



Stormwater Pollution Prevention Plan

The North 60 - Phase 1

*Hospital Road & Route 9A
Mount Pleasant (T)*

Prepared By:



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Project Information:

Project Title: The North 60 – Phase 1
Project Address: Hospital Road & Route 9A, Mount Pleasant, NY
Tax Map Number: Sheet 116.8, Block 1, Lot(s) 3, 4, 5, 6, 7, 8, 9
Sheet 111.20, Block 1, Lot 80
Project Area: 78.92 +/- Acres

Applicant/Owner Information:

Owner(s) Name: Westchester County and 81 Holly Hill Lane, LLC
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Short-Term Responsible Party for SWPPP Implementation:

Short-term responsible parties for SWPPP Implementation will be the General Contractor.

Long-Term Responsible Party for SWPPP Implementation:

Long-term responsible parties for SWPPP Implementation will be the Owners.

Potential Party Responsible for Inspections as Required Under SPDES Permit:

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1.0 Introduction:

The applicant is proposing to construct a new mixed-use community located on Hospital Road and Route 9A in the Town of Mount Pleasant. The project is entitled, “The North 60”. This report pertains to Phase 1 of the site development.

1.1 Project Description:

The Westchester Medical Village site contains 78.92 acres located on the north side of Hospital Road.

The applicant is proposing to construct a new mixed use community with biomedical research facilities. Phase 1 of the project will include the construction of 5 new buildings. The development will consist of a new hotel, retail space, medical office space, and biomedical space. Parking facilities and a new system of roadways will also be constructed as part of in Phase 1. A new “Main Street” boulevard connects the development to the existing Hospital Road and the proposed “West Street” will connect Hospital Road to Route 9A (Saw Mill River Road). The proposed area of disturbance for Phase 1 is 35.8 acres and the project is located within the Saw Mill River Watershed. Please note, the Project Site discharges to the Saw Mill River (Middle and tribs) which has been identified as a “303(d) Impaired Segment by Construction Related Pollutant(s)” in Appendix E of the NYSDEC SPDES General Permit GP-0-20-001. Uncontrolled and untreated release of stormwater runoff to the 303(d) segment could exacerbate the existing water quality concerns. Therefore, drainage systems designed in accordance with New York State Department of Environmental Conservation (NYSDEC) regulations are proposed to treat stormwater runoff generated by the proposed improvements. The project will be served by the existing public water system and will connect wastewater to the existing public sanitary sewer system in the vicinity of the project. The project will not affect any property listed on the State or National Register of Historic Places. A map showing historic places in the vicinity of the project can be found in Appendix “E”.



Assuming a timely permitting process, construction is anticipated to begin in the fall of 2020. Ultimate build out of Phase 1 will take approximately 5 years to complete.

The following is a list permits that must be obtained:

- Town of Mount Pleasant Town Board Zoning Amendment Approval
- Town of Mount Pleasant Planning Board Site Plan and Subdivision Approval
- Army Corps of Engineers Wetlands Approval
- New York State Department of Environmental Conservation Protection of Waters Permit
- Westchester County Department of Health Public Water Supply and Wastewater Approvals
- NYSDOT Highway Work Permit Approval
- New York State Department of Environmental Conservation SPDES #GP-0-20-001 Notice of Intent for Stormwater Discharges from Construction Activities

1.2 Existing Site Conditions:

The existing 78.92 acre site currently has a parking area and a construction staging area on the south side of the site which is accessed from Hospital Road. There are also several residences and an existing landscape business located on the west side of the site which is accessed from an existing paved driveway connected to Old Saw Mill River Road. A majority of the site is undeveloped woodlands and meadows. Two streams flow through the site to the north where they discharge to the Saw Mill River adjacent to Route 9A. The streams originate from the existing Westchester Medical Center drainage system outfalls.

Slopes vary greatly onsite. The existing parking area and existing construction staging area are located on the mildly sloped ridgeline which extends through the center of the site. The north side of the site contains steep slopes which descend towards Route 9A. Very steep ravines are located along the banks



of the two existing streams which separate the site into three distinct areas. NRCS soil boundaries identified onsite and within the boundaries of the analysis consist of Paxton Fine Sandy Loam, Woodbridge Loam, Ridgebury Loam, and Urban Land. Paxton Fine Sandy Loam belongs to hydrologic group “C”, Woodbridge Loam belongs to hydrologic group “C”, and Ridgebury Loam belongs to hydrologic group “D”. The Urban Land areas are treated as hydrologic group “C” for the purposes of this drainage analysis. A soil map for the site area can be found in Appendix “D” of this report.

1.3 Proposed Site Conditions:

The construction of the buildings, roadways, walkways, and parking areas within the limits of Phase 1 will result in the creation of approximately 13.87 acres of impervious surfaces. Runoff from the proposed improvements is to be collected by a system of catch basins and piping, then captured and treated in stormwater management practices. The existing structures and driveways located onsite are to be removed.

As per the New York State Stormwater Management Design Manual (Stormwater Design Manual) the site planning for the project is required to employ techniques (listed on Table 3.1 of the Manual) which will achieve the preservation of natural resources.

The reduction of clearing and grading on site was a key aspect of the design. Although total disturbance for Phase 1 of the site development is approximately 35.8 acres, a large portion of the property is proposed to remain as natural wooded areas.

The natural areas of the property were also preserved by locating proposed disturbance associated with the construction in areas which had been previously developed. The proposed “Main Street” area of the project is located where the existing paved parking lot and existing construction staging area are currently located. The proposed “West Street” is located over a portion of the existing paved common driveway which connects the existing onsite residences to Route



9A. This effectively limits the amount of new impervious required for the construction of the roadways.

The table provided on the following page shows a comparison of pre-development impervious cover with post-development impervious cover for each of the sub-watersheds.

Impervious Area Comparison

	A	B	Total
Pre-development Impervious Area (SF)	181,472	0	181,472
Post-development Impervious Area (SF)	688,994	96,660	785,654
Change in Impervious (SF)	+507,522	+96,660	+604,182

2.0 Stormwater Management:

The stormwater systems for the project are proposed for the qualitative and quantitative management of stormwater runoff from the site. As the site falls under the requirements of the State SPDES program, all stormwater facilities employed for this site have been designed to meet NYSDEC requirements for water quality volume, stream channel protection volume, overbank flood control, and extreme flood control. The Stormwater Pollution Prevention Plan (SWPPP) for the Project Site has also been designed in accordance with the requirements set forth in the Mount Pleasant Town Code Chapter 183, Stormwater Management and Erosion and Sediment Control.

The stormwater management planning process included several design decisions and techniques to help minimize the impacts of development. Roadway pavement and sidewalk widths were designed with the minimum width practicable while meeting the requirements of the Mount Pleasant Town Code. Preservation of natural buffers and undisturbed areas was also a key element of the design. A large portion of the north side of the Project Site is proposed to remain undisturbed woodlands as part of the Master Development Plan. Although a portion of the onsite wetland are proposed to be disturbed, the wetland areas



were already previously impacted by surrounding development and their health would be improved by the proposed stormwater management plan.

The natural areas of the Project Site were also preserved by locating proposed construction disturbance in areas which had been previously developed. The proposed Main Street area of the Project Site is located where the existing paved parking lot and construction staging area are currently located. The proposed West Street is located over a portion of the existing paved common driveway which connects the existing onsite residences to Route 9A. This effectively limits the amount of new impervious required for the construction of the roadways.

Parking reductions were also a factor in the stormwater planning for the Project Site. The Proposed Action includes realistic parking requirements for each proposed onsite use in order to eliminate any unnecessary parking areas which may be in excess of the actual site needs. Dedicated bicycle paths and the proposed shuttle bus route would help promote less vehicular traffic as well, which helps manage the parking requirements for the Project Site. Multilevel parking structures have been proposed under several of the buildings to eliminate the need for large, surface level parking lots which greatly reduces the amount of impervious surfaces proposed for the site.

The hydrologic model for this project consists of two (2) design points. The two existing watercourses which flow through the site enter into two separate culvert pipes prior to crossing under Old Saw Mill River Road on the northern side of the project site. The entrances of these culverts have been selected as the design points for the project. As part of the stormwater analysis, the contributing offsite areas which are tributary to the design points have been included in hydrologic model for the project. The offsite areas mainly consist of the existing Westchester Medical Center facility located to the south of the project site. These areas flow to existing offsite stormwater ponds and the discharge pipes from the existing ponds outlet to the watercourses found on the project site. There are (4) subcatchments in pre-development analysis. Each of the predevelopment design points receive runoff from one offsite subcatchment area and each has one onsite



subcatchment which is tributary to their respective design point. There is a total of (18) subcatchments in the post development analysis. Once again, the two offsite subcatchment areas located to the south of the project site have been included in the analysis. Each of the stormwater treatment practices proposed for the site have separate subcatchment areas in order to analyze and design each proposed practice. The remaining subcatchments represent all untreated runoff which flows to the existing onsite streams or directly to the design points.

HydroCAD v. 10.0, a computer-modeling program based upon TR-20, was used to generate peak flows from the subcatchments. In the program, the user inputs various characteristics for each subcatchment including a curve number and time of concentration. These two parameters relate runoff to the specific land characteristics of the subcatchment. Based upon the inputted data, peak flows are generated for the 1, 2, 10, 25, 50, and 100-year storm events for the pre-development and post-development subcatchments.

The proposed stormwater management practices contained within Phase 1 of The North 60 Project are described below.

Infiltration Basin (Design I-2)

- o Two (2) infiltration basins will be constructed as part of the Phase 1 Plan. The infiltration basin consists of a flat bottom basin located in a highly permeable area of the site and effectively recharges runoff back into the onsite soil which reduces post development runoff volumes from the site. Infiltration Basin #1 is to be located on the north side of proposed Cross Street and to the west of the “North Parking Lot”. Infiltration Basin #1 treats runoff from the “West Parking Lot” and the segment of “Cross Street” to be constructed in Phase 1. Infiltration Basin #2 located on the northern portion of the site where an existing residence and lawn area is currently located. The existing residence is to be removed from the area during the construction of the basin. The infiltration basin treats runoff from impervious surfaces located on the proposed main street portion of the site and the remaining portion of the “North Parking Lot”. The two proposed infiltration basins are both



tributary to Design Point “A”. The infiltration basins have been designed with outlet structures which allow for storage of the entire 90% design storm and extended detention for the larger storm events. A rip-rap spillway is provided above the 100-year peak water elevation for emergency use only if the outlet structure fails to control the peak level of the basin.

Subsurface Infiltration Systems (Design I-4)

- o Four (4) subsurface infiltration systems are proposed for the Phase 1 development. The infiltration systems consist of Cultec Recharger infiltration chambers situated in gravel beds. Infiltration System #1 which treats the upper portion of the proposed “Western Street” shall use Cultec Recharger 360HD chambers. Infiltration System #2 which treats the rooftop runoff from proposed buildings “B1” and “B4” located on the proposed “Main Street” shall use Cultec Recharger 360HD chambers. Infiltration System #3 treats the large surface parking lot located to the north of the proposed hotel. System #3 shall use Cultec Recharger 330XLHD chambers. Infiltration System #4 treats a portion of the “North Parking Lot” located at the end of the Phase 1 “Main Street”. System #4 shall use Cultec Recharger 330XLHD chambers. The subsurface infiltration systems recharge stormwater runoff back into the onsite soil and each system is designed as an “off-line” practice which treats the 90% design storm and bypasses larger storm events via diversion structures.

Wet Pond (Design P-2)

- o One (1) wet pond is proposed for the project. The wet pond stormwater practice shall consist of a permanent pool of water with extended detention capacity above the permanent pool which is controlled by an outlet structure. A sediment forebay has been designed to provide pretreatment at the inlet side of the pond and the



water quality volume associated with the 90% storm is provided partially in the permanent pool and partially in the extended detention area in accordance with the Stormwater Design Manual. The proposed pond is approximately 6 to 7 feet in depth with shallower areas along the side slopes. The wet pond treats the runoff generated from the proposed hotel rooftop and the hotel driveway area. The pond also receives stormwater from the outfall of the existing offsite stormwater basin located to the south of the proposed hotel. The proposed wet pond will be constructed to replace a portion of the existing watercourse which flows through the site to Design Pont “B”. The existing watercourse suffers from existing erosion problems and carries sediment laden runoff through the project site. The proposed wet pond will detain the stormwater which will allow time for quality treatment of the runoff and ultimately reduced peak runoff rates which flow to the remaining portion of the existing stream.

Pocket Wetland (Design W-4)

- o One (1) pocket wetland is proposed for the project. The pocket wetland consist of a forebay located at the inlet, a shallow marsh area, and a micropool at the outlet structure. The pocket wetland has been designed for extended detention and it provides twenty four hour center of mass detention time for the one year storm event (2.8 inches). The pocket wetland also provides extended detention storage above the permanent pool for the larger storm events. The pocket wetland treats the lower portion of “West Street” in the northwest corner of the project site. A high groundwater table was located in the area of the proposed pocket wetland and the wetland has been designed such that the bottom of the deep pools are into the existing groundwater table. This will help sustain wetland plantings within the basin. The design and sizing calculations for the pocket wetland can be found in Appendix “I” of this report.



Required pretreatment for the stormwater runoff will be accomplished using subsurface Hydro-International First Defense High Capacity hydrodynamic separator chambers prior to each practice. The pretreatment practices are to be sized based on the peak flow generated by the one year storm, 2.79" of rainfall in twenty-four hours. The hydrodynamic separator meets the requirements of proprietary treatment systems set forth in the NYSDEC Stormwater Design Manual. See Appendix "C" for the New Jersey DEP certification for the First Defense chamber. Additional information about the capacity, installation, and maintenance for the pretreatment chamber can also be found in Appendix "C". All proposed stormwater conveyance piping shall be high density polyethylene pipe (HDPE). Additional pretreatment for the stormwater management systems will consist of 24" sumps in all preceding catch basins.

The stormwater infiltration practices meet the required 3' separation distance to groundwater or bedrock layer as verified by test pits witnessed by Bibbo Associates, LLP on January 16, 2018 and January 19, 2018. Preliminary infiltration rates have been applied to each practice based on field observations, NRCS soil types, and initial infiltration test runs. Final infiltration testing shall be performed for the practices in order to confirm the preliminary results and the infiltration practices shall be revised accordingly. Please see Appendix "H" of this report for additional soil testing information.

The stormwater management plan for the project must also address the concerns regarding pollutants found in chemical applications such as fertilizers, pesticides, herbicides, and fungicides. Fertilizers and pesticides containing high levels of nutrients such as nitrates can be carried in stormwater runoff and discharged into existing surface waters where the pollutants can cause excess algae growth. Temporary erosion control practices will protect the existing surface waters during the construction process as vegetative cover is being established onsite. As per the Erosion Control Program for the Project Site, all temporary erosion control measures shall remain in place until a firm stand of grass is established on all the disturbed areas not planned for impervious cover.



After construction is complete it's anticipated that the use of fertilizers will be minimal and isolated to the landscaped areas immediately adjacent to the proposed buildings. Runoff reduction practices design in accordance with the Stormwater Design Manual will effectively reduce the impact of these pollutants over the long-term and therefore a separate application plan has not been proposed for the Project Site. Please note, in accordance with the Westchester County Department of Health Pesticide Reduction Law (Chapter 690 of the Laws of Westchester), no pesticides shall be applied to any County-owned property. It is not anticipated that any herbicides, pesticides or fungicides will be used on the project site and any potential future application plans shall be reviewed and approved by the Westchester County Department of Health.

2.1 NYSDEC Requirements:

2.1.1 Water Quality Volume:

The North 60 Project Property is governed by the New York State Stormwater Management Design Manual (Stormwater Design Manual). In order to improve water quality the best management practices employed have been sized using a 90% rainfall volume of 1.5 inches of rain.

The water quality volumes were calculated using formulation specified in Chapter 4 of the Stormwater Design Manual. A summary table illustrating the required water quality volume versus provided water quality volume for each best management practice is provided on the following page. Calculations for the required water quality volumes can be found in the Appendix "B" of this report.



