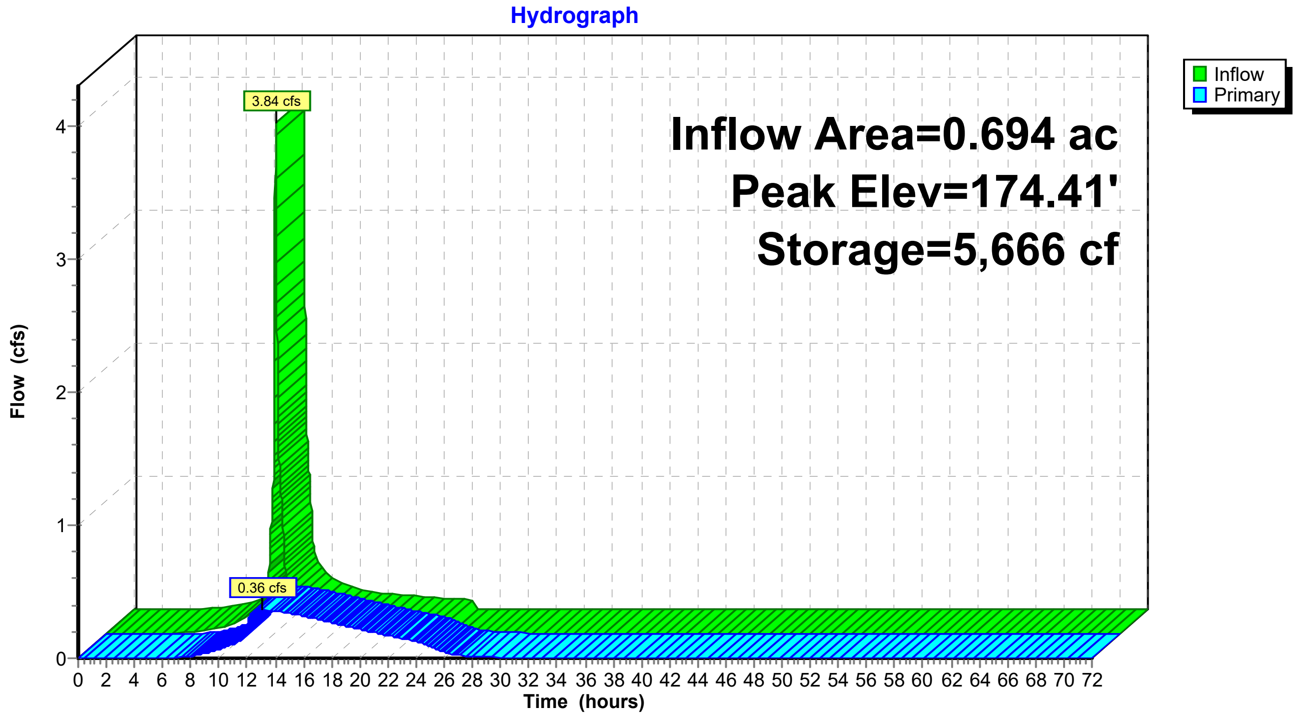
Volume	Invert	Avail.Storage	Storage Description
#1A	171.92'	0 cf	**29.65'W x 79.07'L x 3.00'H Field A** 7,030 cf Overall - 7,030 cf Embedded = 0 cf x 40.0% Voids
#2A	171.92'	6,819 cf	**ACO StormBrixx SD 1** x 300 Inside #1 Inside= 23.7"W x 36.0"H => 5.75 sf x 3.95'L = 22.7 cf Outside= 23.7"W x 36.0"H => 5.93 sf x 3.95'L = 23.4 cf 300 Chambers in 15 Rows
		6,819 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	171.92'	**12.0" Round Culvert** L= 74.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 171.92' / 171.55' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	171.92'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	174.42'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.36 cfs @ 13.07 hrs HW=174.41' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.36 cfs of 4.21 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.36 cfs @ 7.41 fps)
  └─**3=Orifice/Grate** (Controls 0.00 cfs)

Pond DET-2: Underground detention



Summary for Pond DET-3: Underground detention

Inflow Area = 2.312 ac, 77.37% Impervious, Inflow Depth = 6.53" for 100-yr event
Inflow = 15.19 cfs @ 12.04 hrs, Volume= 1.259 af
Outflow = 0.69 cfs @ 14.85 hrs, Volume= 1.251 af, Atten= 95%, Lag= 169.1 min
Primary = 0.69 cfs @ 14.85 hrs, Volume= 1.251 af
Routed to Reach HYD-2 : Hyrdrodynamic 2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 174.25' @ 14.85 hrs Surf.Area= 7,971 sf Storage= 33,109 cf
Flood Elev= 174.47' Surf.Area= 7,971 sf Storage= 34,778 cf

Plug-Flow detention time= 823.0 min calculated for 1.251 af (99% of inflow)
Center-of-Mass det. time= 818.9 min (1,619.6 - 800.6)

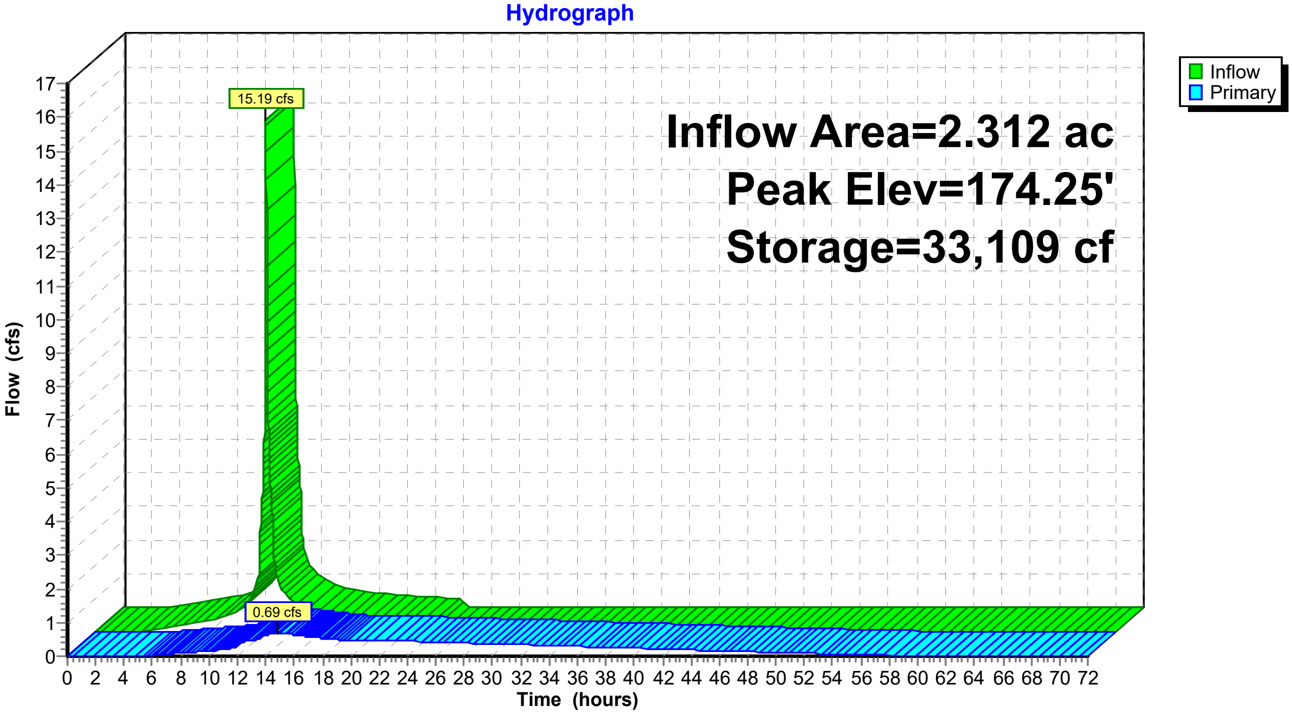
Volume	Invert	Avail.Storage	Storage Description
#1A	169.97'	0 cf	**59.30'W x 134.42'L x 4.50'H Field A** 35,854 cf Overall - 35,854 cf Embedded = 0 cf x 40.0% Voids
#2A	169.97'	34,778 cf	**ACO StormBrixx SD 1.5** x 1020 Inside #1 Inside= 23.7"W x 54.0"H => 8.62 sf x 3.95'L = 34.1 cf Outside= 23.7"W x 54.0"H => 8.89 sf x 3.95'L = 35.2 cf 1020 Chambers in 30 Rows
		34,778 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	169.97'	**18.0" Round Culvert** L= 128.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 169.97' / 169.33' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	169.97'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	173.97'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.69 cfs @ 14.85 hrs HW=174.25' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.69 cfs of 12.62 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.48 cfs @ 9.82 fps)
  └─**3=Orifice/Grate** (Orifice Controls 0.21 cfs @ 1.81 fps)

Pond DET-3: Underground detention



Summary for Pond DET-4: Underground detention

Inflow Area = 0.333 ac,100.00% Impervious, Inflow Depth = 8.09" for 100-yr event
Inflow = 2.44 cfs @ 12.04 hrs, Volume= 0.225 af
Outflow = 0.48 cfs @ 12.55 hrs, Volume= 0.225 af, Atten= 80%, Lag= 31.1 min
Primary = 0.48 cfs @ 12.55 hrs, Volume= 0.225 af
Routed to Reach HYD-1 : Hyrdrodynamic 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 173.16' @ 12.55 hrs Surf.Area= 1,125 sf Storage= 2,939 cf
Flood Elev= 173.47' Surf.Area= 1,125 sf Storage= 3,273 cf

Plug-Flow detention time= 85.2 min calculated for 0.225 af (100% of inflow)
Center-of-Mass det. time= 85.0 min (826.0 - 741.0)

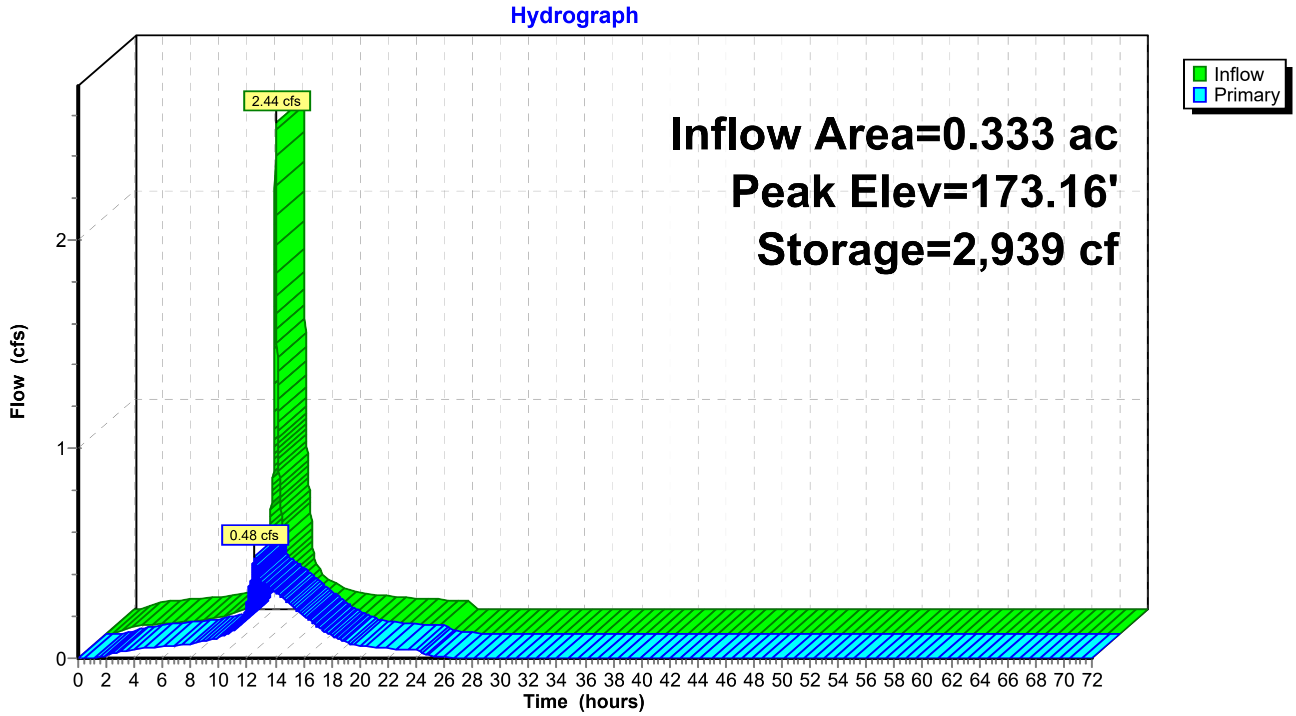
Volume	Invert	Avail.Storage	Storage Description
#1A	170.47'	0 cf	**23.72'W x 47.44'L x 3.00'H Field A** 3,374 cf Overall - 3,374 cf Embedded = 0 cf x 40.0% Voids
#2A	170.47'	3,273 cf	**ACO StormBrixx SD 1** x 144 Inside #1 Inside= 23.7"W x 36.0"H => 5.75 sf x 3.95'L = 22.7 cf Outside= 23.7"W x 36.0"H => 5.93 sf x 3.95'L = 23.4 cf 144 Chambers in 12 Rows
		3,273 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	170.47'	**12.0" Round Culvert** L= 71.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 170.47' / 170.12' S= 0.0049 '/' Cc= 0.900 n= 0.012 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	170.47'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	172.97'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.48 cfs @ 12.55 hrs HW=173.16' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.48 cfs of 4.42 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.38 cfs @ 7.72 fps)
  └─**3=Orifice/Grate** (Orifice Controls 0.10 cfs @ 1.49 fps)