Summary of Water Quality Volume

<i>SW Practice ID</i>	<i>WQv Required (ft³)</i>	<i>WQv Provided (ft³)</i>
INF-SYS. 1	10,946	11,361
INF-SYS. 2	11,035	11,655
INF-SYS. 3	8,379	11,853
INF-SYS. 4	3,551	5,393
SWP-1	6,369	6,369
SWP-2	11,208	11,307
SWP-3	40,460	41,586
SWP-4	6,849	6,849

2.1.2 Runoff Reduction Volume:

The water quality volume (WQv) also forms a target for the runoff reduction volume (RRv). The goal is to capture the runoff at the source and treat the stormwater runoff onsite with green infrastructure techniques, upstream of the end of line practice. The proposed infiltration practices are to be utilized as a volume reduction practices when calculating RRv.

A summary table illustrating the required water quality volume versus provided runoff reduction volume is provided on the following page. The table also includes a column for the Minimum RRv. When it can be shown that 100% of the WQv cannot be reduced in green infrastructure practices, it must be shown that at least the Minimum RRv is reduced by the green practices proposed. The Minimum RRv is based on the impervious area introduced by the project and a Hydrologic Soil Group Specific Reduction Factor. Calculations for RRv and the derivation of Minimum RRv are included in the drainage calculations found in the Appendix "B" of this report.

Summary of Runoff Reduction Volume

<i>Infiltrator System ID</i>	<i>Watershed Area (ac.)</i>	<i>WQv (cu.ft.)</i>	<i>Minimum RRv by Specific Reduction Factor (cu.ft.)</i>	<i>Green Practice Vol. Reduction (cu.ft.)</i>	<i>% WQv Reduction</i>
Basin A	25.27	83,570	24,285	77,201	92%
Basin B	5.00	12,236	3,444	8,379	68%



The goal of treating the entire WQv onsite in green practices was not fully achieved, but the Minimum RRV has been obtained for the site. The Minimum RRV represents the volume reduction required for the new impervious areas. There are several reasons why additional green infrastructure techniques were not used to further reduce the WQv.

The steep slopes found onsite limited the amount of green infrastructure practices which were feasible to use onsite. Another factor which limited the amount of green practices used on the project was the significant portion of the property which is either a wetland area or a wetland buffer area. Our goal was to preserve those areas to the furthest extent possible.

2.1.4 Stream Channel Protection Volume:

Stream channel protection volume is designed to protect downstream channels from erosion, and is obtained by providing 24-hour (1440 min) extended detention of the one-year, twenty-four hour storm event. The infiltration practices have been designed to capture and infiltrate a majority of the runoff generated by the one year storm event. The pocket wetland and proposed pond have been sized to provide 24-hour extended detention of the one year storm event. The peak flow rates generated by the one year storm event have been reduced at both of the design points.

2.1.3 Overbank & Extreme Flood Control:

Overbank Flood Control is intended to mitigate the frequency and magnitude of out-of-bank flooding due to new development. Overbank Flood Control is achieved through the attenuation of the post-development 24-hour peak discharge from the 10-year storm to predevelopment rates. The post-development peak flows have been reduced to below predevelopment levels thus achieving Overbank Flood Control.

Extreme Flood Control is achieved through the attenuation of the post-development 24-hour peak discharge from the 100-year storm to predevelopment rates. The purpose of Extreme Flood Control is to prevent the risk of flood damage from large storm events, maintain the predevelopment 100-year flood



plain boundary, and to physically protect the stormwater management practices at the site. Extreme Flood Control has been achieved for the site.

Summary tables for the 1, 2, 10, 25, 50, and 100-year pre-development and post-development peak flows for each design point can be found in the table provided on the following page. Additionally, the runoff volumes for each storm event have also been provided for comparison purposes. Please see Appendix “A” of this report for detailed HydroCAD Output Reports for each design storm.

Summary of Peak Runoff Rates & Runoff Volumes – Design Point A

1 year storm event	Pre	Post	% Change
Peak flow (cfs)	62.67	49.69	-26.1%
Runoff volume (cf)	277,125	200,988	-37.9%
2 year storm event	Pre	Post	% Change
Peak flow (cfs)	87.57	63.84	-37.2%
Runoff volume (cf)	413,194	300,220	-37.6%
10 year storm event	Pre	Post	% Change
Peak flow (cfs)	152.43	111.80	-36.3%
Runoff volume (cf)	818,458	631,628	-29.6%
25 year storm event	Pre	Post	% Change
Peak flow (cfs)	204.71	157.32	-30.1%
Runoff volume (cf)	1,160,846	939,840	-23.5%
50 year storm event	Pre	Post	% Change
Peak flow (cfs)	277.74	207.13	-34.1%
Runoff volume (cf)	1,488,097	1,237,978	-20.2%
100 year storm event	Pre	Post	% Change
Peak flow (cfs)	364.38	268.04	-35.9%
Runoff volume (cf)	1,887,228	1,607,979	-17.4%



Summary of Peak Runoff Rates & Runoff Volumes – Design Point B

1 year storm event	Pre	Post	% Change
Peak flow (cfs)	17.38	10.91	-59.3%
Runoff volume (cf)	230,831	219,740	-5.0%
2 year storm event	Pre	Post	% Change
Peak flow (cfs)	29.43	19.41	-51.6%
Runoff volume (cf)	334,042	321,985	-3.7%
10 year storm event	Pre	Post	% Change
Peak flow (cfs)	68.06	49.39	-37.8%
Runoff volume (cf)	646,182	631,489	-2.3%
25 year storm event	Pre	Post	% Change
Peak flow (cfs)	101.38	85.84	-18.1%
Runoff volume (cf)	912,811	898,093	-1.6%
50 year storm event	Pre	Post	% Change
Peak flow (cfs)	133.15	129.30	-3.0%
Runoff volume (cf)	1,169,050	1,153,597	-1.3%
100 year storm event	Pre	Post	% Change
Peak flow (cfs)	170.39	169.27	-0.7%
Runoff volume (cf)	1,482,781	1,465,888	-1.2%

3.0 Erosion & Sediment Control:

The plans provide for specific erosion and sediment controls to be employed during construction. It is the intent to provide effective erosion control by minimizing land disturbance at one given time, containing sediment from disturbed areas, treating runoff where possible, and stabilizing disturbed soils as soon as possible. It is anticipated that Phase 1 will be further broken down into approximately ten (10) sub-phases. Appendix "L" includes additional phasing information and a general construction sequence for the project. The directives specified on the plans and in this report serve as a minimum for erosion and sediment control. Further practices and measures may be required pursuant to onsite inspections in conformance with the requirements of the SPDES General Permit GP-0-20-001 permit. As per the SPDES permit onsite, inspections are to be performed by a "Qualified Inspector" on a weekly basis during construction. All erosion and sediment control practices specified for this site shall be in



conformance with the New York Standards & Specifications for Erosion & Sediment Control.

3.1 Temporary Erosion & Sediment Control Practices:

Listed below are the Temporary Erosion & Sediment Control Practices specified on the Erosion Control Plan. All practices shall be installed and maintained in conformance with the New York Standards & Specifications for Erosion & Sediment Control:

- Silt Fence
- Soil Stockpile
- Construction Entrance
- Drop Inlet Protection
- Dust & Debris Control
- Sediment Trap
- Erosion blankets

Silt fence for the site will consist of a geotextile fabric installed at the toe of all disturbed slopes, and parallel to the contours. The silt fence is intended to reduce runoff velocity, and intercept sediment-laden runoff. Construction details specifying the proposed installation and type of permissible silt fence can be found on the plans. The silt fencing will also control litter and construction debris from leaving the site and polluting stormwater discharge. There shall be no chemicals stored onsite.

A stabilized construction entrance should be installed where construction vehicles enter on to existing roadways from the site. The construction entrance is designed to prevent outgoing trucks from tracking soil onto the road. Construction details specifying installation requirements can be found on the plan.

Drop inlet protect for the site will consist of silt fencing surrounding the catch basins. The purpose of the staked silt fence is to prevent water with large amounts of sediment to enter the drainage system through the inlets.



A water truck shall be maintained on-site for dust control as required. Construction debris, such as sheet metal and wood scrap, paper and insulation products, styrofoam cups and paper wrappers which could become windblown litter over and off the site if neglected. Suitable and ample refuse containers shall be provided on the site and emptied when full. Any scattered debris shall be picked up and placed in containers on a continuous basis.

Temporary sediment traps are proposed to control sediment laden runoff and store the accumulated sediment for proper disposal. The sediment traps have been designed to meet the standards of the New York Standards & Specifications for Erosion & Sediment Control. Construction details specifying installation and sizing requirements can be found on the plan.

Erosion control blankets (anchored stabilization matting) provide protective cover for newly graded steep slopes, protect against rainwater splashing/overland flow, and help promote seed germination. Erosion blankets shall be installed on all embankments which are graded steeper than 3 horizontal to 1 vertical. Construction details specifying installation requirements can be found on the plan.

In addition to the temporary erosion and sediment control practices listed above, additional measures shall be implemented to mitigate potential pollution during the construction phase of the project. The general contractor supervising site construction shall be responsible for the implementing the follow measures to control and prevent non-sediment pollution during construction activities; prevent the generation of pollutants due to improper handling, storage, and spills; and prevent the movement of toxic substances from the site into surface waters:

Material Handling & Construction Staging Areas

- All construction waste materials shall be collected and removed from the site regularly by the general contractor. The general contractor shall supply waste barrels for proper disposal of waste materials. All personnel working on the site shall be instructed of the proper procedures for construction waste disposal.



- All construction equipment and maintenance materials shall be stored in a construction staging area. Silt fence shall be installed down gradient of the construction staging area. Shipping containers shall be utilized to store hand tools, small parts, and other construction materials, not taken off site daily. Construction waste barrels, recycling barrels and if necessary hazardous waste containers shall be located within the limits of the construction staging area.

Waste Management & Establishment of Washout Areas

- Although it is not anticipated any hazardous waste materials will be utilized during construction, any hazardous waste materials shall be disposed of in accordance with federal, state, and local regulations. No hazardous waste shall be disposed of onsite. Hazardous waste materials shall be stored in appropriate and clearly marked containers and segregated from the other non-waste materials. All hazardous waste shall be stored in a structurally sound and sealed shipping containers located in the staging areas. Material safety data sheets, material inventory, and emergency contact numbers will be maintained in the office trailer. All personnel working on the site shall be instructed of the proper procedures for hazardous waste disposal.
- Temporary sanitary facilities (portable toilets) shall be provided onsite during the entire length of construction. The sanitary facilities shall be located in the project staging area, or in an alternate area away from the construction activities on the site. The portable toilets shall be inspected weekly for evidence of leaking holding tanks.
- All recyclables, including wood pallets, cardboard boxes, and all other recyclable construction scraps shall be disposed of in a designated recycling barrel provided by the contractor and removed from the site regularly. All personnel working on the site shall be instructed of the proper procedures for construction waste recycling



Proper Equipment Fueling & Spill Prevention

- Throughout the construction of the project, several types of vehicles and equipment will be used onsite. Fueling of the equipment shall occur within the limits of the construction staging area. Fuel will be delivered to the site as needed, by the general contractor, or a party chosen by the general contractor. Only minor vehicle equipment maintenance shall occur on-site, all major maintenance shall be performed off-site. All equipment fluids generated from minor maintenance activities shall be disposed of into designated drums and stored in accordance with the hazardous waste storage as previously discussed.

3.2 Permanent Erosion & Sediment Control Practices:

The intent of the permanent erosion and sediment control practices is to permanently stabilize the ground surface via vegetative and structural practices, while controlling and reducing runoff velocities.

The following permanent erosion & sediment control practices are proposed for the site:

- Land Grading
- Vegetation
- Rock Outlet Protection

Land grading is the reshaping of the existing land surface in accordance with the grading plan. Proper land grading is an essential component of the erosion control plan, as well as the stormwater pollution prevention plan. Proper grading will ensure the intended drainage areas are directed to the stormwater management practices.

Vegetation will be provided on all disturbed soils not covered by the proposed building, driveway, or parking area. Permanent vegetation will reduce runoff velocities, filter stormwater runoff, and minimize soil erosion. Optimum times for planting are the early spring and fall; however, plantings can be started in the summer provided adequate mulch and moisture is supplied.



Rock outlet protection is proposed at the outfall of the outlet pipe from the bioretention basin. The intent of the rock outlet protection is to reduce the depth, velocity, and energy of water to prevent downstream erosion. The flows generated by the 10-year storm have been used to size the proposed rock outlet protection areas in association with the requirements provided in “Figure 5B.12” of the New York Standards & Specifications for Erosion & Sediment Control. Details specifying the dimensions of the rock outlet protection areas have been included on the project plans.

4.0 Maintenance & Inspection Requirements:

Maintenance and inspections are required in order to ensure the stormwater and erosion & sediment control practices are acting as designed. Inspections are to be performed by a “Qualified Inspector” on a weekly basis during construction, consistent with the SPDES General Permit. Upon completion of construction and the subsequent filing of the Notice of Termination, maintenance and inspections are expected to be minimal. Temporary and permanent maintenance and inspection requirements are further discussed below. Proper maintenance and inspections will ensure the longevity and effectiveness of the stormwater pollution prevention plan, and erosion and sediment control plan. The “Construction Site Log Book” from the New York Standards & Specifications for Erosion & Sediment Control provides guidelines for maintenance inspections during construction and has been provided in Appendix “F” of this report.

The Town of Mount Pleasant Stormwater Management Officer may require inspections as necessary to determine compliance with Chapter 183 of the Mount Pleasant Town Code and may either approve that portion of the work completed or notify the applicant wherein the work fails to comply with the requirements of Chapter 183 and the stormwater pollution prevention plan (SWPPP) as approved. To obtain inspections, the applicant shall notify the Town of Mount Pleasant enforcement official at least 48 hours before any of the following as required by the Stormwater Management Officer;



- 1) Start of Construction
- 2) Installation of sediment and erosion control measures
- 3) Completion of site clearing
- 4) Completion of rough grading
- 5) Completion of final grading
- 6) Close of construction season
- 7) Completion of final landscaping
- 8) Successful establishment of landscaping in public areas.

4.1 Short Term Maintenance and Inspection Requirements:

Inspections performed during construction should verify all practices are functioning properly, correctly maintained, and accumulated sediment is removed from all control structures. The inspector must also examine the site for any evidence of soil erosion, the potential for pollutants to enter the storm drain system, turbid discharge at all outfalls, and the potential for soil and mud to be transported on the public roadway at the site entrance. In addition to these general guidelines, the construction plan set will provide more specific erosion control guidelines, as well as a construction sequence to guide the contractor through the construction process. Discussed below are specific maintenance and inspection requirements for the temporary practices to be employed at the site.

During construction, the silt fence should be inspected to ensure correct installation. In addition, any accumulated sediment resulting in “bulges” in the silt fence should be removed and mixed with onsite soil. Any damaged or torn silt fence should be replaced.

The construction entrance should be checked to ensure no sediment is being deposited onto the public roadway. Should sediment be observed, it should be removed from the street, and the stone in the construction entrance replaced.

Once construction is completed and the site has been stabilized, a Notice of Termination shall be filed. At this point limited maintenance requirements are anticipated.



4.2 Long Term Maintenance and Inspection Requirements:

Once final stabilization is achieved, and construction complete maintenance and inspections will be limited to the infiltration systems, hydrodynamic separators, and stormwater basins. The owner, its successors and/or assigns shall completely familiarize themselves with the project plans, details and notes. A copy of the Maintenance & Inspection Checklist from the New York State Stormwater Management Design Manual has been included in Appendix "G" of this report to serve as a guide for maintaining and inspecting the infiltrator systems and stormwater basins.

Inspections of the following items should be performed at a minimum annually and following significant rainstorm events (> ½" within 24 hours):

Stormwater Basins and Ponds:

- Inspect basin for build up of trash or debris. Remove any trash to prevent clogging of outlet structure.
- Inspection of basin for accumulation of sediment. Accumulated sediment should be removed immediately.
- Inspect rock outlet protection pad. Replace any rocks that have been displaced by scour.
- Inspection of the outlet of the outflow pipe to ensure it is not plugged or clogged.

Infiltrator Systems:

- Inspection of the infiltrator units to ensure accumulated water is infiltrating into the soil, and debris has not entered the infiltration units. Any debris should be removed. Once debris is removed, if stormwater is still not infiltrating contact a professional engineer licensed in the State of New York to examine the system.
- Inspection of the outlet of the overflow pipe to ensure it is not plugged or clogged.
- Inspect rock outlet protection pad. Replace any rocks that have been displaced by scour.