Pond DET-4: Underground detention



APPENDIX F:
SWPPP INSPECTION REPORT
(SAMPLE FORM)

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Prepared by:
LaBella Associates
4 British American Blvd
Latham, NY 12110
(518) 273-0055

LaBella
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SWPPP INSPECTION REPORT NUMBER XX
iPark 87 LLC
iPark 87 – EAST CAMPUS
300 ENTERPRISE DRIVE, TOWN OF ULSTER, ULSTER COUNTY, NY

Performed: 9/29/2021 @ 12:00 AM
Report Issued: 9/29/2021

Status: POTENTIAL CLEAN WATER ACT VIOLATION (Contractor must begin repairs within one (1) business day. Overdue corrective actions may result in fines from the NYSDEC in the amount of $37,500/day/violation)

Qualified Inspector (name and title)	Qualified Professional (name and title)
Date	Date
Signature	Signature

NYSDEC Documentation and SWPPP Forms

NYSDEC Issued Permit Identification Number: NYRXXXXXX

5-Acre Waiver: N/A (No 5-acre waiver for this project - Contractor not authorized to disturb >5 acres)

303d Status: Project does not directly discharge to a 303d impaired waterbody

Number of Inspections required: 1 / week

Location of SWPPP and Site Log Book on-site:

YES	NO	N/A	CONTAINED IN SITE LOG BOOK?
☐	☐	☐	Preconstruction Assessment
☐	☐	☐	NOI Acknowledgement letter
☐	☐	☐	Copy of eNOI
☐	☐	☐	Owner / Operator Certification
☐	☐	☐	SWPPP Preparer Certification
☐	☐	☐	MS4 SWPPP Acceptance Form
☐	☐	☐	Contractor and Subcontractor Certifications
☐	☐	☐	SPDES General Permit
☐	☐	☐	5 Acre Waiver
☐	☐	☐	NOT

Comments:

Site Conditions

Approximate Disturbed Area at Time of Inspection: XX Acres			
Allowable Disturbed Area Per NOI and/or 5-acre waiver: XX Acres			
Current Status of Construction: Description			
Weather Conditions: Conditions	**Temperature:** XX ºF		**Soil Conditions:** Choose an item.
Description of Discharge Point/Natural Surface Waterbody	**Condition of Runoff**	**Sediment Discharge Noted Y / N**	**Corrective Action**

Erosion and Sediment Control Deficiencies and Corrective Actions

SWPPP Component	Functional Y / N / NA	Deficiency (See Checklist and/or note)	Deficiency Location	Initial Date	Corrective Action	Corrected Y / N
General Site Conditions						
Silt Fence						
Stabilized Construction Access						
Compost Filter Sock						
Inlet Protection						
Soil Stockpiles						
Temporary Stabilization						
Permanent Stabilization						
Dewatering Operations						
Stone Check Dams						
Rock Outlet Protection						
Sediment Traps and Basins						
Temporary Stream Crossing						
Pavement Sweeping						
Concrete Washout						
Filter Strips						
Slope Protection Measures						
Temporary Swales and Berms						
Temporary Parking Areas						
Fiber Roll						
Permanent Turf Reinforcement						
Water Bars						
Flow Diffusers						
Other:						

SWPPP Inspection Checklist and Deficiency Numbers

1	General Site Conditions
1A	Adjoining properties are not protected from erosion and sediment deposition
1B	Downstream waterways are not protected from erosion and sediment deposition
1C	All E&SC measures have not been constructed as detailed in the SWPPP
1D	Dust is not adequately controlled
1E	Storage areas contain spills, leaks, or harmful materials
1F	Garbage and waste building materials are not being managed properly
1G	Temporary control measures that are no longer needed have not been removed
1H	Permanent SWM practices not constructed per plans

2	Silt Fence
2A	Silt fence not installed on contour
2B	Silt fence not across conveyance channels
2C	Silt fence not at least 10 feet from toe of slope
2D	Silt fence not at appropriate spacing intervals based on slope
2E	Silt fence ends are not wrapped for continuous support
2F	Silt fence fabric is loose or contains rips or frayed areas
2G	Silt fence posts are unstable
2H	Silt fence is not buried 6 inches minimum
2I	Silt fence contains bulges or material buildup

3	Stabilized Construction Access
3A	Temporary construction access not installed or not per NYS standards
3B	Other access areas have not been stabilized immediately as work takes place
3C	Sediment has tracked onto public streets and is not being cleaned daily
3D	Stone is not clean enough to effectively remove mud from vehicles
3E	Adequate drainage not provided to prevent ponding

4	Compost Filter Sock
4A	Filter sock not installed on contour
4B	Filter sock terminal ends do not extended 8' upslope at 45˚ angle
4C	Inappropriate diameter based on slope steepness and slope length
4D	Filter sock not anchored at 10' intervals
4E	More than 50% sediment has built up

5	Inlet Protection
5A	Inlet protection not installed or installation is not per SWPPP or Blue Book specifications
5B	Incorrect type(s) of inlet control installed or is inappropriate for location
5C	Drainage area for inlet protection is greater than 1 acre
5D	Sediment has not been removed when 50% of storage volume has been achieved
5E	A 2" x 4" wood frame and wood posts has not been installed
5F	Filter fabric is not buried a minimum of 1 foot below ground or secured to frame/posts
5G	Posts are unstable, fabric is loose, and contains rips or frayed areas
5H	Post spacing exceeds maximum 3' spacing

6	Soil Stockpiles
6A	No sediment controls at downhill slope

7	Temporary Stabilization
7A	Areas inactive for 14 days or more have not been stabilized (If <5 acres disturbed)
7B	Areas inactive for 7 days or more have not been stabilized (If >5 acres disturbed or 303d)
7C	Soil preparation has not been applied as specified in the SWPPP or the Blue Book
7D	Rolled EC products specified for steep slopes or channels have not been installed

8	Permanent Stabilization
8A	Lawn in disturbed areas has not been established to 80% germination
8B	Soil preparation has not been applied as specified in the SWPPP or the Blue Book
8C	Rolled EC products specified for steep slopes or channels have not been installed

9	Dewatering Operations
9A	Upstream and downstream berms are not installed or functioning poorly
9B	Clean water from upstream pool is not being pumped to the downstream pool
9C	Sediment laden water from work area is not being discharged to a silt-trapping device
9D	Groundwater from excavations managed improperly (No sumps/sediment control)

10	Stone Check Dam
10A	Not installed per standards
10B	Channel is unstable (flow is eroding soil underneath or around the structure)
10C	Check dam in poor condition (rocks not in place or lack of geotextile fabric)
10D	Sediment needs to be removed

11	Rock Outlet Protection
11A	Rock outlet protection not installed per plan or Blue Book
11B	Rock outlet protection not installed concurrently with pipe installation

12	Sediment Traps and Basins
12A	Outlet structure constructed improperly
12B	Geotextile fabric has not been placed beneath rock fill
12C	Depth of sediment in basin has exceeded allowable threshold
12D	Basin and outlet structure not constructed per the approved plan
12E	Basin side slopes are not stabilized with seed/mulch
12F	More than 50% capacity has built up

13	Temporary Stream Crossing
13A	Construction crossings at concentrated flow areas have not been culverted

14	Pavement Sweeping
14A	Pavement has not been swept daily and sediment has traveled into road

Stormwater Management Practice Deficiencies and Corrective Actions

Practice	Sign Y / N	Current Phase of Construction	Items Not in Conformance with SWPPP	Deficiency Location	Initial Date	Corrective Action	Corrected Y / N
Practice 1:							
Practice 2:							
Practice 3:							
Practice 4:							
Practice 5:							
Practice 6:							

Photo Log

Photo 1 *Date – Item in need of repair or maintenance:*	***Photo 1A*** *Date – Corrected Action:*
Photo 2 *Date – Item in need of repair or maintenance:*	***Photo 2A*** *Date – Corrected Action:*
Photo 3 *Date – Item in need of repair or maintenance:*	***Photo 3A*** *Date – Corrected Action:*

Photo Log (continued)

Photo 4 *Date – Item in need of repair or maintenance:*	***Photo 4A*** *Date – Corrected Action:*
Photo 5 *Date – Item in need of repair or maintenance:*	***Photo 5A*** *Date – Corrected Action:*
Photo 6 *Date – Item in need of repair or maintenance:*	***Photo 6A*** *Date – Corrected Action:*

Disturbance / Photo Location Map

Replace this page to include an 11x17 erosion control plan sketch to scale showing:

1. Areas with active soil disturbance activity
2. Areas that have been disturbed but are inactive at the time of the inspection
3. Areas that have been stabilized (temporary and/or final) since the last inspection
4. Limit of disturbance line per the SWPPP and the grading plan
5. Photo locations

Use Bluebeam template with standard colors to indicate limits

APPENDIX G:
POST-CONSTRUCTION INSPECTIONS AND MAINTENANCE

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Tree Planting

Table 2.6.1 TP Watering	
Problem (Check if Present)	**Follow-Up Actions**
☐ Soil is not moist to the touch and/or it has not rained in a week, and leaves/needles are starting to appear wilted/dry.	☐ Water trees deeply and slowly near the base. Soaker hoses and drip irrigation work best for deep watering of trees and shrubs. ☐ Other:

Table 2.6.2 TP Mulch	
Problem (Check if Present)	**Follow-Up Actions**
☐ Mulch is too thin or thick (should be approximately 3" deep) or does not extend to tree canopy (or 5' radius if tree has a larger than 10' canopy reach).	☐ Add or remove mulch around tree canopy to maximum 5' radius but not within 3" of the bark. ☐ If mulch is against the stems or tree trunks, pull it back several inches to expose the base of the trunk and root crown. ☐ Other:

Table 2.6.3 TP Pruning	
Problem (Check if Present)	**Follow-Up Actions**
☐ Presence of suckers, dead or diseased branches, branches that interfere with pedestrian traffic	☐ Selective cutting ☐ Prune to make the tree more aesthetically pleasing and remove disease. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Use an arborist or landscaper for more extensive pruning jobs.