Catch Basins and Drain Manholes:

- Inspect monthly and after heavy rainstorms for sediment accumulation in sumps. Accumulated sediment should be removed immediately.



Hydro-International First Defense Hydrodynamic Separator:

- Inspection of the treatment unit for sediment accumulation. Any debris and sediment should be removed.
- Refer to Appendix “C” of this report for additional inspection and maintenance information.

5.0 Outstanding Violations or Enforcement Actions:

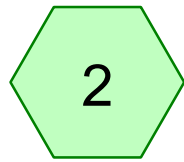
There are no known outstanding violations or enforcement actions against this property, the owner or the applicant. There has been no enforcement actions commenced against the applicant for any alleged violations of law related to the site or the activity for which approval is sought during the 5 years preceding the application.

6.0 Conclusion:

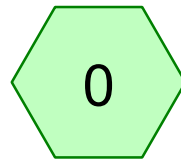
The applicant for the North 60 Project is proposing to construct a new biomedical mixed use community on the project site. The proposed area of disturbance is 35.8 acres. As part of the construction a stormwater management systems will be installed to treat the runoff from the proposed impervious surfaces. The stormwater management system was designed in accordance with the New York State Stormwater Management Design Manual, and shall result in improved stormwater quality as well as reduction in peak runoff flow rates.



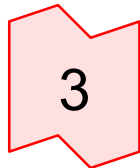
Appendix A-1:
Pre-Development
HydroCAD Output Reports



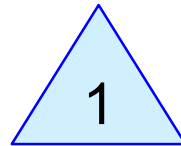
Pre A



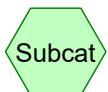
A0 (Offsite)



Design Point A



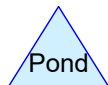
Offsite Pond A



Subcat



Reach



Pond



Link

Routing Diagram for N60 Phase-1 Pre-Dev A

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N60 Phase-1 Pre-Dev A

NRCC 24-hr A 1-yr Rainfall=2.79"

Prepared by {enter your company name here}

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment0: A0 (Offsite)Runoff Area=1,115,060 sf 57.87% Impervious Runoff Depth=1.79"
Flow Length=1,018' Tc=12.5 min CN=90 Runoff=55.28 cfs 166,539 cf**Pond 1: Offsite Pond A**Peak Elev=360.61' Storage=63,532 cf Inflow=55.28 cfs 166,539 cf
Outflow=36.32 cfs 115,344 cf**Subcatchment2: Pre A**Runoff Area=2,349,635 sf 8.44% Impervious Runoff Depth=0.83"
Flow Length=2,614' Tc=34.4 min CN=75 Runoff=30.46 cfs 161,781 cf**Link 3: Design Point A**Inflow=62.67 cfs 277,125 cf
Primary=62.67 cfs 277,125 cf**Total Runoff Area = 3,464,695 sf Runoff Volume = 328,320 cf Average Runoff Depth = 1.14"**
75.65% Pervious = 2,621,024 sf 24.35% Impervious = 843,671 sf

N60 Phase-1 Pre-Dev A

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 0: A0 (Offsite)

Runoff = 55.28 cfs @ 12.20 hrs, Volume= 166,539 cf, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
645,334	98	Paved parking, HSG C
443,611	80	>75% Grass cover, Good, HSG D
23,572	74	>75% Grass cover, Good, HSG C
2,543	61	>75% Grass cover, Good, HSG B
1,115,060	90	Weighted Average
469,726		42.13% Pervious Area
645,334		57.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.0150	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	148	0.0574	3.86		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	740	0.0270	10.25	32.22	Pipe Channel, 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.015 Concrete sewer w/manholes & inlets
12.5	1,018	Total			

N60 Phase-1 Pre-Dev A

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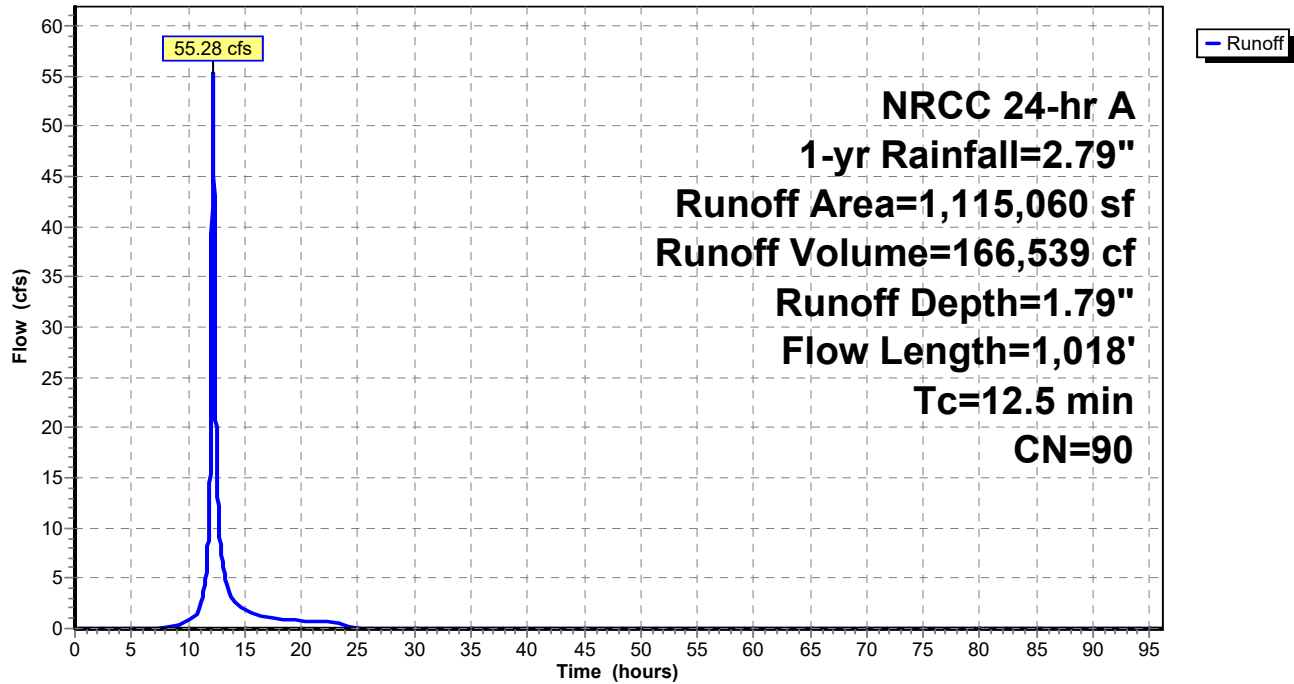
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NRCC 24-hr A 1-yr Rainfall=2.79"

Printed 3/24/2020

Subcatchment 0: A0 (Offsite)

Hydrograph



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Pond 1: Offsite Pond A

Inflow Area = 1,115,060 sf, 57.87% Impervious, Inflow Depth = 1.79" for 1-yr event
 Inflow = 55.28 cfs @ 12.20 hrs, Volume= 166,539 cf
 Outflow = 36.32 cfs @ 12.33 hrs, Volume= 115,344 cf, Atten= 34%, Lag= 7.3 min
 Primary = 36.32 cfs @ 12.33 hrs, Volume= 115,344 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 360.61' @ 12.33 hrs Surf.Area= 20,903 sf Storage= 63,532 cf

Plug-Flow detention time= 143.7 min calculated for 115,332 cf (69% of inflow)
 Center-of-Mass det. time= 59.3 min (869.2 - 810.0)

Volume	Invert	Avail.Storage	Storage Description		
#1	357.00'	221,816 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
357.00	14,633	679.0	0	0	14,633
358.00	16,652	698.0	15,632	15,632	16,826
359.00	17,534	715.0	17,091	32,723	18,864
360.00	19,427	745.0	18,472	51,195	22,425
362.00	24,453	804.0	43,784	94,979	29,861
364.00	28,701	854.0	53,097	148,076	36,663
365.00	36,602	901.0	32,572	180,648	43,285
366.00	45,910	1,262.0	41,168	221,816	105,432

Device	Routing	Invert	Outlet Devices
#1	Primary	357.00'	30.0" Round Culvert L= 125.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 357.00' / 351.00' S= 0.0480 ' S= 0.0480 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#2	Device 1	360.00'	36.0" x 48.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#3	Primary	364.75'	150.0' long x 36.0' 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=36.32 cfs @ 12.33 hrs HW=360.61' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 36.32 cfs @ 7.40 fps)
 2=Orifice/Grate (Passes 36.32 cfs of 43.79 cfs potential flow)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

N60 Phase-1 Pre-Dev A

Prepared by {enter your company name here}

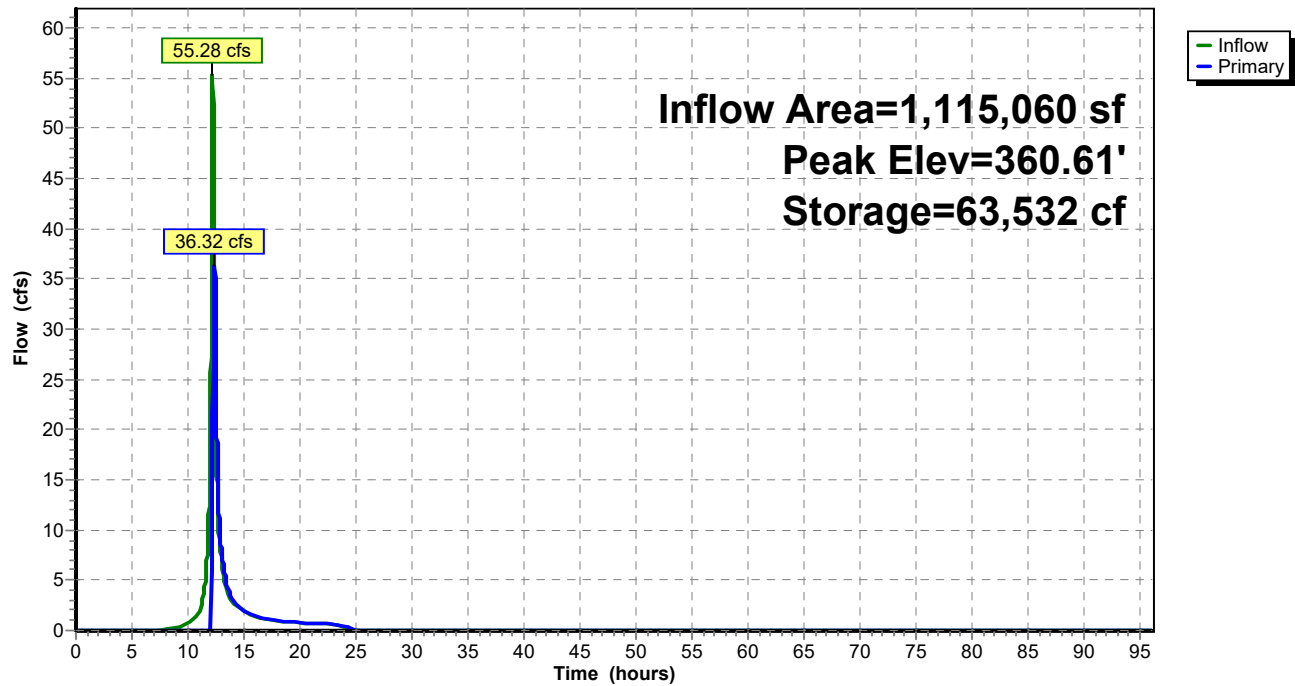
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NRCC 24-hr A 1-yr Rainfall=2.79"

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Pond 1: Offsite Pond A

Hydrograph



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 2: Pre A

Runoff = 30.46 cfs @ 12.53 hrs, Volume= 161,781 cf, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

	Area (sf)	CN	Description
*	181,472	98	Paved parking, roofs, HSG C
	159,966	91	Newly graded area, HSG C
	339,282	74	>75% Grass cover, Good, HSG C
	4,702	80	>75% Grass cover, Good, HSG D
	358,470	70	Brush, Fair, HSG C
	77,923	77	Brush, Fair, HSG D
	20,430	60	Woods, Fair, HSG B
	193,986	77	Woods, Good, HSG D
	996,539	70	Woods, Good, HSG C
	16,865	98	Water Surface, HSG D
	2,349,635	75	Weighted Average
	2,151,298		91.56% Pervious Area
	198,337		8.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
2.4	282	0.0142	1.92		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
13.2	2,232	0.0631	2.83	5.65	Channel Flow, Area= 2.0 sf Perim= 12.0' r= 0.17' n= 0.040 Winding stream, pools & shoals
34.4	2,614	Total			

N60 Phase-1 Pre-Dev A

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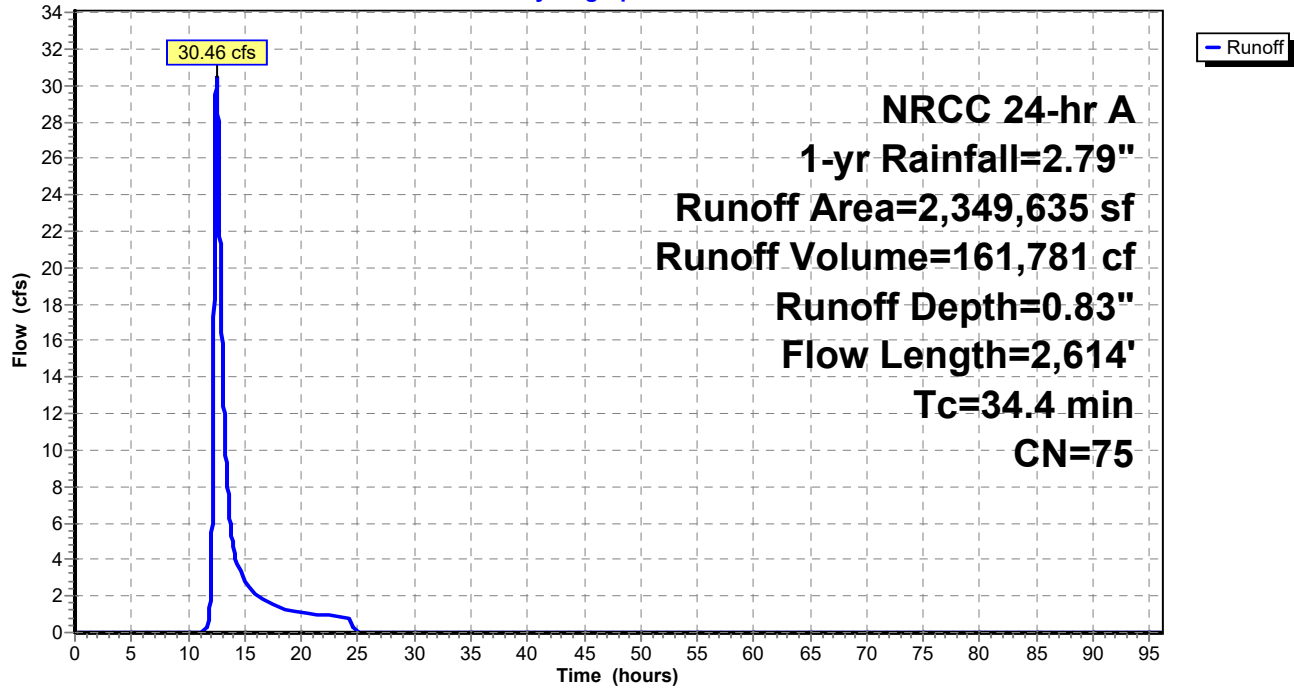
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NRCC 24-hr A 1-yr Rainfall=2.79"

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Subcatchment 2: Pre A

Hydrograph



N60 Phase-1 Pre-Dev A

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NRCC 24-hr A 1-yr Rainfall=2.79"