Bioretention (Bioretention Cell, Dry Swale, Rain Garden, Stormwater Planters, Tree Pits)

Table 2.7.1 BR Drainage Area

Problem (Check if Present)		**Follow-Up Actions**
	☐ Bare soil, erosion of the ground (rills washing out the dirt)	☐ Seed and mulch areas of bare soil to establish vegetation. ☐ Fill in erosion areas with soil, compact, and seed and straw to establish vegetation. ☐ If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. ☐ Other:
		☐ Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths.
	☐ Piles of grass clippings, mulch, dirt, salt, or other materials	☐ Remove or cover piles of grass clippings, mulch, dirt, etc. ☐ Other:
	☐ Open containers of oil, grease, paint, or other substances	☐ Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous. ☐ Other:

Table 2.7.2 BR Inlets

Problem (Check if Present)	Follow-Up Actions
 ☐ Inlets collect grit and debris or grass/weeds. Some water may not be getting into the Bioretention cell. The objective is to have a clear pathway for water to flow into the cell.	☐ Use a flat shovel to remove grit and debris (especially at curb inlets or openings). Parking lots generate fine grit that will accumulate at these spots. ☐ Pull out clumps of growing grass or weeds and scoop out the soil or grit that the plants are growing in. ☐ Remove any grass clippings, leaves, sticks, and other debris that is collecting at inlets. ☐ For pipes and ditches, remove sediment and debris that is partially blocking the pipe or ditch opening where it enters the Bioretention cell. ☐ Dispose of all material properly where it will not re-enter the Bioretention cell. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Inlets are blocked to the extent that most of the water does not seem to be entering the Bioretention cell.
 ☐ Some or all of the inlets are eroding so that rills, gullies, and other erosion is present, or there is bare dirt that is washing into the Bioretention cell.	☐ For small areas of erosion, smooth out the eroded part and apply rock or stone (e.g., river cobble) to prevent further erosion. Usually, filter fabric is placed under the rock or stone. ☐ In some cases, reseeding and applying erosion-control matting can be used to prevent further erosion. Some of these materials may be available at a garden center, but it may be best to consult a landscape contractor. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Erosion is occurring at most of the inlets, and it looks like there is too much water that is concentrating at these points. The inlet design may have to be modified.

Table 2.7.3 BR Ponding Area	
Problem (Check if Present)	**Follow-Up Actions**
 ☐ Mulch (if used) needs to be replaced or replenished. The mulch layer had decomposed or is less than 1-inch thick.	☐ Add new mulch to a total depth (including any existing mulch that is left) of 2 to 3 inches. The mulch should be shredded hardwood mulch that is less likely to float away during rainstorms. ☐ Avoid adding too much mulch so that inlets are obstructed or certain areas become higher than the rest of the Bioretention surface. ☐ Other:
 ☐ Minor areas of sediment, grit, trash, or other debris are accumulating on the bottom.	☐ Use a shovel to scoop out minor areas of sediment or grit, especially in the spring after winter sanding materials may wash in and accumulate. Dispose of the material where it cannot re-enter the Bioretention cell. ☐ If removing the material creates a hole or low area, fill with soil mix that matches original mix and cover with mulch so that the Bioretention surface area is as flat as possible. ☐ Remove trash, vegetative debris, and other undesirable materials. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Sediment has accumulated more than 2-inches deep and covers 25% or more of the Bioretention surface. ☐ Kick-Out to Level 2 Inspection: The Bioretention cell is too densely vegetated to assess sediment accumulation or ponding; see BR-4, Vegetation.
 ☐ There is erosion in the bottom or on the side slopes. Water seems to be carving out rills as it flows across the Bioretention surface or on the slopes, or sinkholes are forming in certain areas. ☐ Source: Stormwater Maintenance, LLC.	☐ Try filling the eroded areas with clean topsoil or sand, and cover with mulch. ☐ If the problem recurs, you may have to use stone (e.g., river cobble) to fill in problem areas. ☐ If the erosion is on a side slope, fill with clay that can be compacted and seed and mulch the area. ☐ Other: ☐ Kick-Out to Level 2 Inspection: The problem persists or the erosion is more than 3-inches deep and seems to be an issue with how water enters and moves through the Bioretention cell. ☐ Kick-Out to Level 2 Inspection: The problem does not seem to be caused by flowing water, but a collapse or sinking of the surface (e.g., "sinkhole") due to some underground problem.

 ☐ The bottom of the Bioretention cell is not flat, and the water pools at one end, along an edge, or in certain pockets. The whole bottom is not uniformly covered with water. See design plan to verify that Bioretention surface is intended to be flat. Check during or immediately after a rainstorm.	☐ If the problem is minor (just small, isolated areas are not covered with water), try raking the surface OR adding mulch to low spots to create a more level surface. You may need to remove and replace plantings in order to properly even off the surface. ☐ Check the surface with a string and bubble level to get the surface as flat as possible. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Ponding water is isolated to less than half of the Bioretention surface area, and there seem to be elevation differences of more than a couple of inches across the surface.
 ☐ Water stands on the surface more than 72 hours after a rainstorm and /or wetland-type vegetation is present. The Bioretention cell does not appear to be draining properly.	☐ Kick-Out to Level 2 Inspection: This is generally a serious problem, and it will be necessary to activate a Level 2 Inspection.

Table 2.7.4 BR Vegetation

Problem (Check if Present)	Follow-Up Actions
 ☐ Vegetation requires regular maintenance—pulling weeds, removing dead and diseased plants, replacing mulch around plants, adding plants to fill in areas that are not well vegetated, etc.	☐ If you can identify which plants are weeds or not intended to be part of the planting plan, eliminate these, preferably by hand pulling. ☐ If weeds are widespread, check with the local stormwater authority and/or Extension Office about proper use of herbicides for areas connected with the flow of water. ☐ Even vegetation that is intended to be present can become large, overgrown, and/or crowd out surrounding plants. Prune and thin accordingly. ☐ If weeds or invasive plants have overtaken the whole Bioretention cell, bush-hog the entire area before seedheads form in the spring. It will be necessary to remove the root mat manually or with appropriate herbicides, as noted above. ☐ Re-plant with species that are aesthetically pleasing and seem to be doing well in the Bioretention cell. ☐ Other: ☐ Kick-Out to Level 2 Inspection: You are unsure of the original planting design, or the vegetation maintenance task is beyond your capabilities of time, expertise, or resources. If you are unsure of the health of the vegetation (e.g. salt damage, invasives, which plants are undesirable) or the appropriate season to conduct vegetation management, consult a landscape professional before undertaking any cutting, pruning, mowing, or brush hogging.
 ☐ Vegetation is too thin, is not healthy, and there are many spots that are not well vegetated.	☐ The original plants are likely not suited for the actual conditions within the Bioretention cell. If you are knowledgeable about plants, select and plant more appropriate vegetation (preferably native plants) so that almost the entire surface area will be covered by the end of the second growing season. ☐ Other: ☐ Kick-Out to Level 2 Inspection: For all but small practices (e.g., rain gardens), this task will likely require a landscape design professional or horticulturalist.

Table 2.7.5 BR Outlets

Problem (Check if Present)	Follow-Up Actions
☐ Erosion at outlet	☐ Add stone to reduce the impact from the water flowing out of the outlet pipe or weir during storms. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Rills have formed and erosion problem becomes more severe.
 ☐ Outlet obstructed with mulch, sediment, debris, trash, etc.	☐ Remove the debris and dispose of it where it cannot re-enter the Bioretention cell. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Outlet is completely clogged or obstructed; there is too much material to remove by hand or with simple hand tools.

Bioretention Stormwater Management Practices
Level 1 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public

SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other ____________________	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

BR Drainage Area

Look for areas that are uphill from the Bioretention cell.

Problem (Check if Present)		**Follow-Up Actions**
	☐ Bare soil, erosion of the ground (rills washing out the dirt)	☐ Seed and mulch areas of bare soil to establish vegetation. ☐ Fill in erosion areas with soil, compact, and seed and straw to establish vegetation. ☐ If a rill or small channel is forming, try to redirect water flowing to this area by creating a small berm or adding topsoil to areas that are heavily compacted. ☐ Other:

BR Drainage Area

Look for areas that are uphill from the Bioretention cell.

Problem (Check if Present)		Follow-Up Actions
		☐ Kick-Out to Level 2 Inspection: Large areas of soil have been eroded, or larger channels are forming. May require rerouting of flow paths.
	☐ Piles of grass clippings, mulch, dirt, salt, or other materials	☐ Remove or cover piles of grass clippings, mulch, dirt, etc. ☐ Other:
	☐ Open containers of oil, grease, paint, or other substances	☐ Cover or properly dispose of materials; consult your local solid waste authority for guidance on materials that may be toxic or hazardous. ☐ Other:

BR Inlets

Stand in the Bioretention cell itself and look for all the places where water flows in. Often there will be multiple points of inflow to the practice.

Problem (Check if Present)	Follow-Up Actions
 ☐ Inlets collect grit and debris or grass/weeds. Some water may not be getting into the Bioretention cell. The objective is to have a clear pathway for water to flow into the cell.	☐ Use a flat shovel to remove grit and debris (especially at curb inlets or openings). Parking lots generate fine grit that will accumulate at these spots. ☐ Pull out clumps of growing grass or weeds and scoop out the soil or grit that the plants are growing in. ☐ Remove any grass clippings, leaves, sticks, and other debris that is collecting at inlets. ☐ For pipes and ditches, remove sediment and debris that is partially blocking the pipe or ditch opening where it enters the Bioretention cell. ☐ Dispose of all material properly where it will not re-enter the Bioretention cell. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Inlets are blocked to the extent that most of the water does not seem to be entering the Bioretention cell.
 ☐ Some or all of the inlets are eroding so that rills, gullies, and other erosion is present, or there is bare dirt that is washing into the Bioretention cell.	☐ For small areas of erosion, smooth out the eroded part and apply rock or stone (e.g., river cobble) to prevent further erosion. Usually, filter fabric is placed under the rock or stone. ☐ In some cases, reseeding and applying erosion-control matting can be used to prevent further erosion. Some of these materials may be available at a garden center, but it may be best to consult a landscape contractor. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Erosion is occurring at most of the inlets, and it looks like there is too much water that is concentrating at these points. The inlet design may have to be modified.

BR Ponding Area

Examine the entire Bioretention surface and side slopes

Problem (Check if Present)	Follow-Up Actions
 ☐ Mulch (if used) needs to be replaced or replenished. The mulch layer had decomposed or is less than 1-inch thick.	☐ Add new mulch to a total depth (including any existing mulch that is left) of 2 to 3 inches. The mulch should be shredded hardwood mulch that is less likely to float away during rainstorms. ☐ Avoid adding too much mulch so that inlets are obstructed or certain areas become higher than the rest of the Bioretention surface. ☐ Other:
 ☐ Minor areas of sediment, grit, trash, or other debris are accumulating on the bottom.	☐ Use a shovel to scoop out minor areas of sediment or grit, especially in the spring after winter sanding materials may wash in and accumulate. Dispose of the material where it cannot re-enter the Bioretention cell . ☐ If removing the material creates a hole or low area, fill with soil mix that matches original mix and cover with mulch so that the Bioretention surface area is as flat as possible. ☐ Remove trash, vegetative debris, and other undesirable materials. ☐ Other: ☐ Kick-Out to Level 2 Inspection: Sediment has accumulated more than 2-inches deep and covers 25% or more of the Bioretention surface. ☐ Kick-Out to Level 2 Inspection: The Bioretention cell is too densely vegetated to assess sediment accumulation or ponding; see BR-4, Vegetation.

BR Ponding Area

Examine the entire Bioretention surface and side slopes

Problem (Check if Present)	Follow-Up Actions
 ☐ There is erosion in the bottom or on the side slopes. Water seems to be carving out rills as it flows across the Bioretention surface or on the slopes, or sinkholes are forming in certain areas. ☐ Source: Stormwater Maintenance, LLC.	☐ Try filling the eroded areas with clean topsoil or sand, and cover with mulch. ☐ If the problem recurs, you may have to use stone (e.g., river cobble) to fill in problem areas. ☐ If the erosion is on a side slope, fill with clay that can be compacted and seed and mulch the area. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: The problem persists or the erosion is more than 3-inches deep and seems to be an issue with how water enters and moves through the Bioretention cell. ☐ Kick-Out to Level 2 Inspection: The problem does not seem to be caused by flowing water, but a collapse or sinking of the surface (e.g., “sinkhole”) due to some underground problem.
 ☐ The bottom of the Bioretention cell is not flat, and the water pools at one end, along an edge, or in certain pockets. The whole bottom is not uniformly covered with water. See design plan to verify that bioretention surface is intended to be flat. Check during or immediately after a rainstorm.	☐ If the problem is minor (just small, isolated areas are not covered with water), try raking the surface OR adding mulch to low spots to create a more level surface. You may need to remove and replace plantings in order to properly even off the surface. ☐ Check the surface with a string and bubble level to get the surface as flat as possible. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Ponding water is isolated to less than half of the Bioretention surface area, and there seem to be elevation differences of more than a couple of inches across the surface.