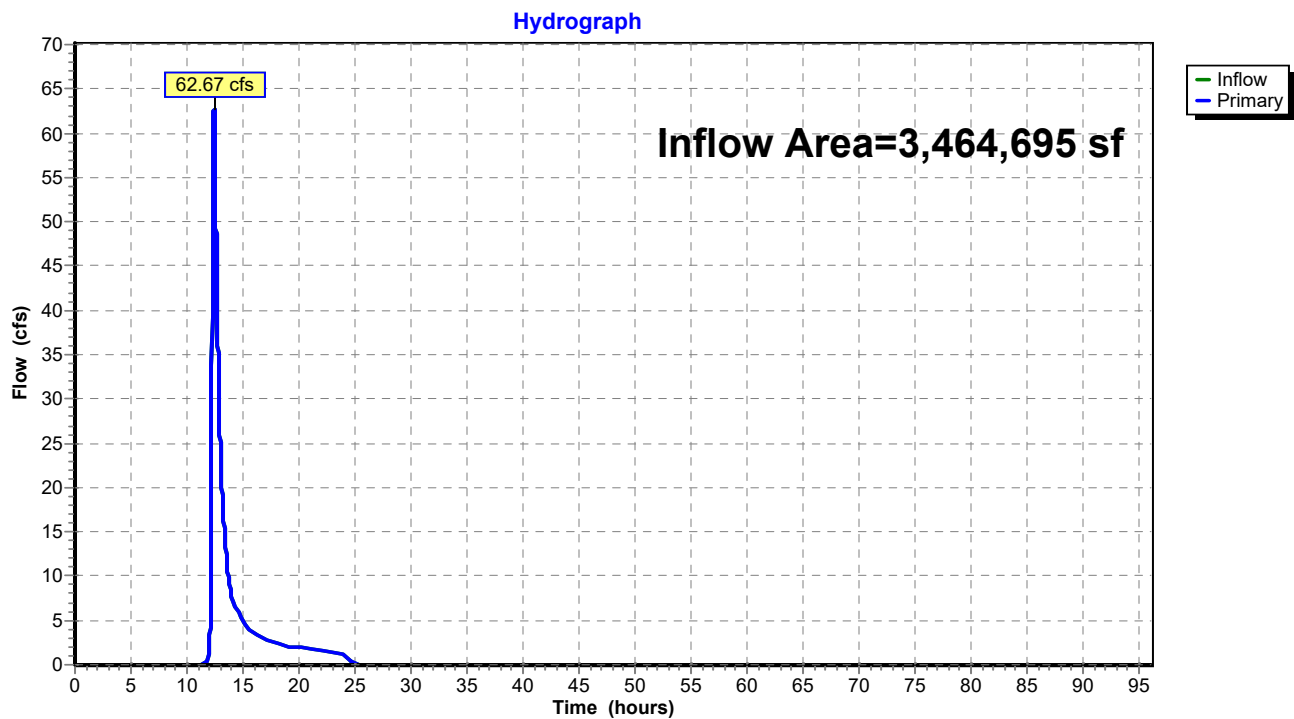
Printed 3/24/2020

Summary for Link 3: Design Point A

Inflow Area = 3,464,695 sf, 24.35% Impervious, Inflow Depth = 0.96" for 1-yr event
Inflow = 62.67 cfs @ 12.40 hrs, Volume= 277,125 cf
Primary = 62.67 cfs @ 12.40 hrs, Volume= 277,125 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3: Design Point A



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 2-yr Rainfall=3.42"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment0: A0 (Offsite)Runoff Area=1,115,060 sf 57.87% Impervious Runoff Depth=2.37"
Flow Length=1,018' Tc=12.5 min CN=90 Runoff=72.43 cfs 220,520 cf**Pond 1: Offsite Pond A**Peak Elev=361.29' Storage=78,351 cf Inflow=72.43 cfs 220,520 cf
Outflow=41.23 cfs 169,325 cf**Subcatchment2: Pre A**Runoff Area=2,349,635 sf 8.44% Impervious Runoff Depth=1.25"
Flow Length=2,614' Tc=34.4 min CN=75 Runoff=47.89 cfs 243,869 cf**Link 3: Design Point A**Inflow=87.57 cfs 413,194 cf
Primary=87.57 cfs 413,194 cf**Total Runoff Area = 3,464,695 sf Runoff Volume = 464,389 cf Average Runoff Depth = 1.61"**
75.65% Pervious = 2,621,024 sf 24.35% Impervious = 843,671 sf

N60 Phase-1 Pre-Dev A

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 0: A0 (Offsite)

Runoff = 72.43 cfs @ 12.20 hrs, Volume= 220,520 cf, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
645,334	98	Paved parking, HSG C
443,611	80	>75% Grass cover, Good, HSG D
23,572	74	>75% Grass cover, Good, HSG C
2,543	61	>75% Grass cover, Good, HSG B
1,115,060	90	Weighted Average
469,726		42.13% Pervious Area
645,334		57.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.0150	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	148	0.0574	3.86		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	740	0.0270	10.25	32.22	Pipe Channel, 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.015 Concrete sewer w/manholes & inlets
12.5	1,018	Total			

N60 Phase-1 Pre-Dev A

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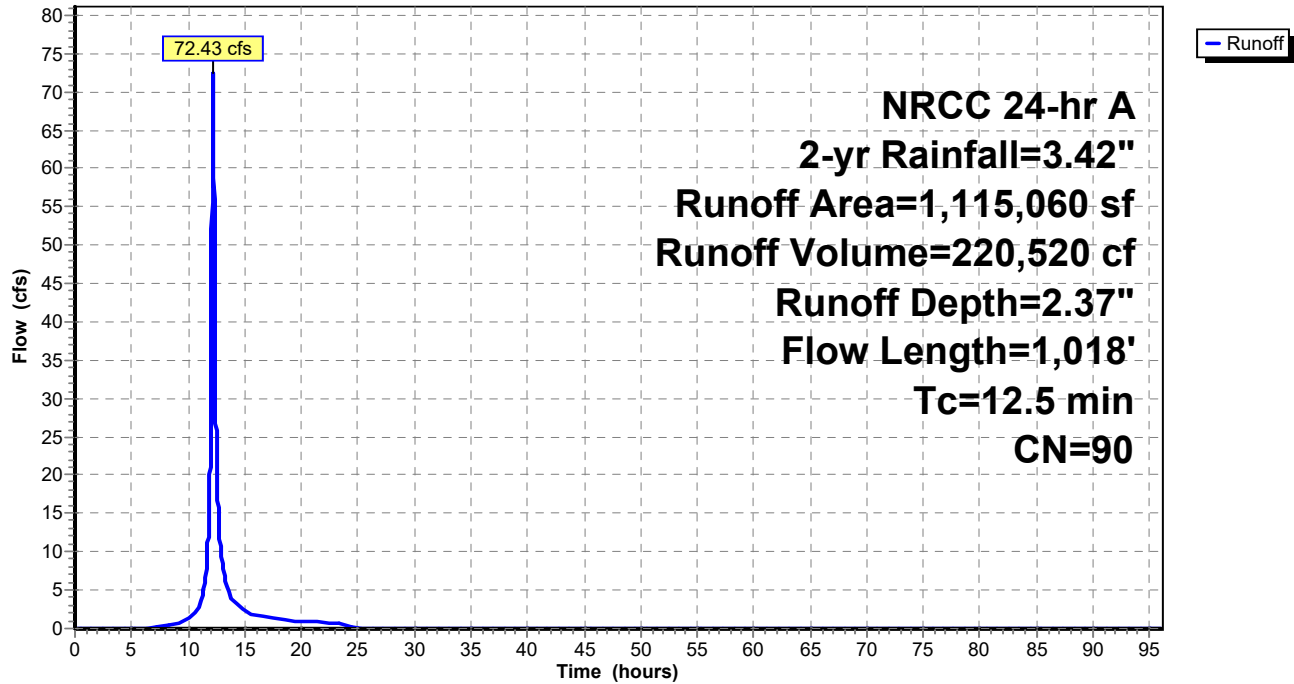
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NRCC 24-hr A 2-yr Rainfall=3.42"

Printed 3/24/2020

Subcatchment 0: A0 (Offsite)

Hydrograph



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 1: Offsite Pond A

Inflow Area = 1,115,060 sf, 57.87% Impervious, Inflow Depth = 2.37" for 2-yr event
 Inflow = 72.43 cfs @ 12.20 hrs, Volume= 220,520 cf
 Outflow = 41.23 cfs @ 12.35 hrs, Volume= 169,325 cf, Atten= 43%, Lag= 9.1 min
 Primary = 41.23 cfs @ 12.35 hrs, Volume= 169,325 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 361.29' @ 12.35 hrs Surf.Area= 22,611 sf Storage= 78,351 cf

Plug-Flow detention time= 123.4 min calculated for 169,325 cf (77% of inflow)
 Center-of-Mass det. time= 48.0 min (851.3 - 803.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	357.00'	221,816 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
357.00	14,633	679.0	0	0	14,633
358.00	16,652	698.0	15,632	15,632	16,826
359.00	17,534	715.0	17,091	32,723	18,864
360.00	19,427	745.0	18,472	51,195	22,425
362.00	24,453	804.0	43,784	94,979	29,861
364.00	28,701	854.0	53,097	148,076	36,663
365.00	36,602	901.0	32,572	180,648	43,285
366.00	45,910	1,262.0	41,168	221,816	105,432

Device	Routing	Invert	Outlet Devices
#1	Primary	357.00'	30.0" Round Culvert L= 125.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 357.00' / 351.00' S= 0.0480 ' S= 0.0480 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#2	Device 1	360.00'	36.0" x 48.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#3	Primary	364.75'	150.0' long x 36.0' 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=41.23 cfs @ 12.35 hrs HW=361.29' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 41.23 cfs @ 8.40 fps)
 2=Orifice/Grate (Passes 41.23 cfs of 131.40 cfs potential flow)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

N60 Phase-1 Pre-Dev A

Prepared by {enter your company name here}

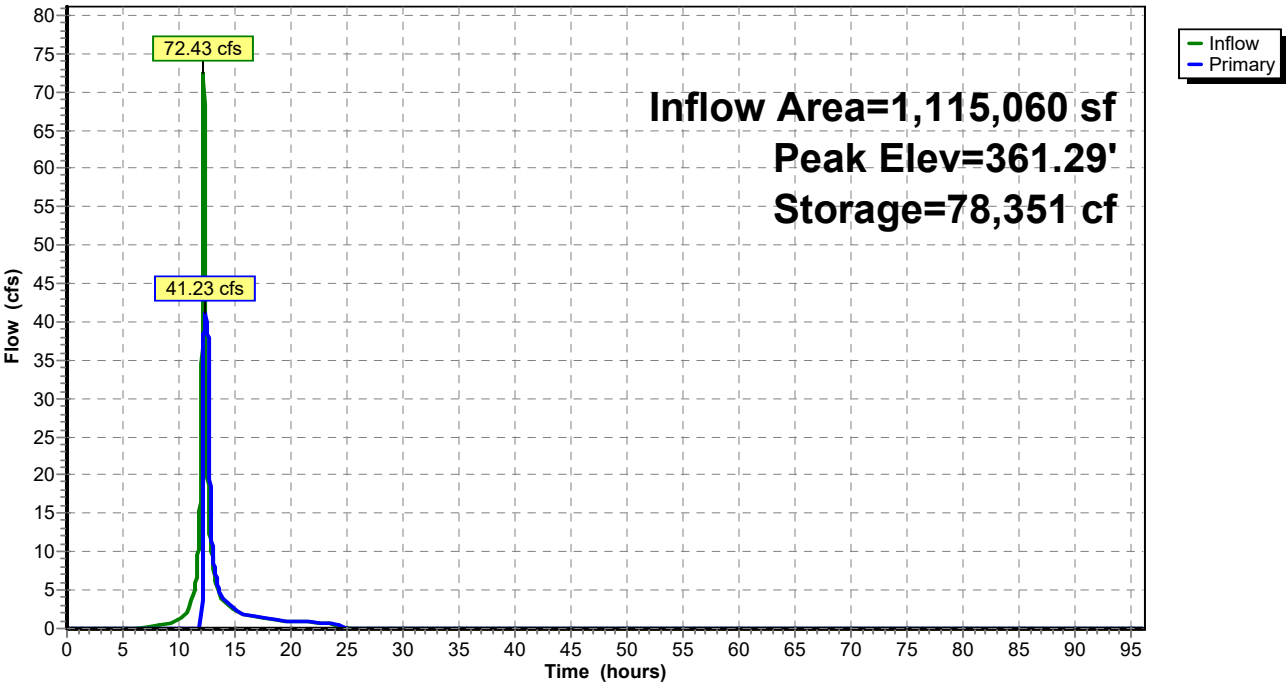
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NRCC 24-hr A 2-yr Rainfall=3.42"

Printed 3/24/2020

Pond 1: Offsite Pond A

Hydrograph



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 2: Pre A

Runoff = 47.89 cfs @ 12.50 hrs, Volume= 243,869 cf, Depth= 1.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

	Area (sf)	CN	Description
*	181,472	98	Paved parking, roofs, HSG C
	159,966	91	Newly graded area, HSG C
	339,282	74	>75% Grass cover, Good, HSG C
	4,702	80	>75% Grass cover, Good, HSG D
	358,470	70	Brush, Fair, HSG C
	77,923	77	Brush, Fair, HSG D
	20,430	60	Woods, Fair, HSG B
	193,986	77	Woods, Good, HSG D
	996,539	70	Woods, Good, HSG C
	16,865	98	Water Surface, HSG D
	2,349,635	75	Weighted Average
	2,151,298		91.56% Pervious Area
	198,337		8.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
2.4	282	0.0142	1.92		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
13.2	2,232	0.0631	2.83	5.65	Channel Flow, Area= 2.0 sf Perim= 12.0' r= 0.17' n= 0.040 Winding stream, pools & shoals
34.4	2,614	Total			

N60 Phase-1 Pre-Dev A

Prepared by {enter your company name here}

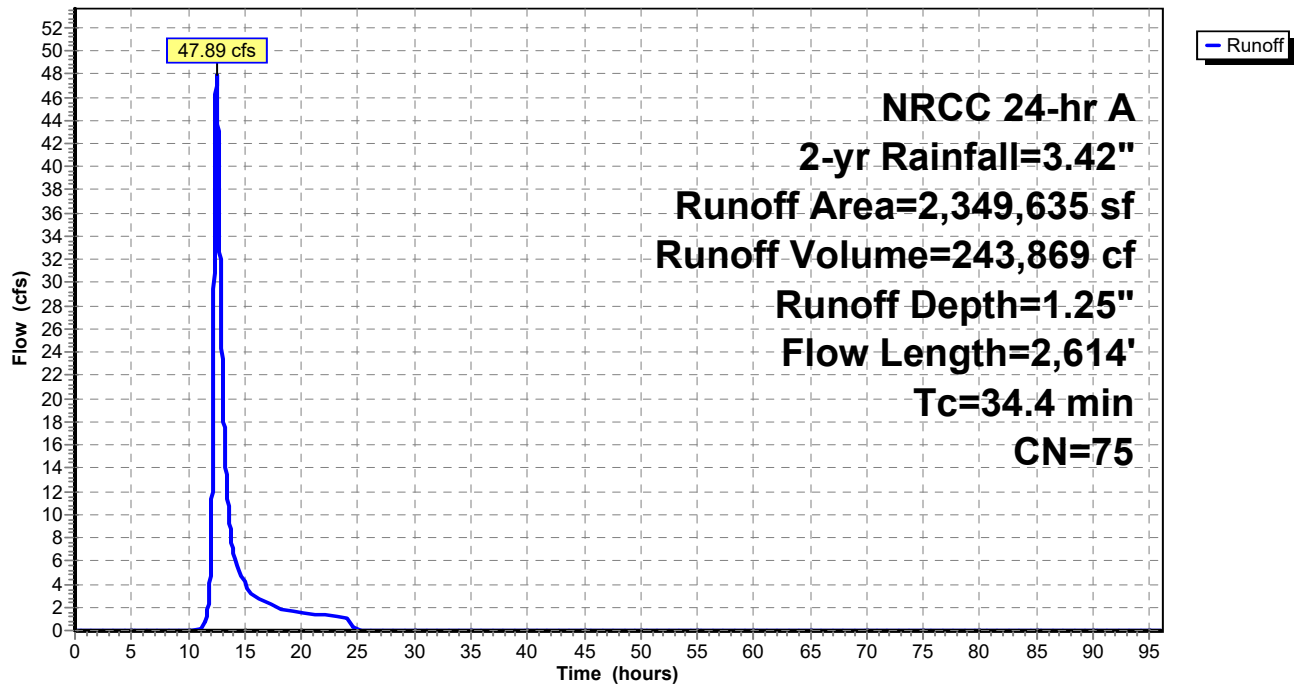
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NRCC 24-hr A 2-yr Rainfall=3.42"

Printed 3/24/2020

Subcatchment 2: Pre A

Hydrograph



N60 Phase-1 Pre-Dev A

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NRCC 24-hr A 2-yr Rainfall=3.42"