BR Ponding Area

Examine the entire Bioretention surface and side slopes

Problem (Check if Present)	Follow-Up Actions
 ☐ Water stands on the surface more than 72 hours after a rainstorm and /or wetland-type vegetation is present. The Bioretention cell does not appear to be draining properly.	☐ Kick-Out to Level 2 Inspection: This is generally a serious problem, and it will be necessary to activate a Level 2 Inspection.

BR Vegetation

Examine all Bioretention cell vegetation.

Problem (Check if Present)	Follow-Up Actions
 ☐ Vegetation requires regular maintenance—pulling weeds, removing dead and diseased plants, replacing mulch around plants, adding plants to fill in areas that are not well vegetated, etc.	☐ If you can identify which plants are weeds or not intended to be part of the planting plan, eliminate these, preferably by hand pulling. ☐ If weeds are widespread, check with the local stormwater authority and/or Extension Office about proper use of herbicides for areas connected with the flow of water. ☐ Even vegetation that is intended to be present can become large, overgrown, and/or crowd out surrounding plants. Prune and thin accordingly. ☐ If weeds or invasive plants have overtaken the whole Bioretention cell , bush-hog the entire area before seedheads form in the spring. It will be necessary to remove the root mat manually or with appropriate herbicides, as noted above. ☐ Re-plant with species that are aesthetically pleasing and seem to be doing well in the Bioretention cell. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: You are unsure of the original planting design, or the vegetation maintenance task is beyond your capabilities of time, expertise, or resources. If you are unsure of the health of the vegetation (e.g. salt damage, invasives, which plants are undesirable) or the appropriate season to conduct vegetation management, consult a landscape professional before undertaking any cutting, pruning, mowing, or brush hogging.

BR Vegetation

Examine all Bioretention cell vegetation.

Problem (Check if Present)	Follow-Up Actions
 ☐ Vegetation is too thin, is not healthy, and there are many spots that are not well vegetated.	☐ The original plants are likely not suited for the actual conditions within the Bioretention cell . If you are knowledgeable about plants, select and plant more appropriate vegetation (preferably native plants) so that almost the entire surface area will be covered by the end of the second growing season. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: For all but small practices (e.g., rain gardens), this task will likely require a landscape design professional or horticulturalist.

BR Outlets

Examine outlets that release water out of the Bioretention cell.

Problem (Check if Present)	Follow-Up Actions
☐ Erosion at outlet	☐ Add stone to reduce the impact from the water flowing out of the outlet pipe or weir during storms. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Rills have formed and erosion problem becomes more severe.
 ☐ Outlet obstructed with mulch, sediment, debris, trash, etc.	☐ Remove the debris and dispose of it where it cannot re-enter the Bioretention cell . ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Outlet is completely clogged or obstructed; there is too much material to remove by hand or with simple hand tools.

Additional Notes:

Inspector:____ Date: __________________

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

"I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____________ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: ________________________________ Date: ___________________

Bioretention Stormwater Management Practices
Level 2 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other ________________________	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

<table>
<tr><th colspan="2">Level 2 Inspection: BIORETENTION
NOTE: Key Source for this Information (CSN, 2013)</th></tr>
<tr><th>Recommended Repairs</th><th>Triggers for Level 3 Inspection</th></tr>
<tr><td colspan="2">Observed Condition: Water Stands on Surface for More than 72 Hours after Storm</td></tr>
<tr><td>☐ Condition 1: Small pockets of standing water

Use a soil probe or auger to examine the soil profile. If isolated areas have accumulated grit, fines, or vegetative debris or have bad soil media, try scraping off top 3 inches of media and replacing with clean material. Also check to see that surface is level and water is not ponding selectively in certain areas.

☐ Condition 2: Standing water is widespread or covers entire surface

Requires diagnosis and resolution of problem:
• Clogged underdrain?
• Filter fabric between soil media and underdrain stone?
• Need to install underdrain if not present?
• Too much sediment/grit washing in from drainage area?
• Too much ponding depth?
• Improper soil media?</td><td>• Soil media is clogged and problem is not evident from Level 2 inspection.
• Level 2 inspection identifies problem, but it cannot be resolved easily or is associated with the original design of the practice.

☐ Level 3 inspection necessary</td></tr>
<tr><td colspan="2">Observed Condition: Vegetation is sparse or out of control</td></tr>
<tr><td>☐ Condition 1: Original design planting plan seems good but has not been maintained, so there are many invasives and/or dead plants

Will require some horticultural experience to restore vegetation to intended condition by weeding, pruning, removing plants, and adding new plants.

☐ Condition 2: Original design planting plan is unknown or cannot be actualized

A landscape architect or horticulturalist will be needed to redo the planting plan. Will likely require analysis of soil pH, moisture, organic content, sun/shade, and other conditions to make sure plants match conditions. Plan should include invasive plant management and maintenance plan to include mulching, watering, disease intervention, periodic thinning/pruning, etc.</td><td>• Vegetation deviates significantly from original planting plan; Bioretention has been neglected and suffered from deferred maintenance.
• Owner/responsible party does not know how to maintain the practice.

☐ Level 3 inspection necessary</td></tr>
<tr><td colspan="2">Observed Condition: Bioretention does not conform to original design plan in surface area or storage</td></tr>
<tr><td>☐ Condition 1: Level 2 Inspection reveals that practice is too small based on design dimension, does not have adequate storage (e.g., ponding depth) based on the plan, and/or does not treat the drainage area runoff as indicated on the plan

Small areas of deviation can be corrected by the property owner or responsible party, but it is likely that a Qualified Professional will have to revisit the design and attempt a redesign that meets original objectives or that can be resubmitted to the municipality for approval.</td><td>• More than a 25% departure from the approved plan in surface area, storage, or drainage area; sometimes less than this threshold at the discretion of the Level 2 inspector.

☐ Level 3 inspection necessary</td></tr>
</table>

<table>
<tr><th colspan="2">Level 2 Inspection: BIORETENTION
NOTE: Key Source for this Information (CSN, 2013)</th></tr>
<tr><th>Recommended Repairs</th><th>Triggers for Level 3 Inspection</th></tr>
<tr><td colspan="2">Observed Condition: Severe erosion of filter bed, inlets, or around outlets</td></tr>
<tr><td>☐ Condition 1: Erosion at inlets

The lining (e.g., grass, matting, stone, rock) may not be adequate for the actual flow velocities coming through the inlets. First line of defense is to try a more non-erosive lining and/or to extend the lining further down to where inlet slopes meet the Bioretention surface. If problem persists, analysis by a Qualified Professional is warranted.

☐ Condition 2: Erosion of Bioretention filter bed

This is often caused by “preferential flow paths” through and along the Bioretention surface. The source of flow should be analyzed and methods employed to dissipate energy and disperse the flow (e.g., check dams, rock splash pads).

☐ Condition 3: Erosion on side slopes

Again, the issue is likely linked with unanticipated flow paths down the side slopes (probably overland flow that concentrates as it hits the edge of the slope). For small or isolated areas, try filling, compacting, and re-establishing healthy ground cover vegetation. If the problem is more widespread, further analysis is required to determine how to redirect the flow.</td><td>• Erosion (rills, gullies) is more than 12 inches deep at inlets or the filter bed or more than 3 inches deep on side slopes.
• If the issue is not caused by moving water but some sort of subsurface defect. This may manifest as a sinkhole or linear depression and be associated with problems with the underdrain stone or pipe or underlying soil.

☐ Level 3 inspection necessary</td></tr>
<tr><td colspan="2">Observed Condition: Significant sediment accumulation, indicating an uncontrolled source of sediment</td></tr>
<tr><td>☐ Condition 1: Isolated areas of sediment accumulation, generally less than 3-inches deep

Sediment source may be from a one-time or isolated event. Remove accumulated sediment and top 2 to 3 inches of Bioretention soil media; replace with clean material. Check drainage area for any ongoing sources of sediment.

☐ Condition 2: Majority of the surface is caked with “hard pan” (thin layer of clogging material) or accumulated sediment that is 3-inches deep or more

This can be caused by an improper construction sequence (drainage area not fully stabilized prior to installation of Bioretention soil media) or another chronic source of sediment in the drainage area. Augering several holes down through the media can indicate how severe the problem is; often the damage is confined to the first several inches of soil media. Removing and replacing this top layer (or to the depth where sediment incursion is seen in auger holes) can be adequate, as long as the problem does not recur.</td><td>• More than 2 inches of accumulated sediment cover 25% or more of the Bioretention surface area.
• “Hard pan” of thin, crusty layer covers majority of Bioretention surface area and seems to be impeding flow of water down through the soil media.
• New sources of sediment seem to be accumulating with each significant rainfall event.

☐ Level 3 inspection necessary</td></tr>
</table>

Notes:

Inspector:____ Date: __________________

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

"I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____________ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: ________________________________ Date: ___________________

Recommended Maintenance Activities for Subsurface Systems

SCHEDULE	ACTIVITY	EQUIPMENT
Seasonally or as needed	• Remove and clean filter bag • Immediately clean up spills on the pavement draining to the green infrastructure • Sweep impervious surfaces that drain to the green infrastructure • Maintain paved cover so that it drains properly to subsurface system • Maintain vegetation cover in good condition with complete coverage (if applicable) • Clean debris from pervious surface over subsurface system, if applicable • Clean perforated pipes (if applicable)	• Broom • Shovel • Replacement filter bags • Jet vacuum
When 25% of the pipe volume has been filled	• Jet-vacuum sediment and debris from the header pipe. Use a high-pressure nozzle with rear-facing jets to wash the sediment and debris into the inlet or pretreatment sump	• Jet vacuum
When sediment buildup reaches half the sump capacity (e.g., six inches)	• Vactor sediment and debris from the pretreatment sump. • Apply multiple passes of jet vacuum until backflush water is clean	• Vactor truck • Jet vacuum
Semi-annually the first year; annually thereafter	• Remove sediment and debris from sumps in pretreatment and outlet control structures using a vacuum truck or similar device, after other system components such as pipes and vaults have been maintained • Replace filter bag	• Shovel • Jet vacuum • Replacement filter bags
Every five to ten years	• Jet-vacuum pipes clear of debris for perforated pipe and gravel bed systems, if scour protection has been installed below the pipes	• Jet vacuum
Winter considerations	• Break up ice formation around inlet hood	• Ice pick, or equivalent tool • Manhole bar

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Tree Planting Stormwater Management Practices
Level 1 Inspection Checklist

SMP ID #		**SMP Owner**		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		**Longitude**	

Party Responsible for Maintenance	**System Type**		**Type of Site**
☐ Same as SMP Owner ☐ Other __________________	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		**Inspection Time**	
Inspector			
Date of Last Inspection			

TP Watering

Inspect the trees to determine whether they need watering.

Problem (Check if Present)	**Follow-Up Actions**
☐ Soil is not moist to the touch and/or it has not rained in a week, and leaves/needles are starting to appear wilted/dry.	☐ Water trees deeply and slowly near the base. Soaker hoses and drip irrigation work best for deep watering of trees and shrubs. ☐ Other:

TP Mulch

Mulch should be applied in the late spring and during leaf fall. Check the depth of mulch regularly. Rake the old mulch to break up any matted layers and to refresh the appearance.

Problem (Check if Present)	Follow-Up Actions
☐ Mulch is too thin or thick (should be approximately 3" deep) or does not extend to tree canopy (or 5' radius if tree has a larger than 10' canopy reach).	☐ Add or remove mulch around tree canopy to maximum 5' radius but not within 3" of the bark. ☐ If mulch is against the stems or tree trunks, pull it back several inches to expose the base of the trunk and root crown. ☐ Other:

TP Pruning

Examine the branches and tree shape.

Problem (Check if Present)	Follow-Up Actions
☐ Presence of suckers, dead or diseased branches, branches that interfere with pedestrian traffic	☐ Selective cutting ☐ Prune to make the tree more aesthetically pleasing and remove disease. ☐ Other:
	☐ Kick-Out to Level 2 Inspection: Use an arborist or landscaper for more extensive pruning jobs.

Additional Notes:

Inspector:_______________________________________ Date: __________________

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

"I hereby certify that the follow-up/corrective actions identified in the inspection performed on _____________ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _______________________________ Date: ___________________

Department of Environmental Conservation

Tree Planting Stormwater Management Practices
Level 2 Inspection Checklist

SMP ID #		SMP Owner		☐ Private ☐ Public
SMP Location (Address; Latitude & Longitude)				
	Latitude		Longitude	

Party Responsible for Maintenance	System Type		Type of Site
☐ Same as SMP Owner ☐ Other ____________________	☐ Seasonal ☐ Continuous Use ☐ Other	☐ Above Ground ☐ Below Ground	☐ Commercial ☐ Industrial ☐ Residential ☐ State

Inspection Date		Inspection Time	
Inspector			
Date of Last Inspection			

Level 2 Inspection: TREE PLANTING	
Recommended Repairs	**Triggers for Level 3 Inspection**
Observed Condition: Appearance of fungus or pest damage	
☐ Condition 1: Fungus, discoloration, browning leaves or holes in leaves Check with arborist or other tree professional about the best way to proceed. This requires a Level 3 inspection. ☐ Condition 2: Burrowing insects, holes Check with arborist or other tree professional about the best way to proceed. This requires a Level 3 inspection.	• Any concerns about how to address infestation or disease ☐ Level 3 inspection necessary

Notes:

Inspector:____ Date: ___________________

Complete the following if follow-up/corrective actions were identified during this inspection:

Certified Completion of Follow-Up Actions:

"I hereby certify that the follow-up/corrective actions identified in the inspection performed on ______________ (DATE) have been completed and any required maintenance deficiencies have been adequately corrected."

Inspector/Operator: _________________________________ Date: ____________________

CONTECH®
ENGINEERED SOLUTIONS

Cascade Separator® Inspection and Maintenance Guide

CASCADE
separator®

Maintenance

The Cascade Separator® system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall). However, more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash-down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. The inspection should also quantify the accumulation of hydrocarbons, trash and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided in this Inspection and Maintenance Guide.

Access to the Cascade Separator unit is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and slanted skirt. For large units, multiple manhole covers allow access to the chambers and sump.

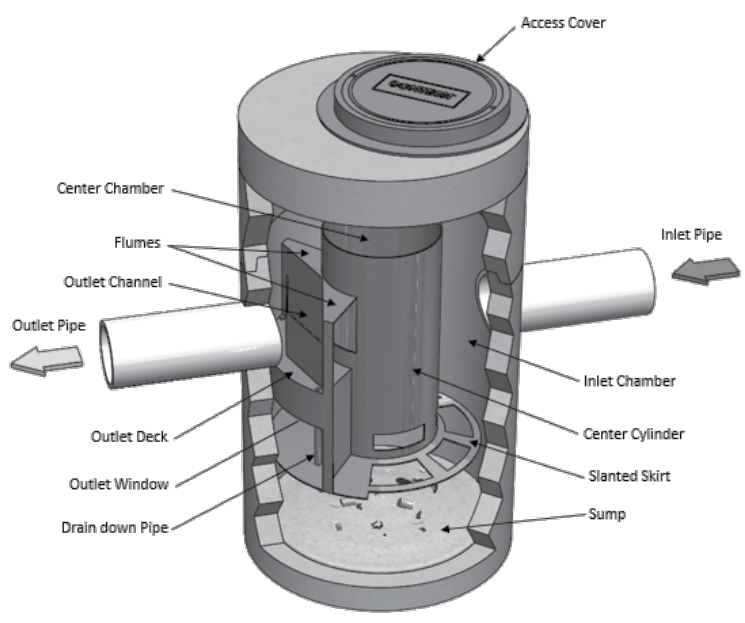
The Cascade Separator system should be cleaned before the level of sediment in the sump reaches the maximum sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance may be impacted when maximum sediment storage capacity is exceeded. Contech recommends maintaining the system when sediment level reaches 50% of maximum storage volume. The level of sediment is easily determined by measuring the distance from the system outlet invert (standing water level) to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the chart in this document to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage.

Cleaning

Cleaning of a Cascade Separator system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole cover and insert the vacuum tube down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the slanted skirt should also be washed off if pollutant build-up exists in these areas.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. Then the system should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Cascade Separator system must be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal. If any components are damaged, replacement parts can be ordered from the manufacturer.



Cascade Separator® Maintenance Indicators and Sediment Storage Capacities

Model Number	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y^3	m^3
CS-3	3	0.9	1.5	0.5	0.4	0.3
CS-4	4	1.2	2.5	0.8	0.7	0.5
CS-5	5	1.3	3	0.9	1.1	0.8
CS-6	6	1.8	3.5	1	1.6	1.2
CS-8	8	2.4	4.8	1.4	2.8	2.1
CS-10	10	3.0	6.2	1.9	4.4	3.3
CS-12	12	3.6	7.5	2.3	6.3	4.8

Note: The information in the chart is for standard units. Units may have been designed with non-standard sediment storage depth.

A Cascade Separator unit can be easily cleaned in less than 30 minutes.

A vacuum truck excavates pollutants from the systems.

Cascade Separator® Inspection & Maintenance Log

Cascade Model:			Location:		
Date	Depth Below Invert to Top of Sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The depth to sediment is determined by taking a measurement from the manhole outlet invert (standing water level) to the top of the sediment pile. Once this measurement is recorded, it should be compared to the chart in the maintenance guide to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage. Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

SUPPORT

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

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800-925-5240
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ACO StormBrixx®

Geocellular Stormwater Storage Product Maintenance

Prevention
Inspection
Maintenance
Cleaning

ACO StormBrixx® SD and HD

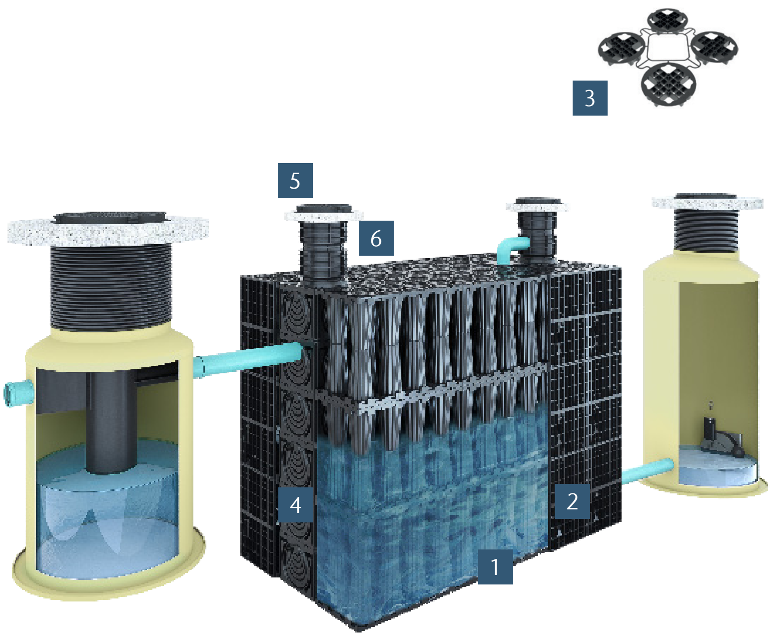
ACO StormBrixx® is a unique and patented geocellular stormwater management system for detention and infiltration usage.

Its versatile design allows the system to be used in configurations and applications across all construction environments as a standalone solution or as part of an integrated LID (Low Impact Development) or BMP (Best Management Practices). Systems may or may not include pre-treatment to remove sediment and/or contaminants prior to entering the storage area. Those without pre-treatment require greater attention to system functionality and may require additional maintenance.

In order to sustain proper system functionality, ACO offers the following general maintenance guidelines for the StormBrixx® product.

Contents

System Components



1. StormBrixx Tank Bodies*
2. Side Panel*
3. Top Cover*
4. Remote Access Unit*
5. Remote Access Cover - Ductile Iron
6. Extension Shaft*

* Image shown represents a StormBrixx® SD system. The Remote Access Unit may be swapped out with the Remote Access Plate. ACO offers vented and non-vented Remote Access Covers.

1 Prevention Measures

1.1 PRIOR TO & DURING CONSTRUCTION

Siltation Prevention of the Stormwater System
Conform to all local, state, and federal regulations for sediment and erosion control during construction.

Install site erosion and sediment BMP's (Best Management Practices) required to prevent siltation of the stormwater system.

Inspect and maintain erosion and sediment BMP's during construction.

1.2 POST CONSTRUCTION

Prior to Commissioning the ACO StormBrixx® System
Remove and properly dispose of construction erosion and sediment BMP's per all local, state, and federal regulations.

Care should be taken during removal of the BMP devices to prevent collected sediment or debris falling into the stormwater system.

Flush the ACO StormBrixx® system to remove any sediment or construction debris immediately after the BMP's removal. Follow the maintenance procedure outlined.

The prevention measures we recommend will increase the efficiency of the installed tank and the life of the entire system.

StormBrixx® is built to be used in areas in which protecting the environment is important. The prevention measures allow for the system as well as the locale it is installed to be sustainable.

StormBrixx® provides top of the line stormwater management solutions for detention, retention, reuse, and infiltration systems. The long term environmental focuses of StormBrixx® through LID, SuDS, MS4, and BMP will benefit the installer, the land owner, and the nearby environment.

Prevention measure

2 Inspections

Follow all local, state, and federal regulations regarding stormwater BMP inspection requirements. The results of the visual inspection, notes and repairs can be recorded in an operating logbook as a recommended best practice. These records will allow decisions to be made about the necessary frequency of future inspection and maintenance measures.

ACO makes the following recommendations:

2.1 VISUAL INSPECTION

Year One

During the first service year a visual inspection should be completed during and after each major rainfall event, in addition to every 6 month period to monitor and establish what sediment and debris buildup occurs.

Each ACO StormBrixx® system is unique to the application and multiple criteria can affect maintenance frequency as such:

- System Design: pre-treatment/no-treatment, inlet protection, stand-alone device.
- Surface area collecting from: hardscape, gravel, soil, or any other surface.
- Adjacent Area: soil runoff, gravel, trash.

2.2 ANNUAL INSPECTION

Year Two

Establish an annual inspection frequency based on the information collected during the first year. At a minimum an inspection should be performed at 6 month intervals.

2.3 ITEMS TO INSPECT

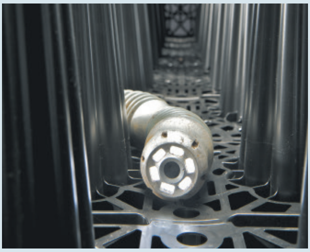
Components

- ACO StormBrixx® Remote Access Units/ Plates and inspection ports.
- Inlet and Outlet points.
- Discharge area.

2.4 IDENTIFY AND REPORT

Maintenance required if:

- Sediment and debris accumulation 6” or more.
- System backing up.
- Make operating logbook notes if needed.



Inspection camera

3 Maintenance Procedure

3.1 SURFACE ACCESS

Regulations
Conform to all local, state, and federal regulations.

Access Cover
Locate access cover(s) at the surface connected to the tank.

3.2 SAFETY

Access Cover
Once located, safely open lid and remove.

3.3 SYSTEM INSPECTION

System Debris
Perform an inspection of the tank to locate any debris. This can be done visually, with or without an inspection camera.

3.4 STANDING WATER

Remove Water
If the tank has standing water in it, you will need to vacuum the water first before visually inspecting the tank.

3.5 HIGH PRESSURE

System Clearing
Use the high pressure jet nozzle/wand to loosen and suspend any solid debris that has built up.

Access to high pressure water and vacuum will be needed to clear the tank of any built up debris.

A minimum water pressure of 2,500 PSI is recommended. The maximum pressure depends on the geotextile fabric chosen. Please check with fabric manufacturer for max PSI.

To ensure correct insertion angle of the high pressure jet nozzle, we recommend using a pipe elbow.

Alternatively, a nearby fire hydrant can be used to suspend debris within the StormBrixx® system before vacuuming up the water.

Vacuum removal of debris

Wand used to loosen debris

3

Maintenance Procedure

3.6 WATER LEVEL

Optimal Water Depth
Once the water level has reached 12” or more, shut off and remove high pressure jet nozzle/wand.

3.7 VACUUM HOSE

Remote Access Unit/Plate
Insert vacuum hose via the remote access unit/plate and begin removing all debris that is now suspended in water. Do this until all water has been removed.

3.8 REPEAT

Water and Debris
Not all water and debris may be removed in the first round, you may need to add and remove more water.