Printed 3/24/2020

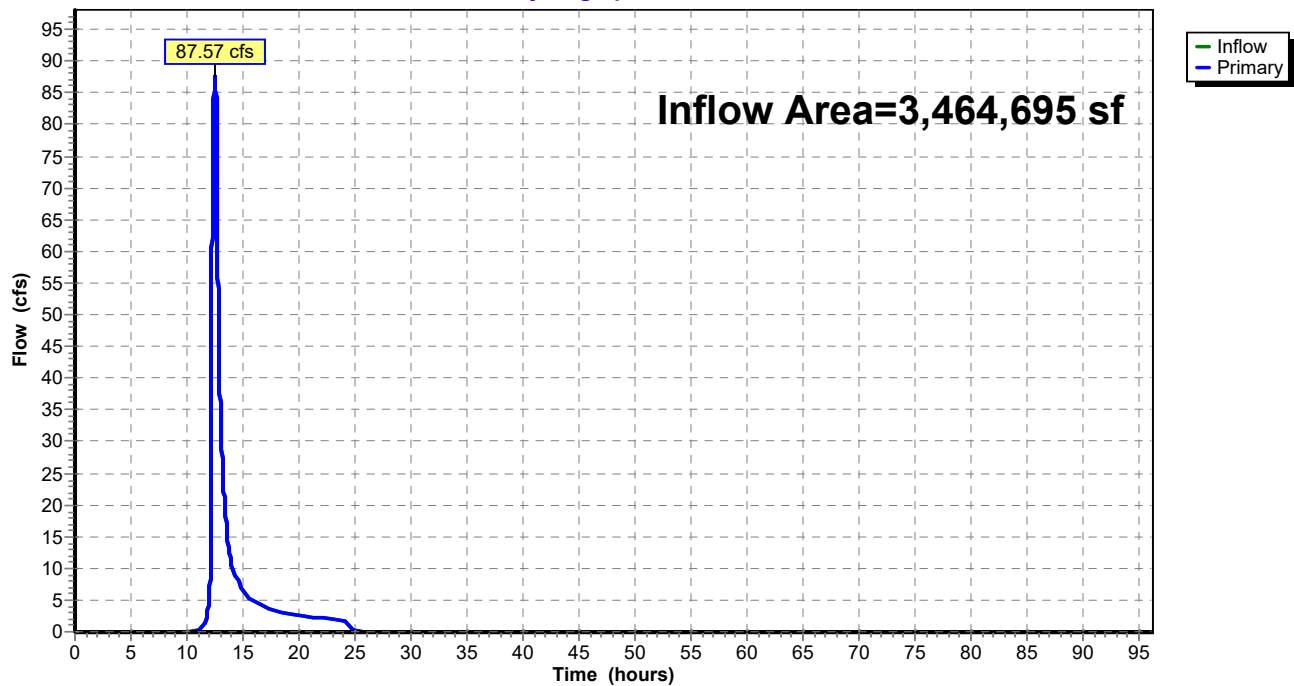
Summary for Link 3: Design Point A

Inflow Area = 3,464,695 sf, 24.35% Impervious, Inflow Depth = 1.43" for 2-yr event
Inflow = 87.57 cfs @ 12.50 hrs, Volume= 413,194 cf
Primary = 87.57 cfs @ 12.50 hrs, Volume= 413,194 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3: Design Point A

Hydrograph



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 10-yr Rainfall=5.12"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment0: A0 (Offsite)Runoff Area=1,115,060 sf 57.87% Impervious Runoff Depth=3.99"
Flow Length=1,018' Tc=12.5 min CN=90 Runoff=118.73 cfs 370,955 cf**Pond 1: Offsite Pond A**Peak Elev=363.03' Storage=121,390 cf Inflow=118.73 cfs 370,955 cf
Outflow=51.70 cfs 319,760 cf**Subcatchment2: Pre A**Runoff Area=2,349,635 sf 8.44% Impervious Runoff Depth=2.55"
Flow Length=2,614' Tc=34.4 min CN=75 Runoff=101.19 cfs 498,698 cf**Link 3: Design Point A**Inflow=152.43 cfs 818,458 cf
Primary=152.43 cfs 818,458 cf**Total Runoff Area = 3,464,695 sf Runoff Volume = 869,653 cf Average Runoff Depth = 3.01"**
75.65% Pervious = 2,621,024 sf 24.35% Impervious = 843,671 sf

N60 Phase-1 Pre-Dev A

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 0: A0 (Offsite)

Runoff = 118.73 cfs @ 12.20 hrs, Volume= 370,955 cf, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
645,334	98	Paved parking, HSG C
443,611	80	>75% Grass cover, Good, HSG D
23,572	74	>75% Grass cover, Good, HSG C
2,543	61	>75% Grass cover, Good, HSG B
1,115,060	90	Weighted Average
469,726		42.13% Pervious Area
645,334		57.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.0150	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	148	0.0574	3.86		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	740	0.0270	10.25	32.22	Pipe Channel, 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.015 Concrete sewer w/manholes & inlets
12.5	1,018	Total			

N60 Phase-1 Pre-Dev A

Prepared by {enter your company name here}

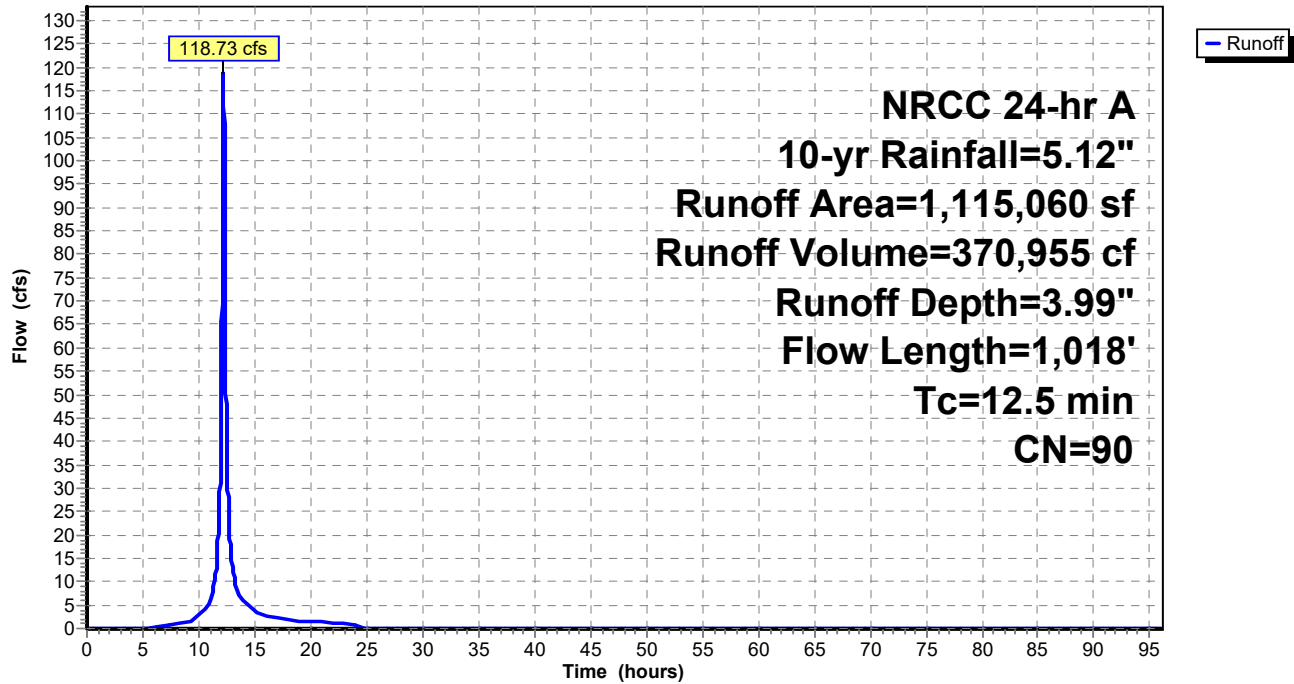
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NRCC 24-hr A 10-yr Rainfall=5.12"

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Subcatchment 0: A0 (Offsite)

Hydrograph



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Pond 1: Offsite Pond A

Inflow Area = 1,115,060 sf, 57.87% Impervious, Inflow Depth = 3.99" for 10-yr event
 Inflow = 118.73 cfs @ 12.20 hrs, Volume= 370,955 cf
 Outflow = 51.70 cfs @ 12.41 hrs, Volume= 319,760 cf, Atten= 56%, Lag= 12.7 min
 Primary = 51.70 cfs @ 12.41 hrs, Volume= 319,760 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 363.03' @ 12.41 hrs Surf.Area= 26,608 sf Storage= 121,390 cf

Plug-Flow detention time= 99.2 min calculated for 319,726 cf (86% of inflow)
 Center-of-Mass det. time= 41.8 min (832.7 - 790.9)

Volume	Invert	Avail.Storage	Storage Description		
#1	357.00'	221,816 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
357.00	14,633	679.0	0	0	14,633
358.00	16,652	698.0	15,632	15,632	16,826
359.00	17,534	715.0	17,091	32,723	18,864
360.00	19,427	745.0	18,472	51,195	22,425
362.00	24,453	804.0	43,784	94,979	29,861
364.00	28,701	854.0	53,097	148,076	36,663
365.00	36,602	901.0	32,572	180,648	43,285
366.00	45,910	1,262.0	41,168	221,816	105,432

Device	Routing	Invert	Outlet Devices
#1	Primary	357.00'	30.0" Round Culvert L= 125.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 357.00' / 351.00' S= 0.0480 ' S= 0.0480 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#2	Device 1	360.00'	36.0" x 48.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#3	Primary	364.75'	150.0' long x 36.0' 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=51.70 cfs @ 12.41 hrs HW=363.03' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 51.70 cfs @ 10.53 fps)
 2=Orifice/Grate (Passes 51.70 cfs of 201.30 cfs potential flow)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

N60 Phase-1 Pre-Dev A

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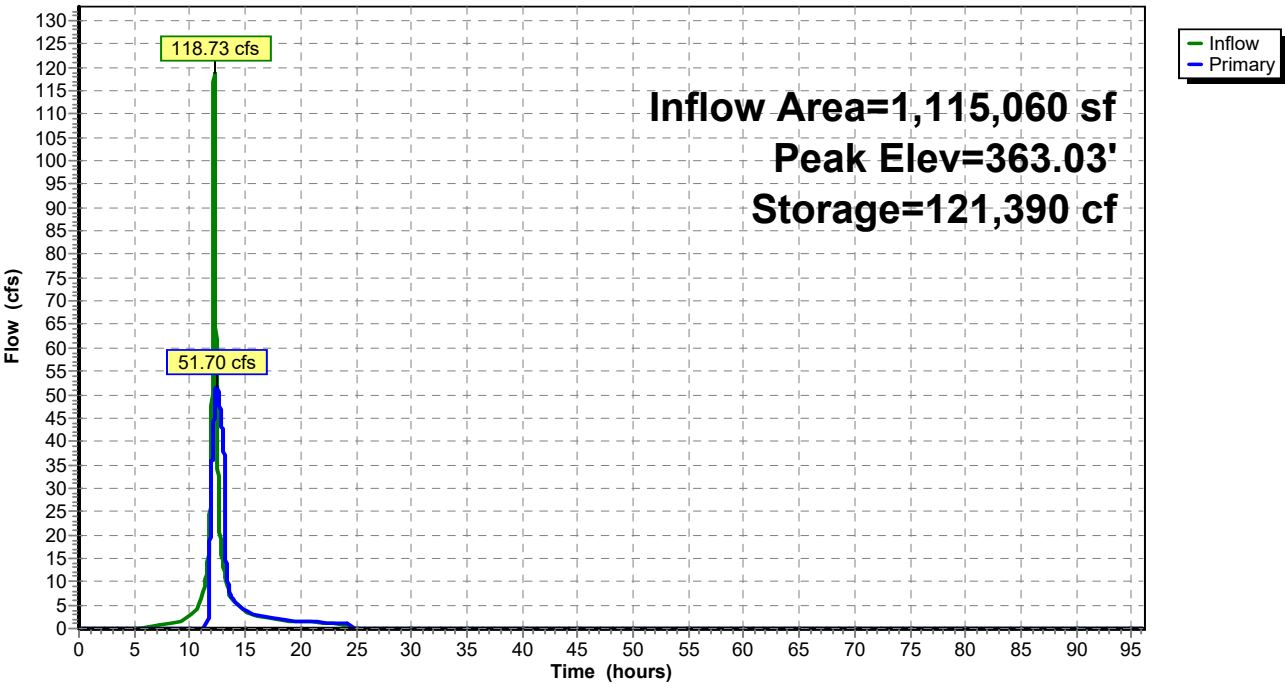
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NRCC 24-hr A 10-yr Rainfall=5.12"

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Pond 1: Offsite Pond A

Hydrograph



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 2: Pre A

Runoff = 101.19 cfs @ 12.50 hrs, Volume= 498,698 cf, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

	Area (sf)	CN	Description
*	181,472	98	Paved parking, roofs, HSG C
	159,966	91	Newly graded area, HSG C
	339,282	74	>75% Grass cover, Good, HSG C
	4,702	80	>75% Grass cover, Good, HSG D
	358,470	70	Brush, Fair, HSG C
	77,923	77	Brush, Fair, HSG D
	20,430	60	Woods, Fair, HSG B
	193,986	77	Woods, Good, HSG D
	996,539	70	Woods, Good, HSG C
	16,865	98	Water Surface, HSG D
	2,349,635	75	Weighted Average
	2,151,298		91.56% Pervious Area
	198,337		8.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
2.4	282	0.0142	1.92		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
13.2	2,232	0.0631	2.83	5.65	Channel Flow, Area= 2.0 sf Perim= 12.0' r= 0.17' n= 0.040 Winding stream, pools & shoals
34.4	2,614	Total			

N60 Phase-1 Pre-Dev A

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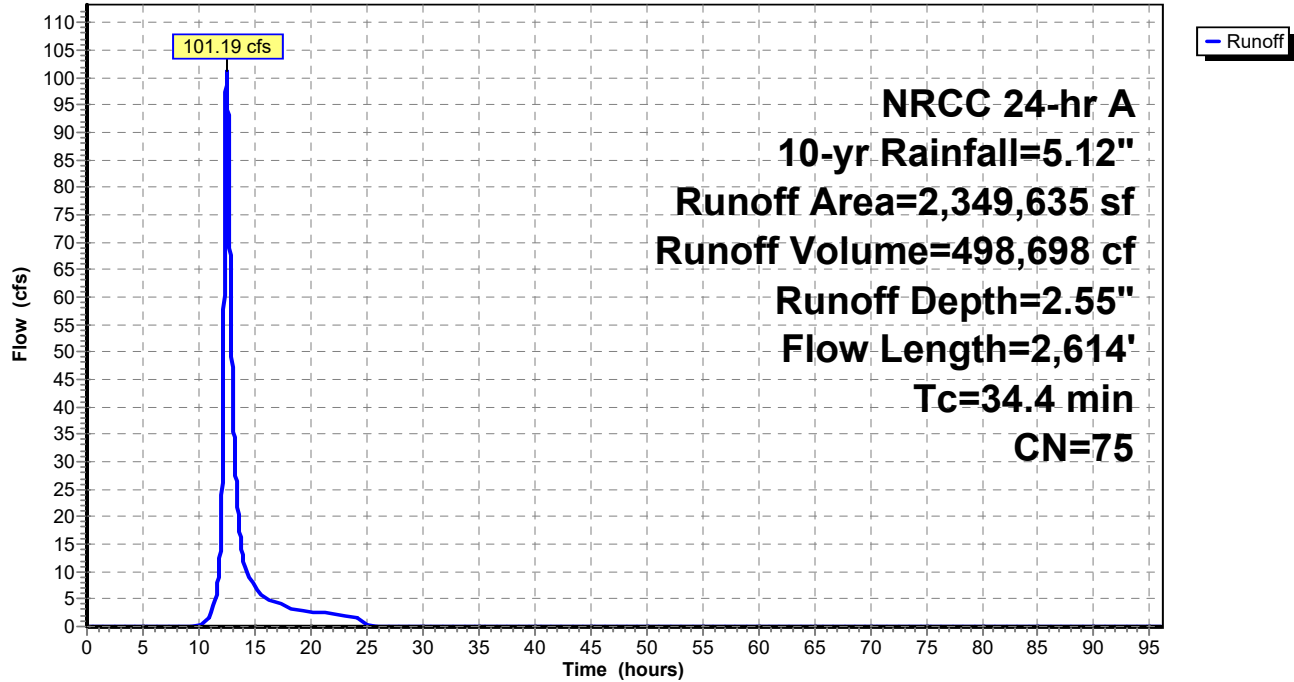
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NRCC 24-hr A 10-yr Rainfall=5.12"