3.9 FINAL INSPECTION

Cleared Tank
Once all debris has been removed, inspect tank again to make sure everything has been cleared.

3.10 REMOVE EQUIPMENT

Replace Cover
Once the tank is clear of debris and water, remove all equipment and place the cover back on the tank. Secure cover accordingly.

Final inspection

Camera view of clean tank

For further information on ACO products, please visit the ACO USA website. This allows access to technical data, videos, images, specifications, and installation instructions.

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APPENDIX H:
NYSDEC "DEEP-RIPPING AND DECOMPACTION," APRIL 2008

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New York State
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water

Deep-Ripping and Decompaction

April 2008

New York State
Department of Environmental Conservation

Document Prepared by:

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NYS Dept. of Agriculture & Markets)

Description

The two-phase practice of 1) "Deep Ripping;" and 2) "Decompaction" (deep subsoiling), of the soil material as a step in the cleanup and restoration/landscaping of a construction site, helps mitigate the physically induced impacts of soil compression; i.e.: soil compaction or the substantial increase in the bulk density of the soil material.

Deep Ripping and Decompaction are key factors which help in restoring soil pore space and permeability for water infiltration. Conversely, the physical actions of cut-and-fill work, land grading, the ongoing movement of construction equipment and the transport of building materials throughout a site alter the architecture and structure of the soil, resulting in: the mixing of layers (horizons) of soil materials, compression of those materials and diminished soil porosity which, if left unchecked, severely impairs the soil's water holding capacity and vertical drainage (rainfall infiltration), from the surface downward.

In a humid climate region, compaction damage on a site is virtually guaranteed over the duration of a project. Soil in very moist to wet condition when compacted, will have severely reduced permeability. Figure 1 displays the early stage of the deep-ripping phase (Note that all topsoil was stripped prior to construction access, and it remains stockpiled until the next phase – decompaction – is complete). A heavy-duty tractor is pulling a three-shank ripper on the first of several series of incrementally deepening passes through the construction access corridor's densely compressed subsoil material. Figure 2 illustrates the approximate volumetric composition of a loam surface soil when conditions are good for plant growth, with adequate natural pore space for fluctuating moisture conditions.

Fig. 1. A typical deep ripping phase of this practice, during the first in a series of progressively deeper "rips" through severely compressed subsoil.

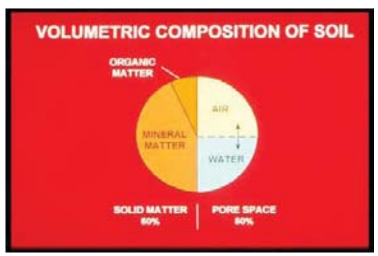

Fig. 2. About 50% of the volume of undisturbed loam surface soil is pore space, when soil is in good condition for plant growth. Brady, 2002.

Recommended Application of Practice

The objective of Deep Ripping and Decompaction is to effectively fracture (vertically and laterallly) through the thickness of the physically compressed subsoil material (see Figure 3), restoring soil porosity and permeability and aiding infiltration to help reduce runoff. Together with topsoil stripping, the "two-phase" practice of Deep Ripping and Decompaction first became established as a "best management practice" through ongoing success on commercial farmlands affected by heavy utility construction right-of-way projects (transmission pipelines and large power lines).

Fig. 3. Construction site with significant compaction of the deep basal till subsoil extends 24 inches below this exposed cut-and-fill work surface.

Soil permeability, soil drainage and cropland productivity were restored. For broader construction application, the two-phase practice of Deep Ripping and Decompaction is best adapted to areas impacted with significant soil compaction, on contiguous open portions of large construction sites and inside long, open construction corridors used as temporary access over the duration of construction. Each mitigation area should have minimal above-and-below-ground obstructions for the easy avoidance and maneuvering of a large tractor and ripping/decompacting implements. Conversely, the complete two-phase practice is not recommended in congested or obstructed areas due to the limitations on tractor and implement movement.

Benefits

Aggressive "deep ripping" through the compressed thickness of exposed subsoil before the replacement/respreading of the topsoil layer, followed by "decompaction," i.e.: "sub-soiling," through the restored topsoil layer down into the subsoil, offers the following benefits:

- Increases the project (larger size) area's direct surface infiltration of rainfall by providing the open site's mitigated soil condition and lowers the demand on concentrated runoff control structures
- Enhances direct groundwater recharge through greater dispersion across and through a broader surface than afforded by some runoff-control structural measures
- Decreases runoff volume generated and provides hydrologic source control
- May be planned for application in feasible open locations either alone or in

conjunction with plans for structural practices (e.g., subsurface drain line or infiltration basin) serving the same or contiguous areas

- Promotes successful long-term revegetation by restoring soil permeability, drainage and water holding capacity for healthy (rather than restricted) root-system development of trees, shrubs and deep rooted ground cover, minimizing plant drowning during wet periods and burnout during dry periods.

Feasibility / Limitations

The effectiveness of Deep Ripping and Decompaction is governed mostly by site factors such as: the original (undisturbed) soil's hydrologic characteristics; the general slope; local weather/timing (soil moisture) for implementation; the space-related freedom of equipment/implement maneuverability (noted above in **Recommended Application of Practice**), and by the proper selection and operation of tractor and implements (explained below in **Design Guidance**). The more notable site-related factors include:

Soil
In the undisturbed condition, each identified soil type comprising a site is grouped into one of four categories of soil hydrology, Hydrologic Soil Group A, B, C or D, determined primarily by a range of characteristics including soil texture, drainage capability when thoroughly wet, and depth to water table. The natural rates of infiltration and transmission of soil-water through the undisturbed soil layers for Group A is "high" with a low runoff potential while soils in Group B are moderate in infiltration and the transmission of soil-water with a moderate runoff potential, depending somewhat on slope. Soils in Group C have slow rates of infiltration and transmission of soil-water and a moderately high runoff potential influenced by soil texture and slope; while soils in Group D have exceptionally slow rates of infiltration and transmission of soil-water, and high runoff potential.

In Figure 4, the profile displays the undisturbed horizons of a soil in Hydrologic Soil Group C and the naturally slow rate of infiltration through the subsoil. The slow rate of infiltration begins immediately below the topsoil horizon (30 cm), due to the limited amount of macro pores, e.g.: natural subsoil fractures, worm holes and root channels. Infiltration after the construction-induced mixing and compression of such subsoil material is virtually absent; but can be restored back to this natural level with the two-phase practice of deep ripping and decompaction, followed by the permanent establishment of an appropriate, deep taproot

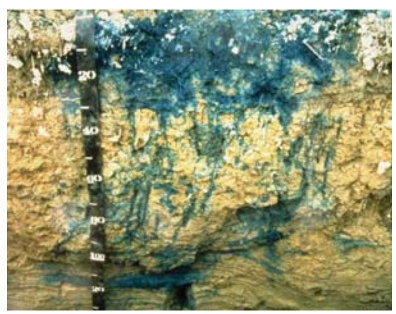
Fig. 4. Profile (in centimeters) displaying the infiltration test result of the natural undisturbed horizons of a soil in Hydrologic Soil Group C.

lawn/ground cover to help maintain the restored subsoil structure. Infiltration after construction-induced mixing and compression of such subsoil material can be notably rehabilitated with the Deep Ripping and Decompaction practice, which prepares the site for the appropriate long-term lawn/ground cover mix including deep taproot plants such as clover, fescue or trefoil, etc. needed for all rehabilitated soils.

Generally, soils in Hydrologic Soil Groups A and B, which respectively may include deep, well-drained, sandy-gravelly materials or deep, moderately well-drained basal till materials, are among the easier ones to restore permeability and infiltration, by deep ripping and decompaction. Among the many different soils in Hydrologic Soil Group C are those unique glacial tills having a natural fragipan zone, beginning about 12 to 18 inches (30 – 45cm), below surface. Although soils in Hydrologic Soil Group C do require a somewhat more carefully applied level of the Deep Ripping and Decompaction practice, it can greatly benefit such affected areas by reducing the runoff and fostering infiltration to a level equal to that of pre-disturbance.

Soils in Hydrologic Soil Group D typically have a permanent high water table close to the surface, influenced by a clay or other highly impervious layer of material. In many locations with clay subsoil material, the bulk density is so naturally high that heavy trafficking has little or no added impact on infiltration; and structural runoff control practices rather than Deep Ripping and Decompaction should be considered.

The information about Hydrologic Soil Groups is merely a general guideline. Site-specific data such as limited depths of cut-and-fill grading with minimal removal or translocation of the inherent subsoil materials (as analyzed in the county soil survey) or, conversely, the excavation and translocation of deeper, unconsolidated substratum or consolidated bedrock materials (unlike the analyzed subsoil horizons' materials referred to in the county soil survey) should always be taken into account.

Sites made up with significant quantities of large rocks, or having a very shallow depth to bedrock, are not conducive to deep ripping and decompation (subsoiling); and other measures may be more practical.

Slope
The two-phase application of 1) deep ripping and 2) decompaction (deep subsoiling), is most practical on flat, gentle and moderate slopes. In some situations, such as but not limited to temporary construction access corridors, inclusion areas that are moderately steep along a project's otherwise gentle or moderate slope may also be deep ripped and decompacted. For limited instances of moderate steepness on other projects, however, the post-construction land use and the relative alignment of the potential ripping and decompaction work in relation to the lay of the slope should be reviewed for safety and practicality. In broad construction areas predominated by moderately steep or steep slopes, the practice is generally not used.

Local Weather/Timing/Soil Moisture
Effective fracturing of compressed subsoil material from the exposed work surface, laterally and vertically down through the affected zone is achieved only when the soil material is moderately dry to moderately moist. Neither one of the two-phases, deep ripping nor decompaction (deep

subsoiling), can be effectively conducted when the soil material (subsoil or replaced topsoil) is in either a "plastic" or "liquid" state of soil consistency. Pulling the respective implements legs through the soil when it is overly moist only results in the "slicing and smearing" of the material or added "squeezing and compression" instead of the necessary fracturing. Ample drying time is needed for a "rippable" soil condition not merely in the material close to the surface, but throughout the material located down to the bottom of the physically compressed zone of the subsoil.

The "poor man's Atterberg field test" for soil plasticity is a simple "hand-roll" method used for quick, on-site determination of whether or not the moisture level of the affected soil material is low enough for: effective deep ripping of subsoil; respreading of topsoil in a friable state; and final decompaction (deep subsoiling). Using a sample of soil material obtained from the planned bottom depth of ripping, e.g.: 20 - 24 inches below exposed subsoil surface, the sample is hand rolled between the palms down to a 1/8-inch diameter thread. (Use the same test for stored topsoil material before respreading on the site.) If the respective soil sample crumbles apart in segments no greater than 3/8 of an inch long, by the time it is rolled down to 1/8 inch diameter, it is low enough in moisture for deep ripping (or topsoil replacement), and decompaction. Conversely, as shown in Figure 5, if the rolled sample stretches out in increments greater than 3/8 of an inch long before crumbling, it is in a "plastic" state of soil consistency and is too wet for subsoil ripping (as well as topsoil replacement) and final decompaction.

Fig. 5. Augered from a depth of 19 inches below the surface of the replaced topsoil, this subsoil sample was hand rolled to a 1/8-inch diameter. The test shows the soil at this site stretches out too far without crumbling; it indicates the material is in a plastic state of consistence, too wet for final decompaction (deep subsoiling) at this time.

Design Guidance

Beyond the above-noted site factors, a vital requirement for the effective Deep Ripping and Decompaction (deep subsoiling), is implementing the practice in its distinct, two-phase process:

1) Deep rip the affected thickness of exposed subsoil material (see Figure 10 and 11), aggressively fracturing it before the protected topsoil is reapplied on the site (see Figure 12); and

2) Decompact (deep subsoil), simultaneously through the restored topsoil layer and the upper half of the affected subsoil (Figure 13). The second phase, "decompaction," mitigates the partial recompaction which occurs during the heavy process of topsoil spreading/grading. Prior to deep ripping and decompacting the site, all construction activity, including construction equipment and material storage, site cleanup and trafficking (Figure 14), should be finished; and the site closed off to further disturbance. Likewise, once the practice is underway and the area's soil permeability and

rainfall infiltration are being restored, a policy limiting all further traffic to permanent travel lanes is maintained.