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Subcatchment 2: Pre A

Hydrograph



N60 Phase-1 Pre-Dev A

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NRCC 24-hr A 10-yr Rainfall=5.12"

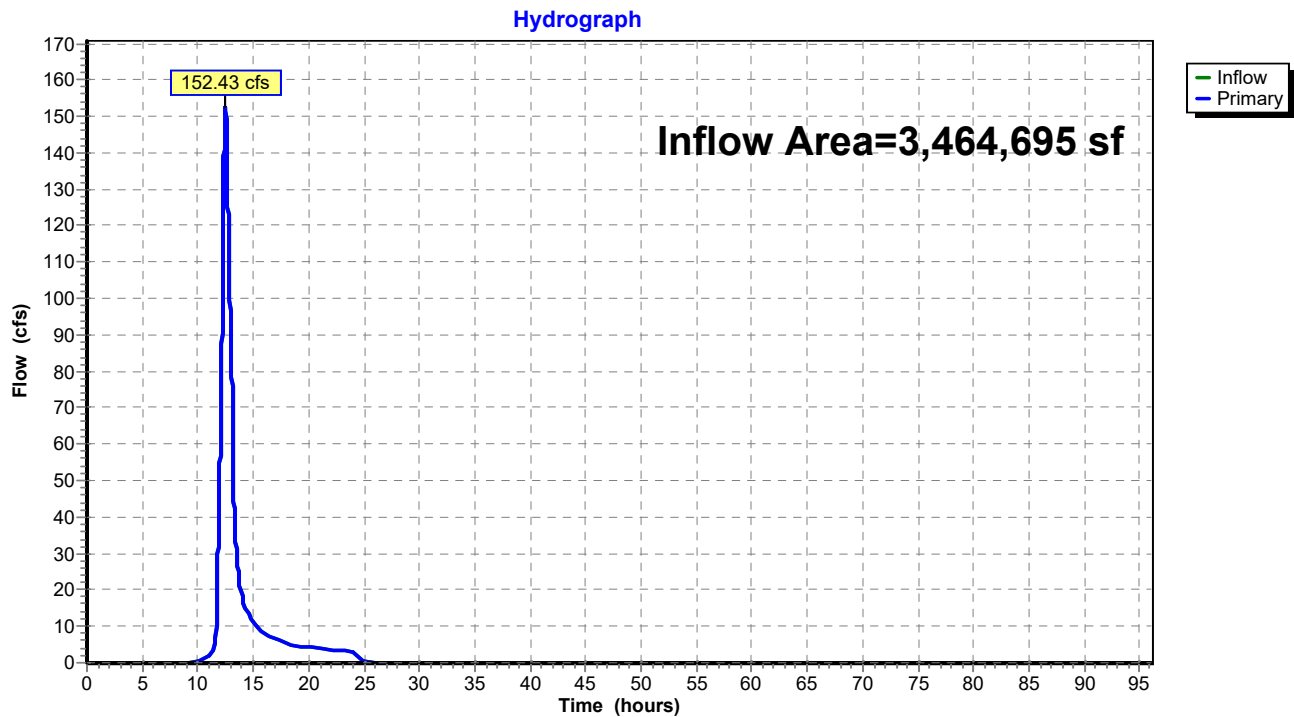
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Summary for Link 3: Design Point A

Inflow Area = 3,464,695 sf, 24.35% Impervious, Inflow Depth = 2.83" for 10-yr event
Inflow = 152.43 cfs @ 12.50 hrs, Volume= 818,458 cf
Primary = 152.43 cfs @ 12.50 hrs, Volume= 818,458 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3: Design Point A



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 25-yr Rainfall=6.46"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment0: A0 (Offsite)Runoff Area=1,115,060 sf 57.87% Impervious Runoff Depth=5.29"
Flow Length=1,018' Tc=12.5 min CN=90 Runoff=154.93 cfs 491,989 cf**Pond 1: Offsite Pond A**Peak Elev=364.35' Storage=158,428 cf Inflow=154.93 cfs 491,989 cf
Outflow=58.35 cfs 440,794 cf**Subcatchment2: Pre A**Runoff Area=2,349,635 sf 8.44% Impervious Runoff Depth=3.68"
Flow Length=2,614' Tc=34.4 min CN=75 Runoff=146.55 cfs 720,052 cf**Link 3: Design Point A**Inflow=204.71 cfs 1,160,846 cf
Primary=204.71 cfs 1,160,846 cf**Total Runoff Area = 3,464,695 sf Runoff Volume = 1,212,041 cf Average Runoff Depth = 4.20"**
75.65% Pervious = 2,621,024 sf 24.35% Impervious = 843,671 sf

N60 Phase-1 Pre-Dev A

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 0: A0 (Offsite)

Runoff = 154.93 cfs @ 12.20 hrs, Volume= 491,989 cf, Depth= 5.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
645,334	98	Paved parking, HSG C
443,611	80	>75% Grass cover, Good, HSG D
23,572	74	>75% Grass cover, Good, HSG C
2,543	61	>75% Grass cover, Good, HSG B
1,115,060	90	Weighted Average
469,726		42.13% Pervious Area
645,334		57.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.0150	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	148	0.0574	3.86		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	740	0.0270	10.25	32.22	Pipe Channel, 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.015 Concrete sewer w/manholes & inlets
12.5	1,018	Total			

N60 Phase-1 Pre-Dev A

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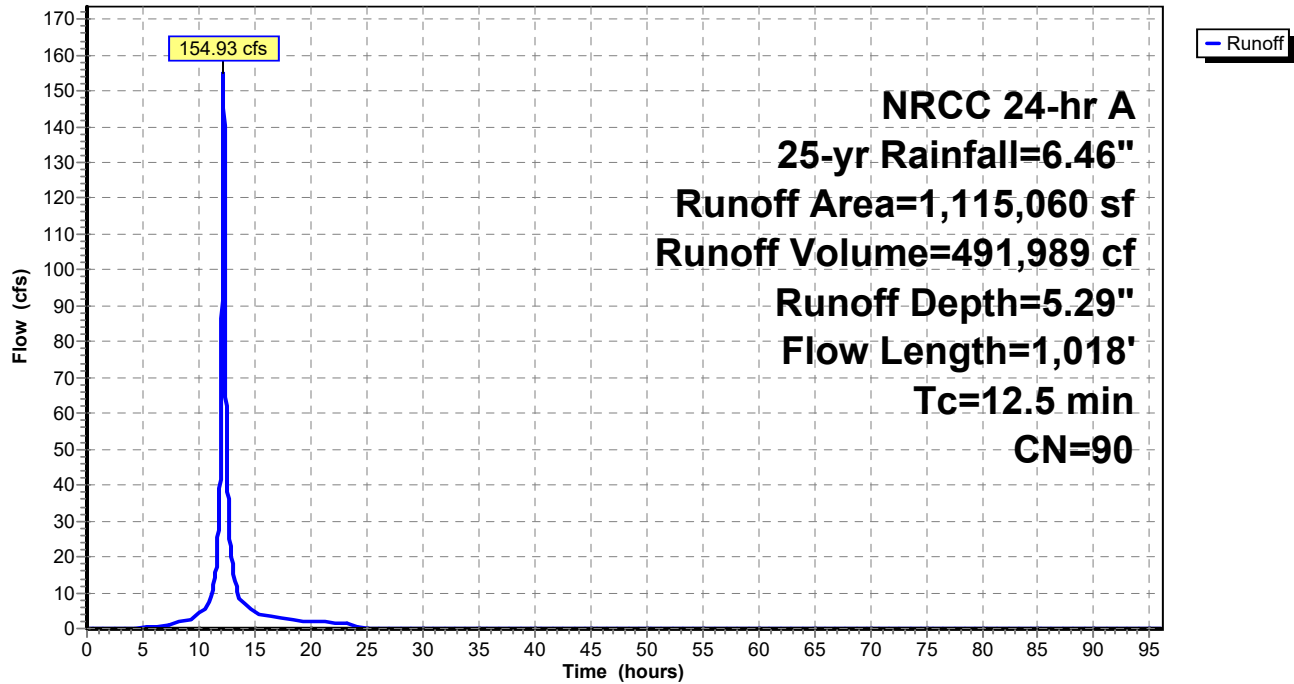
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NRCC 24-hr A 25-yr Rainfall=6.46"

Printed 3/24/2020

Subcatchment 0: A0 (Offsite)

Hydrograph



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Pond 1: Offsite Pond A

Inflow Area = 1,115,060 sf, 57.87% Impervious, Inflow Depth = 5.29" for 25-yr event
 Inflow = 154.93 cfs @ 12.20 hrs, Volume= 491,989 cf
 Outflow = 58.35 cfs @ 12.45 hrs, Volume= 440,794 cf, Atten= 62%, Lag= 14.8 min
 Primary = 58.35 cfs @ 12.45 hrs, Volume= 440,794 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 364.35' @ 12.45 hrs Surf.Area= 31,319 sf Storage= 158,428 cf

Plug-Flow detention time= 90.4 min calculated for 440,794 cf (90% of inflow)
 Center-of-Mass det. time= 42.1 min (826.5 - 784.4)

Volume	Invert	Avail.Storage	Storage Description
#1	357.00'	221,816 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
357.00	14,633	679.0	0	0	14,633
358.00	16,652	698.0	15,632	15,632	16,826
359.00	17,534	715.0	17,091	32,723	18,864
360.00	19,427	745.0	18,472	51,195	22,425
362.00	24,453	804.0	43,784	94,979	29,861
364.00	28,701	854.0	53,097	148,076	36,663
365.00	36,602	901.0	32,572	180,648	43,285
366.00	45,910	1,262.0	41,168	221,816	105,432

Device	Routing	Invert	Outlet Devices
#1	Primary	357.00'	30.0" Round Culvert L= 125.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 357.00' / 351.00' S= 0.0480 ' S= 0.0480 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#2	Device 1	360.00'	36.0" x 48.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#3	Primary	364.75'	150.0' long x 36.0' 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=58.35 cfs @ 12.45 hrs HW=364.34' TW=0.00' (Dynamic Tailwater)

1=Culvert (Inlet Controls 58.35 cfs @ 11.89 fps)
 2=Orifice/Grate (Passes 58.35 cfs of 240.87 cfs potential flow)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

N60 Phase-1 Pre-Dev A

Prepared by {enter your company name here}

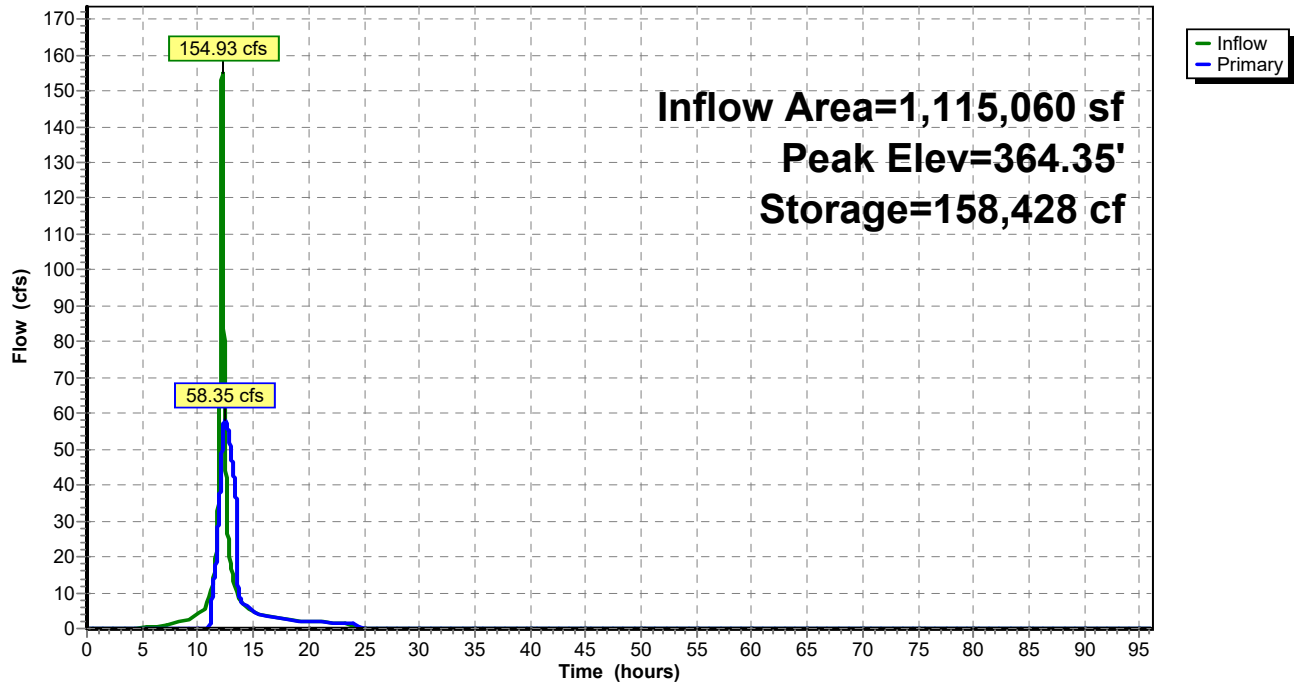
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NRCC 24-hr A 25-yr Rainfall=6.46"

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Pond 1: Offsite Pond A

Hydrograph



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 2: Pre A

Runoff = 146.55 cfs @ 12.50 hrs, Volume= 720,052 cf, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

	Area (sf)	CN	Description
*	181,472	98	Paved parking, roofs, HSG C
	159,966	91	Newly graded area, HSG C
	339,282	74	>75% Grass cover, Good, HSG C
	4,702	80	>75% Grass cover, Good, HSG D
	358,470	70	Brush, Fair, HSG C
	77,923	77	Brush, Fair, HSG D
	20,430	60	Woods, Fair, HSG B
	193,986	77	Woods, Good, HSG D
	996,539	70	Woods, Good, HSG C
	16,865	98	Water Surface, HSG D
	2,349,635	75	Weighted Average
	2,151,298		91.56% Pervious Area
	198,337		8.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
2.4	282	0.0142	1.92		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
13.2	2,232	0.0631	2.83	5.65	Channel Flow, Area= 2.0 sf Perim= 12.0' r= 0.17' n= 0.040 Winding stream, pools & shoals
34.4	2,614	Total			

N60 Phase-1 Pre-Dev A

Prepared by {enter your company name here}

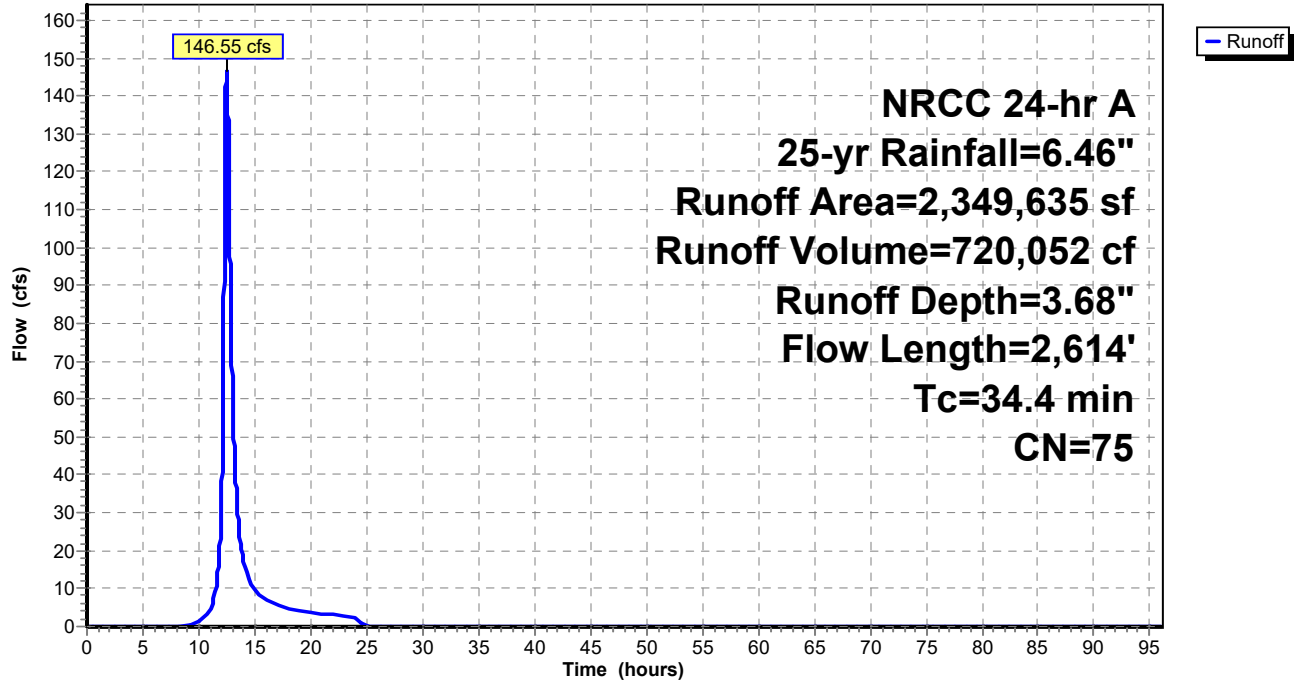
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NRCC 24-hr A 25-yr Rainfall=6.46"

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Subcatchment 2: Pre A

Hydrograph



N60 Phase-1 Pre-Dev A

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NRCC 24-hr A 25-yr Rainfall=6.46"

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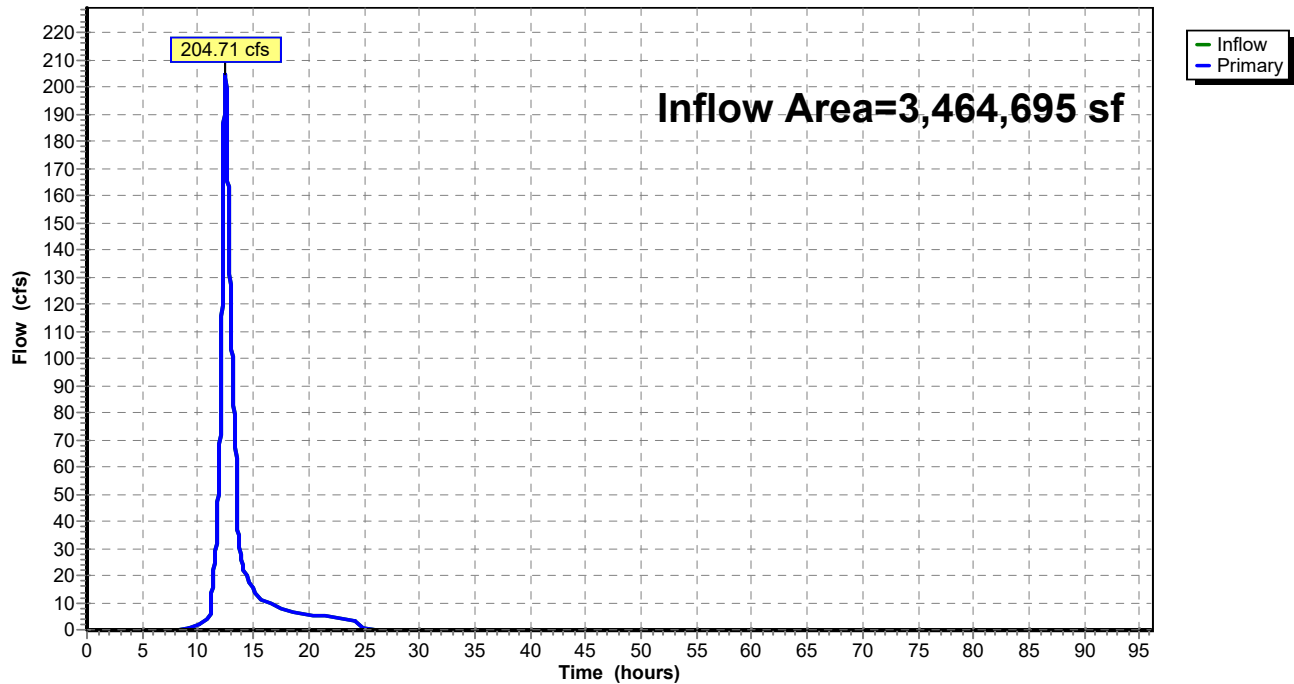
Summary for Link 3: Design Point A

Inflow Area = 3,464,695 sf, 24.35% Impervious, Inflow Depth = 4.02" for 25-yr event
Inflow = 204.71 cfs @ 12.49 hrs, Volume= 1,160,846 cf
Primary = 204.71 cfs @ 12.49 hrs, Volume= 1,160,846 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3: Design Point A

Hydrograph



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 50-yr Rainfall=7.70"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment0: A0 (Offsite)Runoff Area=1,115,060 sf 57.87% Impervious Runoff Depth=6.51"
Flow Length=1,018' Tc=12.5 min CN=90 Runoff=188.18 cfs 604,958 cf**Pond 1: Offsite Pond A**Peak Elev=364.99' Storage=180,130 cf Inflow=188.18 cfs 604,958 cf
Outflow=107.44 cfs 553,763 cf**Subcatchment2: Pre A**Runoff Area=2,349,635 sf 8.44% Impervious Runoff Depth=4.77"
Flow Length=2,614' Tc=34.4 min CN=75 Runoff=189.66 cfs 934,335 cf**Link 3: Design Point A**Inflow=277.74 cfs 1,488,097 cf
Primary=277.74 cfs 1,488,097 cf**Total Runoff Area = 3,464,695 sf Runoff Volume = 1,539,292 cf Average Runoff Depth = 5.33"**
75.65% Pervious = 2,621,024 sf 24.35% Impervious = 843,671 sf

N60 Phase-1 Pre-Dev A

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 0: A0 (Offsite)

Runoff = 188.18 cfs @ 12.20 hrs, Volume= 604,958 cf, Depth= 6.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
645,334	98	Paved parking, HSG C
443,611	80	>75% Grass cover, Good, HSG D
23,572	74	>75% Grass cover, Good, HSG C
2,543	61	>75% Grass cover, Good, HSG B
1,115,060	90	Weighted Average
469,726		42.13% Pervious Area
645,334		57.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.0150	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	148	0.0574	3.86		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	740	0.0270	10.25	32.22	Pipe Channel, 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.015 Concrete sewer w/manholes & inlets
12.5	1,018	Total			

N60 Phase-1 Pre-Dev A

Prepared by {enter your company name here}

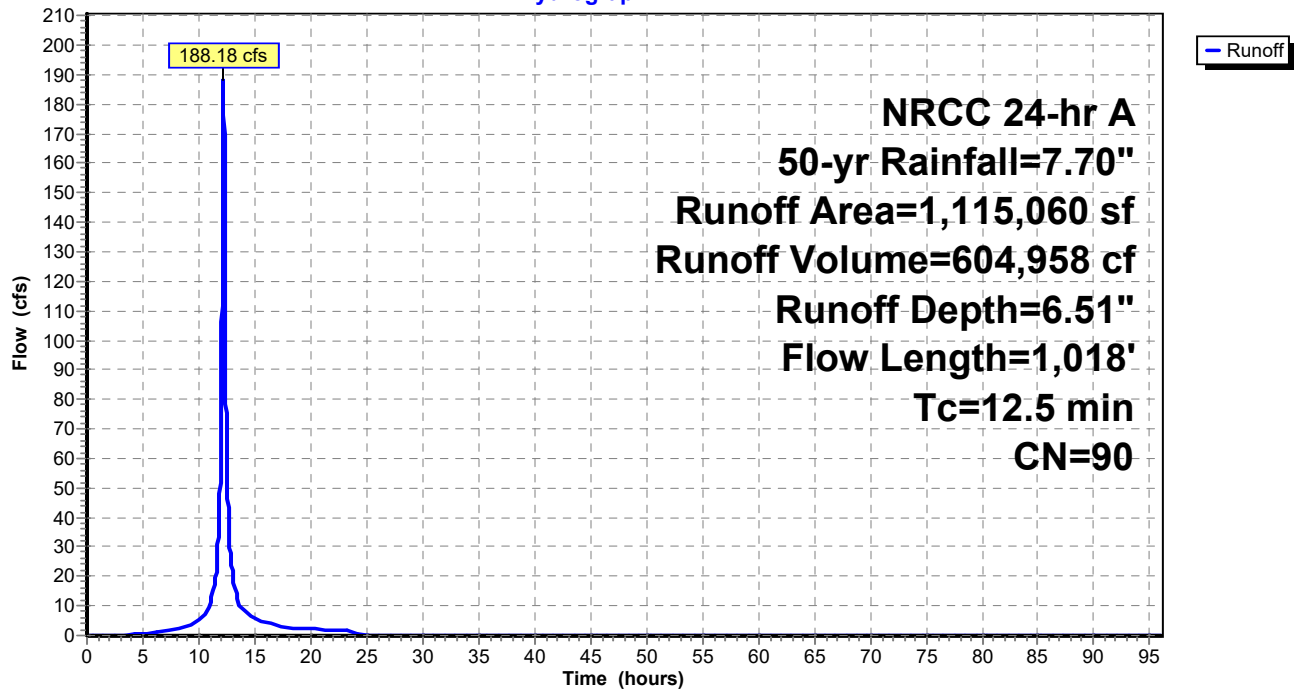
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NRCC 24-hr A 50-yr Rainfall=7.70"

Printed 3/24/2020

Subcatchment 0: A0 (Offsite)

Hydrograph



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Pond 1: Offsite Pond A

Inflow Area = 1,115,060 sf, 57.87% Impervious, Inflow Depth = 6.51" for 50-yr event
 Inflow = 188.18 cfs @ 12.20 hrs, Volume= 604,958 cf
 Outflow = 107.44 cfs @ 12.35 hrs, Volume= 553,763 cf, Atten= 43%, Lag= 8.9 min
 Primary = 107.44 cfs @ 12.35 hrs, Volume= 553,763 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 364.99' @ 12.35 hrs Surf.Area= 36,483 sf Storage= 180,130 cf

Plug-Flow detention time= 83.1 min calculated for 553,763 cf (92% of inflow)
 Center-of-Mass det. time= 41.1 min (820.8 - 779.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	357.00'	221,816 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
357.00	14,633	679.0	0	0	14,633
358.00	16,652	698.0	15,632	15,632	16,826
359.00	17,534	715.0	17,091	32,723	18,864
360.00	19,427	745.0	18,472	51,195	22,425
362.00	24,453	804.0	43,784	94,979	29,861
364.00	28,701	854.0	53,097	148,076	36,663
365.00	36,602	901.0	32,572	180,648	43,285
366.00	45,910	1,262.0	41,168	221,816	105,432

Device	Routing	Invert	Outlet Devices
#1	Primary	357.00'	30.0" Round Culvert L= 125.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 357.00' / 351.00' S= 0.0480 ' S= 0.0480 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#2	Device 1	360.00'	36.0" x 48.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#3	Primary	364.75'	150.0' long x 36.0' 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=107.34 cfs @ 12.35 hrs HW=364.99' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 61.34 cfs @ 12.50 fps)
 2=Orifice/Grate (Passes 61.34 cfs of 258.02 cfs potential flow)
 3=Broad-Crested Rectangular Weir (Weir Controls 46.00 cfs @ 1.30 fps)

N60 Phase-1 Pre-Dev A

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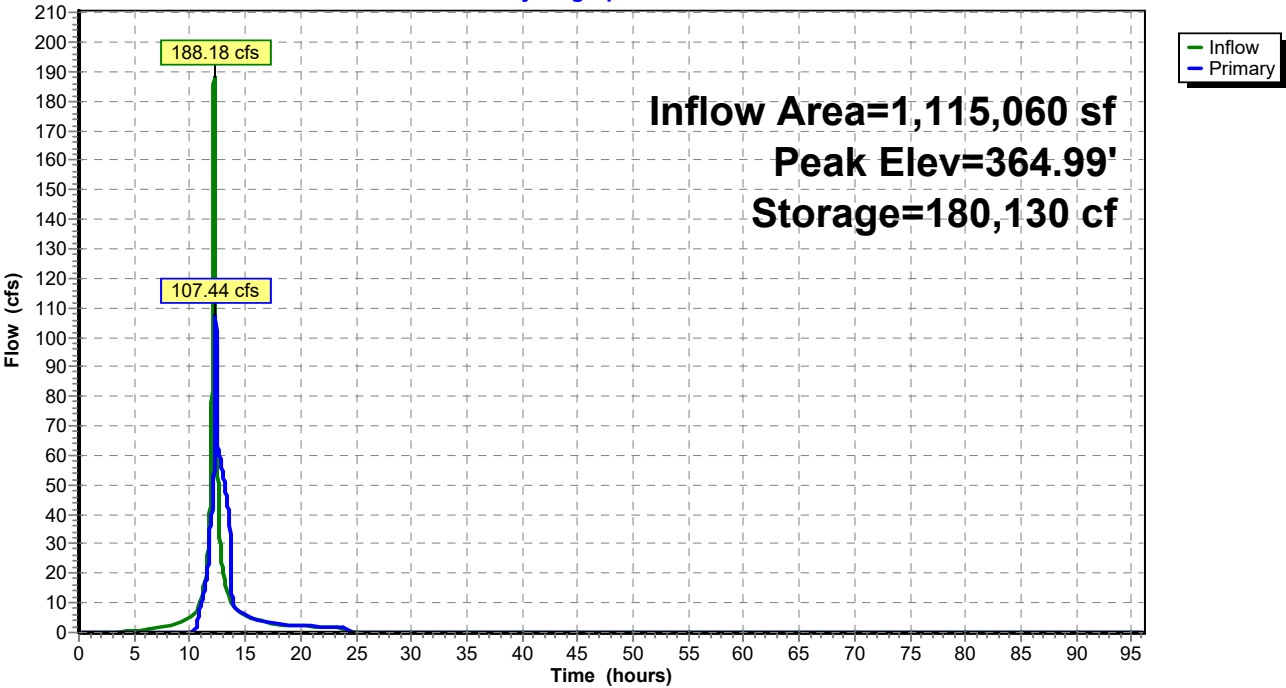
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NRCC 24-hr A 50-yr Rainfall=7.70"

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Pond 1: Offsite Pond A

Hydrograph



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 2: Pre A

Runoff = 189.66 cfs @ 12.49 hrs, Volume= 934,335 cf, Depth= 4.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

	Area (sf)	CN	Description
*	181,472	98	Paved parking, roofs, HSG C
	159,966	91	Newly graded area, HSG C
	339,282	74	>75% Grass cover, Good, HSG C
	4,702	80	>75% Grass cover, Good, HSG D
	358,470	70	Brush, Fair, HSG C
	77,923	77	Brush, Fair, HSG D
	20,430	60	Woods, Fair, HSG B
	193,986	77	Woods, Good, HSG D
	996,539	70	Woods, Good, HSG C
	16,865	98	Water Surface, HSG D
	2,349,635	75	Weighted Average
	2,151,298		91.56% Pervious Area
	198,337		8.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
2.4	282	0.0142	1.92		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
13.2	2,232	0.0631	2.83	5.65	Channel Flow, Area= 2.0 sf Perim= 12.0' r= 0.17' n= 0.040 Winding stream, pools & shoals
34.4	2,614	Total			