The other critical elements, outlined below, are: using the proper implements (deep, heavy-duty rippers and subsoilers), and ample pulling-power equipment (tractors); and conducting the practice at the appropriate speed, depth and pattern(s) of movement.

Note that an appropriate plan for the separate practice of establishing a healthy perennial ground cover, with deep rooting to help maintain the restored soil structure, should be developed in advance. This may require the assistance of an agronomist or landscape horticulturist.

Implements

Avoid the use of all undersize implements. The small-to-medium, light-duty tool will, at best, only "scarify" the uppermost surface portion of the mass of compacted subsoil material. The term "chisel plow" is commonly but incorrectly applied to a broad range of implements. While a few may be adapted for the moderate subsoiling of non-impacted soils, the majority are less durable and used for only lighter land-fitting (see Figure 6).

Fig. 6. A light duty chisel implement, not adequate for either the deep ripping or decompaction (deep subsoiling) phase.

Fig. 7. One of several variations of an agricultural ripper. This unit has long, rugged shanks mounted on a steel V-frame for deep, aggressive fracturing through Phase 1.

Use a "heavy duty" agricultural-grade, deep ripper (see Figures 7,9,10 and 11) for the first phase: the lateral and vertical fracturing of the mass of exposed and compressed subsoil, down and through, to the bottom of impact, prior to the replacement of the topsoil layer. (Any oversize rocks which are uplifted to the subsoil surface during the deep ripping phase are picked and removed.) Like the heavy-duty class of implement for the first phase, the decompaction (deep subsoiling) of Phase 2 is conducted with the heavy-duty version of the deep subsoiler. More preferable is the angled-leg variety of deep subsoiler (shown in Figures 8 and 13). It minimizes the inversion of the subsoil and topsoil layers while laterally and vertically fracturing the upper half of the previously ripped subsoil layer and all of the topsoil layer by delivering a momentary, wave-like "lifting and shattering" action up through the soil layers as it is pulled.

Pulling-Power of Equipment
Use the following rule of thumb for tractor horsepower (hp) whenever deep ripping and decompacting a significantly impacted site: For both types of implement, have at least 40 hp of tractor pull available for each mounted shank/ leg.

Using the examples of a 3-shank and a 5-shank implement, the respective tractors should have 120 and 200 hp available for fracturing down to the final depth of 20-to-24 inches per phase. Final depth for the deep ripping in Phase 1 is achieved incrementally by a progressive series of passes (see Depth and Patterns of Movement, below); while for Phase 2, the full operating depth of the deep subsoiler is applied from the beginning.


Fig. 8. A deep, angled-leg subsoiler, ideal for Phase 2 decompaction of after the topsoil layer is graded on top of the ripped subsoil.

The operating speed for pulling both types of implement should not exceed 2 to 3 mph. At this slow and managed rate of operating speed, maximum functional performance is sustained by the tractor and the implement performing the soil fracturing. Referring to Figure 8, the implement is the 6-leg version of the deep angled-leg subsoiler. Its two outside legs are "chained up" so that only four legs will be engaged (at the maximum depth), requiring no less than 160 hp, (rather than 240 hp) of pull. The 4-wheel drive, articulated-frame tractor in Figure 8 is 174 hp. It will be decompacting this unobstructed, former construction access area simultaneously through 11 inches of replaced topsoil and the upper 12 inches of the previously deep-ripped subsoil. In constricted areas of Phase 1) Deep Ripping, a medium-size tractor with adequate hp, such as the one in Figure 9 pulling a 3-shank deep ripper, may be more maneuverable.


Fig. 9. This medium tractor is pulling a 3-shank deep ripper. The severely compacted construction access corridor is narrow, and the 120 hp tractor is more maneuverable for Phase 1 deep ripping (subsoil fracturing), here.

Some industrial-grade variations of ripping implements are attached to power graders and bulldozers. Although highly durable, they are generally not recommended. Typically, the shanks or "teeth" of these rippers are too short and stout; and they are mounted too far apart to achieve the well-distributed type of lateral and vertical fracturing of the soil materials necessary to restore soil permeability and infiltration. In addition, the power graders and bulldozers, as pullers, are far less maneuverable for turns and patterns than the tractor.

Depth and Patterns of Movement
As previously noted both Phase 1 Deep Ripping through significantly compressed, exposed subsoil and Phase 2 Decompaction (deep subsoiling) through the replaced topsoil and upper subsoil need to be performed at maximum capable depth of each implement. With an implement's guide wheels attached, some have a "normal" maximum operating depth of 18 inches, while others may go deeper. In many situations, however, the tractor/implement operator must first remove the guide wheels and other non essential elements from the implement. This adapts the ripper or the deep subsoiler for skillful pulling with its frame only a few inches above surface, while the shanks or legs, fracture the soil material 20-to-24 inches deep.

There may be construction sites where the depth of the exposed subsoil's compression is moderate, e.g.: 12 inches, rather than deep. This can be verified by using a ¾ inch cone penetrometer and a shovel to test the subsoil for its level of compaction, incrementally, every three inches of increasing depth. Once the full thickness of the subsoil's compacted zone is finally "pieced" and there is a significant drop in the psi measurements of the soil penetrometer, the depth/thickness of compaction is determined. This is repeated at several representative locations of the construction site. If the thickness of the site's subsoil compaction is verified as, for example, ten inches, then the Phase 1 Deep Ripping can be correspondingly reduced to the implement's minimum operable depth of 12 inches. However, the Phase 2 simultaneous Decompation (subsoiling) of an 11 inch thick layer of replaced topsoil and the upper subsoil should run at the subsoiling implements full operating depth.


Fig. 10. An early pass with a 3-shank deep ripper penetrating only 8 inches into this worksite's severely compressed subsoil.


Fig. 11. A repeat run of the 3-shank ripper along the same patterned pass area as Fig. 9; here, incrementally reaching 18 of the needed 22 inches of subsoil fracture.

Typically, three separate series (patterns) are used for both the Phase 1 Deep Ripping and the Phase 2 Decompaction on significantly compacted sites. For Phase 1, each series begins with a moderate depth of rip and, by repeat-pass, continues until full depth is reached. Phase 2 applies the full depth of Decompation (subsoiling), from the beginning.

Every separate series (pattern) consists of parallel, forward-and-return runs, with each progressive pass of the implement's legs or shanks evenly staggered between those from the previous pass. This compensates for the shank or leg-spacing on the implement, e.g., with 24-to-30 inches between each shank or leg. The staggered return pass ensures lateral and vertical fracturing actuated every 12 to 15 inches across the densely compressed soil mass.

Large, Unobstructed Areas
For larger easy areas, use the standard patterns of movement:

- The first series (pattern) of passes is applied lengthwise, parallel with the longest spread of the site; gradually progressing across the site's width, with each successive pass.

- The second series runs obliquely, crossing the first series at an angle of about 45 degrees.

- The third series runs at right angle (or 90 degrees), to the first series to complete the fracturing and shattering on severely compacted sites, and avoid leaving large unbroken blocks of compressed soil material. (In certain instances, the third series may be optional, depending on how thoroughly the first two series loosen the material and eliminate large chunks/blocks of material as verified by tests with a ¾-inch cone penetrometer.)


Fig. 12. Moderately dry topsoil is being replaced on the affected site now that Phase 1 deep ripping of the compressed subsoil is complete.


Fig. 13. The same deep, angled-leg subsoiler shown in Fig. 7 is engaged at maximum depth for Phase 2, decompaction (deep soiling), of the replaced topsoil and the upper subsoil materials.

Corridors
In long corridors of limited width and less maneuverability than larger sites, e.g.: along compacted areas used as temporary construction access, a modified series of pattern passes are used.

- First, apply the same initial lengthwise, parallel series of passes described above.

- A second series of passes makes a broad "S" shaped pattern of rips, continually and gradually alternating the "S" curves between opposite edges inside the compacted corridor.

- The third and final series again uses the broad, alternating S pattern, but it is "flip-flopped" to continually cross the previous S pattern along the corridor's centerline. This final series of the S pattern curves back along the edge areas skipped by the second series.

Maintenance and Cost

Once the two-phase practice of Deep Ripping and Decompation is completed, two items are essential for maintaining a site's soil porosity and permeability for infiltration. They are: planting and maintaining the appropriate ground cover with deep roots to maintain the soil structure (see Figure 15); and keeping the site free of traffic or other weight loads.

Note that site-specific choice of an appropriate vegetative ground-cover seed mix, including the proper seeding ratio of one or more perennial species with a deep taproot system and the proper amount of lime and soil nutrients (fertilizer mix) adapted to the soil-needs, are basic to the final practice of landscaping, i.e: surface tillage, seeding/planting/fertilizing and culti-packing or mulching is applied. The "maintenance" of an effectively deep-ripped and decompacted area is generally limited to the successful perennial (long-term) landscape ground cover; as long as no weight-bearing force of soil compaction is applied.


Fig. 14. The severely compacted soil of a temporary construction yard used daily by heavy equipment for four months; shown before deep ripping, topsoil replacement, and decompaction.


Fig. 15. The same site as Fig. 14 after deep ripping of the exposed subsoil, topsoil replacement, decompaction through the topsoil and upper subsoil and final surface tillage and revegetation to maintain soil permeability and infiltration.

The Deep Ripping and Decompaction practice is, by necessity, more extensive than periodic subsoiling of farmland.The cost of deep ripping and decompacting (deep subsoiling), will vary according to the depth and severity of soil-material compression and the relative amount of tractor and implement time that is required. In some instances, depending on open maneuverability, two-to-three acres of compacted project area may be deep-ripped in one day. In other situations of more severe compaction and - or less maneuverability, as little as one acre may be fully ripped in a day. Generally, if the Phase 1) Deep Ripping is fully effective, the Phase 2) Decompaction should be completed in 2/3 to 3/4 of the time required for Phase 1.

Using the example of two acres of Phase 1) Deep Ripping in one day, at $1800 per day, the net cost is $900 per acre. If the Phase 2) Decompacting or deep subsoiling takes 3/4 the time as Phase 1, it costs $675 per acre for a combined total of $1575 per acre to complete the practice (these figures do not include the cost of the separate practice of topsoil stripping and replacement). Due to the many variables, it must be recognized that cost will be determined by the specific conditions or constraints of the site and the availability of proper equipment.

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- Soil penetrometer information. Access by internet searches of: *Diagnosing Soil Compaction using a Penetrometer (soil compaction tester), PSU Extension;* as well as *Dickey-john Soil Compaction Tester*. http://www.dickey-johnproducts.com/pdf/SoilCompactionTest.pdf and http://cropsoil.psu.edu/Extension/Facts/uc178pdf Last visited Sept. 07

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APPENDIX I:
LABELLA CERTIFYING PROFESSIONALS LETTER

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February 17, 2022

RE: LaBella Certifying Professionals for NYSDEC SPDES GP-20-001

To Whom it May Concern:

In accordance with the NYSDEC SPDES General Permit GP 0-20-001, part VII.H.2, the New York State licensed Professional Engineers employed by LaBella Associates and listed on the attachment to this letter are duly authorized to sign and seal Stormwater Pollution Prevention Plans (SWPPPs), NOIs, and NOTs prepared under their direct supervision.

Respectfully submitted,

LaBella Associates

Steven P. Metzger, PE
Chief Executive Officer

LaBella Professional Engineers duly authorized to sign and seal SWPPPs, NOIs, and NOTs:

Name:	Title:	Signature:	Date:
Kyle Ahearn, PE	Senior Civil Engineer		2/9/22
Jody Allen, PE	Senior Civil Engineer		2/24/2022
Anthony Bernardi, PE	Senior Civil Engineer		
Christian Bertram, PE	Senior Civil Engineer		2/9/2022
Brendan Bystrak, PE	Vice President		
Steven Calocerinos, PE	Senior Civil Engineer		2/9/2022
Jason Ebbs, PE	Municipal Group Leader		
Michael Flanagan, PE	Senior Civil Engineer		2/10/22
Don Hoefler, PE	Senior Project Engineer		
Reuben Hull, PE	Senior Civil Engineer		2/9/2022
Eric Johnson, PE	Senior Civil Engineer		2/9/2022
Roger Keating, PE	Senior Civil Engineer		2/9/2022
Walter Kubow, PE	Senior Civil Engineer		2/9/2022
Christopher Lapine, PE	Senior Civil Engineer		2/9/22
Joseph Lanaro, PE	Vice President		2/9/2022
Michael Mishook, PE	Vice President		2/10/22
Lauren Rodriquez, PE	Civil Engineer		2/9/2022
Jonathan Spurr, PE	Civil Engineer		2/10/22
Mary Steblein, PE	Senior Civil Engineer		2/9/2022
Robert Steehler, PE	Vice President		2/9/2022
Timothy Webber, PE	Vice President		2/9/2022
Kristopher Winkler, PE	Senior Civil Engineer		2/14/2022

APPENDIX J:
NYSDEC SPDES GENERAL PERMIT
GP-0-20-001

LaBella
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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

1-23-20

Authorized Signature Date

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

PREFACE

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

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

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

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

Table of Contents

Part 1. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application

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

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

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

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

B. Effluent Limitations Applicable to Discharges from Construction Activities

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

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

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

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

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

(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**. *Discharges* from *dewatering* activities, including *discharges* 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 *Discharges*.** The following *discharges* 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. *Discharges* 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* 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.

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, with the exception of:

   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 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;

   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* <u>and</u> 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* or *alter the hydrology from pre to post development* conditions, and 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

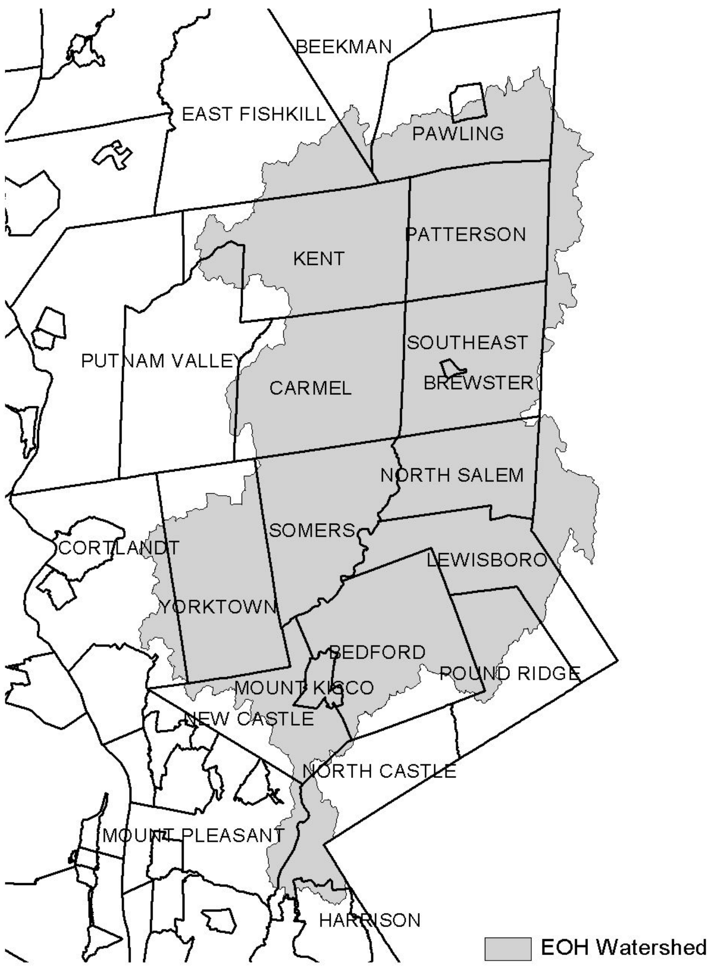


Figure 2 - Onondaga Lake Watershed

Figure 3 - Greenwood Lake Watershed

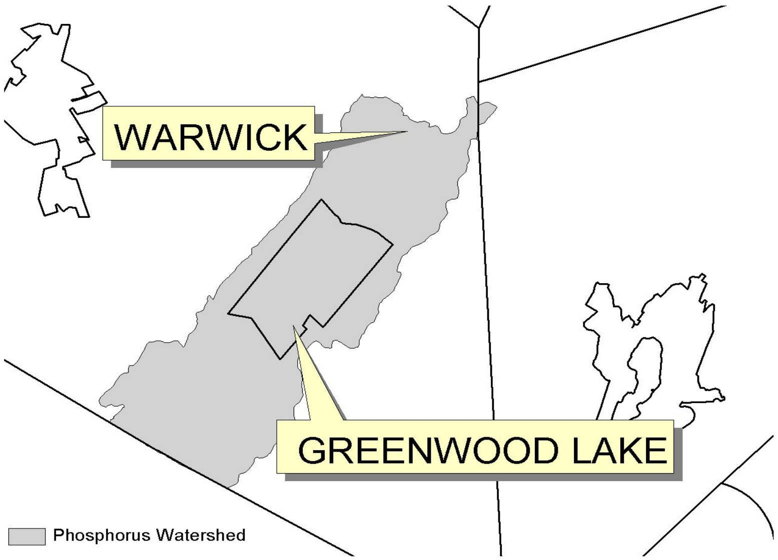


Figure 4 - Oscawana Lake Watershed

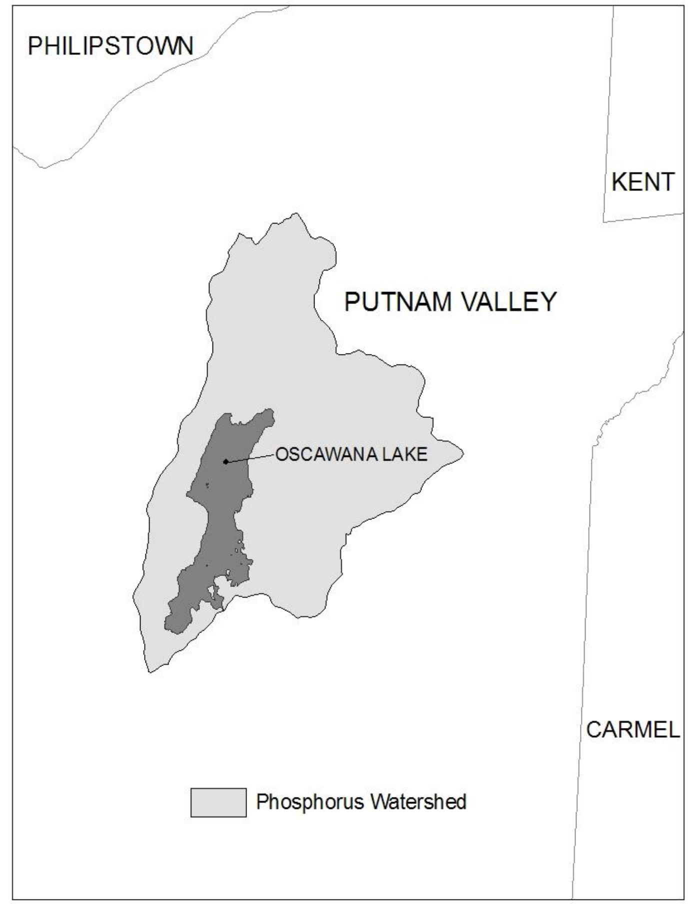
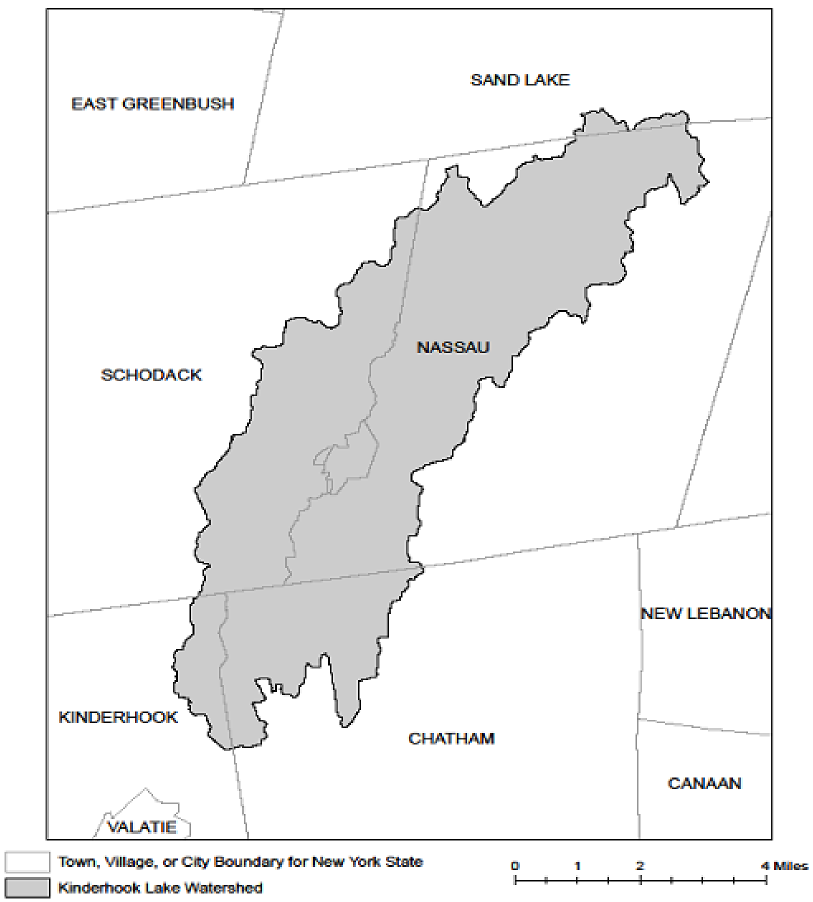


Figure 5 - Kinderhook Lake Watershed



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

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APPENDIX K:
TOWN OF ULSTER
SAMPLE STORMWATER CONTROL FACILITY MAINTENANCE AGREEMENT

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SAMPLE STORMWATER CONTROL FACILITY MAINTENANCE AGREEMENT

Whereas, the Town Board of the Ulster, hereafter referred to as Town Board and the ______________(“facility owner”) want to enter into an agreement to provide for the long term maintenance and continuation of stormwater control measures approved by the Town Board for the below named project, and

Whereas, the Town Board and the facility owner desire that the stormwater control measures be built in accordance with the approved project plans and thereafter be maintained, cleaned, repaired, replaced and continued in perpetuity in order to ensure optimum performance of the components. Therefore, the Town Board and the facility owner agree as follows:

1. This agreement binds the Town Board and the facility owner, its successors and assigns, to the maintenance provisions depicted in the approved project plans which are attached as Schedule A of this agreement.

2. The facility owner shall maintain, clean, repair, replace and continue the stormwater control measures depicted in Schedule A as necessary to ensure optimum performance of the measures to design specifications. The stormwater control measures shall include, but not be limited to, the following: drainage ditches, swales, dry wells, infiltrators, drop inlets, pipes, culvert s, soil absorption devices and retention ponds.

3. The facility owner shall be responsible for all the expenses related to the maintenance of the stormwater control measures and shall establish a means for the collection and distribution of expenses among parties for any commonly owned facilities.

4. The facility owner shall provide for the periodic inspection of the stormwater control measures, not less than once every five year period, to determine the condition and integrity of the measures. Such inspection shall be performed by a Professional Engineer licensed by the State of New York. The inspecting engineer shall prepare and submit to the Town Board within 30 days of the inspection, a written report of the findings including recommendations for those actions necessary for the continuation of the stormwater control measures.

5. The facility owner shall not authorize, undertake or permit alteration, abandonment, modification or discontinuation of the stormwater control measures except in accordance with written approval of the Town Board.

6. The facility owner shall undertake necessary repairs and replacement of the stormwater control measures at the direction of the Town Board or in accordance with the recommendations of the inspecting engineer.

7. The facility owner shall provide to the Town Board within 30 days of the date of this agreement, a security for the maintenance and continuation of the stormwater control measures in the form of (a Bond, letter of credit or screw or escrow account).

8. This agreement shall be recorded in the Office of the County Clerk, County of Ulster together with the deed for the common property and shall be included in the offering plan and/or prospectus approved pursuant to_______________________________________.

9. If ever the Town Board determines that the facility owner has failed to construct or maintain the stormwater control measures in accordance with the project plan or has failed to undertake corrective action specified by the Town Board or by inspecting engineer, the Town Board is authorized to undertake such steps as reasonably necessary for the preservation, continuation or maintenance of the stormwater control measures and affix the expenses thereof as a lien against the property.

10. This agreement is effective__________________.

Signature Date