N60 Phase-1 Pre-Dev A

Prepared by {enter your company name here}

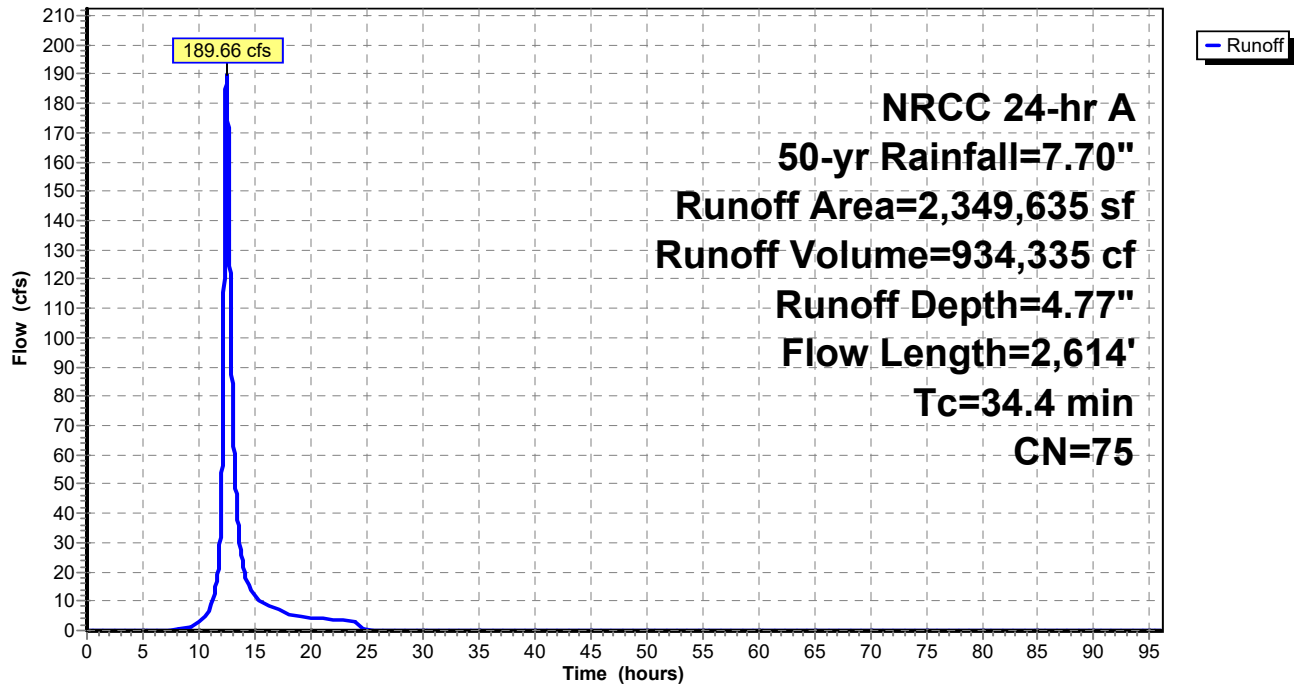
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NRCC 24-hr A 50-yr Rainfall=7.70"

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Subcatchment 2: Pre A

Hydrograph



N60 Phase-1 Pre-Dev A

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NRCC 24-hr A 50-yr Rainfall=7.70"

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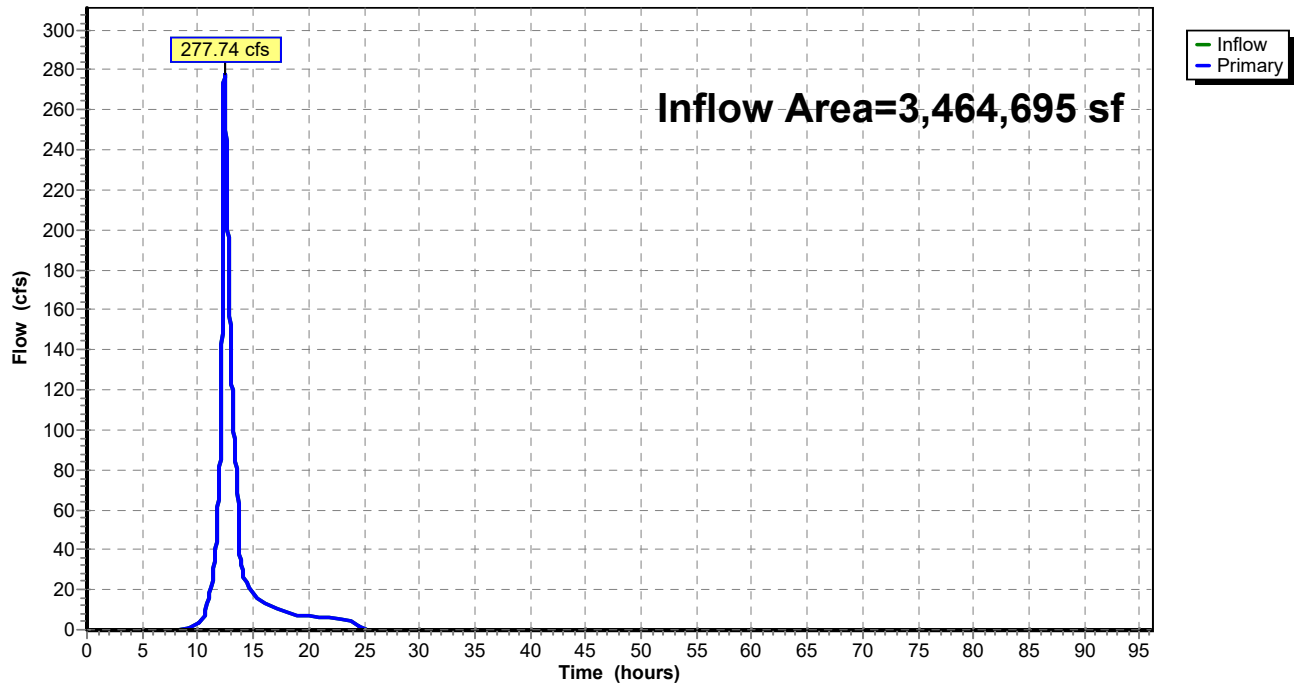
Summary for Link 3: Design Point A

Inflow Area = 3,464,695 sf, 24.35% Impervious, Inflow Depth = 5.15" for 50-yr event
Inflow = 277.74 cfs @ 12.38 hrs, Volume= 1,488,097 cf
Primary = 277.74 cfs @ 12.38 hrs, Volume= 1,488,097 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 3: Design Point A

Hydrograph



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 100-yr Rainfall=9.18"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment0: A0 (Offsite)Runoff Area=1,115,060 sf 57.87% Impervious Runoff Depth=7.97"
Flow Length=1,018' Tc=12.5 min CN=90 Runoff=227.61 cfs 740,519 cf**Pond 1: Offsite Pond A**Peak Elev=365.20' Storage=188,028 cf Inflow=227.61 cfs 740,519 cf
Outflow=183.31 cfs 689,324 cf**Subcatchment2: Pre A**Runoff Area=2,349,635 sf 8.44% Impervious Runoff Depth=6.12"
Flow Length=2,614' Tc=34.4 min CN=75 Runoff=241.96 cfs 1,197,905 cf**Link 3: Design Point A**Inflow=364.38 cfs 1,887,228 cf
Primary=364.38 cfs 1,887,228 cf**Total Runoff Area = 3,464,695 sf Runoff Volume = 1,938,423 cf Average Runoff Depth = 6.71"**
75.65% Pervious = 2,621,024 sf 24.35% Impervious = 843,671 sf

N60 Phase-1 Pre-Dev A

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 0: A0 (Offsite)

Runoff = 227.61 cfs @ 12.20 hrs, Volume= 740,519 cf, Depth= 7.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
645,334	98	Paved parking, HSG C
443,611	80	>75% Grass cover, Good, HSG D
23,572	74	>75% Grass cover, Good, HSG C
2,543	61	>75% Grass cover, Good, HSG B
1,115,060	90	Weighted Average
469,726		42.13% Pervious Area
645,334		57.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.0150	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	148	0.0574	3.86		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	740	0.0270	10.25	32.22	Pipe Channel, 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.015 Concrete sewer w/manholes & inlets
12.5	1,018	Total			

N60 Phase-1 Pre-Dev A

Prepared by {enter your company name here}

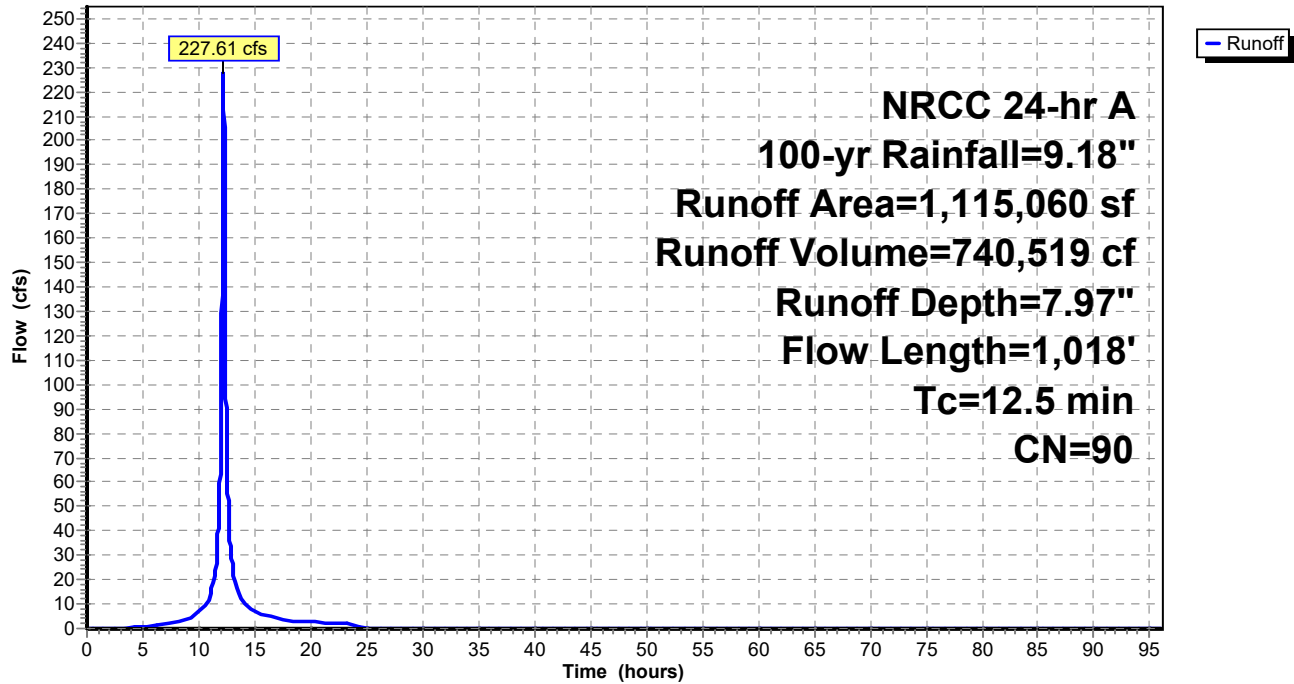
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NRCC 24-hr A 100-yr Rainfall=9.18"

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Subcatchment 0: A0 (Offsite)

Hydrograph



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 1: Offsite Pond A

Inflow Area = 1,115,060 sf, 57.87% Impervious, Inflow Depth = 7.97" for 100-yr event
 Inflow = 227.61 cfs @ 12.20 hrs, Volume= 740,519 cf
 Outflow = 183.31 cfs @ 12.28 hrs, Volume= 689,324 cf, Atten= 19%, Lag= 4.8 min
 Primary = 183.31 cfs @ 12.28 hrs, Volume= 689,324 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 365.20' @ 12.28 hrs Surf.Area= 38,352 sf Storage= 188,028 cf

Plug-Flow detention time= 74.7 min calculated for 689,324 cf (93% of inflow)
 Center-of-Mass det. time= 38.3 min (813.6 - 775.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	357.00'	221,816 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
357.00	14,633	679.0	0	0	14,633
358.00	16,652	698.0	15,632	15,632	16,826
359.00	17,534	715.0	17,091	32,723	18,864
360.00	19,427	745.0	18,472	51,195	22,425
362.00	24,453	804.0	43,784	94,979	29,861
364.00	28,701	854.0	53,097	148,076	36,663
365.00	36,602	901.0	32,572	180,648	43,285
366.00	45,910	1,262.0	41,168	221,816	105,432

Device	Routing	Invert	Outlet Devices
#1	Primary	357.00'	30.0" Round Culvert L= 125.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 357.00' / 351.00' S= 0.0480 ' S= 0.0480 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#2	Device 1	360.00'	36.0" x 48.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#3	Primary	364.75'	150.0' long x 36.0' 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=183.09 cfs @ 12.28 hrs HW=365.20' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 62.29 cfs @ 12.69 fps)
 2=Orifice/Grate (Passes 62.29 cfs of 263.43 cfs potential flow)
 3=Broad-Crested Rectangular Weir (Weir Controls 120.80 cfs @ 1.80 fps)

N60 Phase-1 Pre-Dev A

Prepared by {enter your company name here}

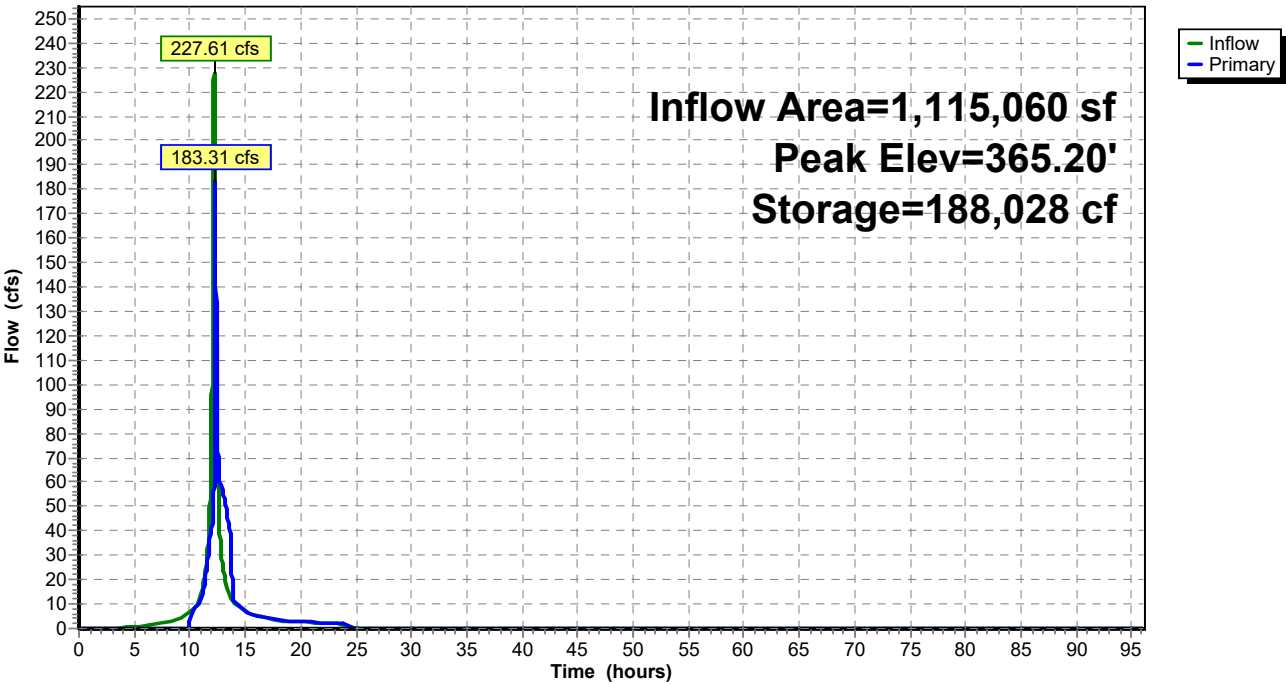
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NRCC 24-hr A 100-yr Rainfall=9.18"

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Pond 1: Offsite Pond A

Hydrograph



N60 Phase-1 Pre-Dev A

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 2: Pre A

Runoff = 241.96 cfs @ 12.49 hrs, Volume= 1,197,905 cf, Depth= 6.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

	Area (sf)	CN	Description
*	181,472	98	Paved parking, roofs, HSG C
	159,966	91	Newly graded area, HSG C
	339,282	74	>75% Grass cover, Good, HSG C
	4,702	80	>75% Grass cover, Good, HSG D
	358,470	70	Brush, Fair, HSG C
	77,923	77	Brush, Fair, HSG D
	20,430	60	Woods, Fair, HSG B
	193,986	77	Woods, Good, HSG D
	996,539	70	Woods, Good, HSG C
	16,865	98	Water Surface, HSG D
	2,349,635	75	Weighted Average
	2,151,298		91.56% Pervious Area
	198,337		8.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
2.4	282	0.0142	1.92		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
13.2	2,232	0.0631	2.83	5.65	Channel Flow, Area= 2.0 sf Perim= 12.0' r= 0.17' n= 0.040 Winding stream, pools & shoals
34.4	2,614	Total			

N60 Phase-1 Pre-Dev A

Prepared by {enter your company name here}

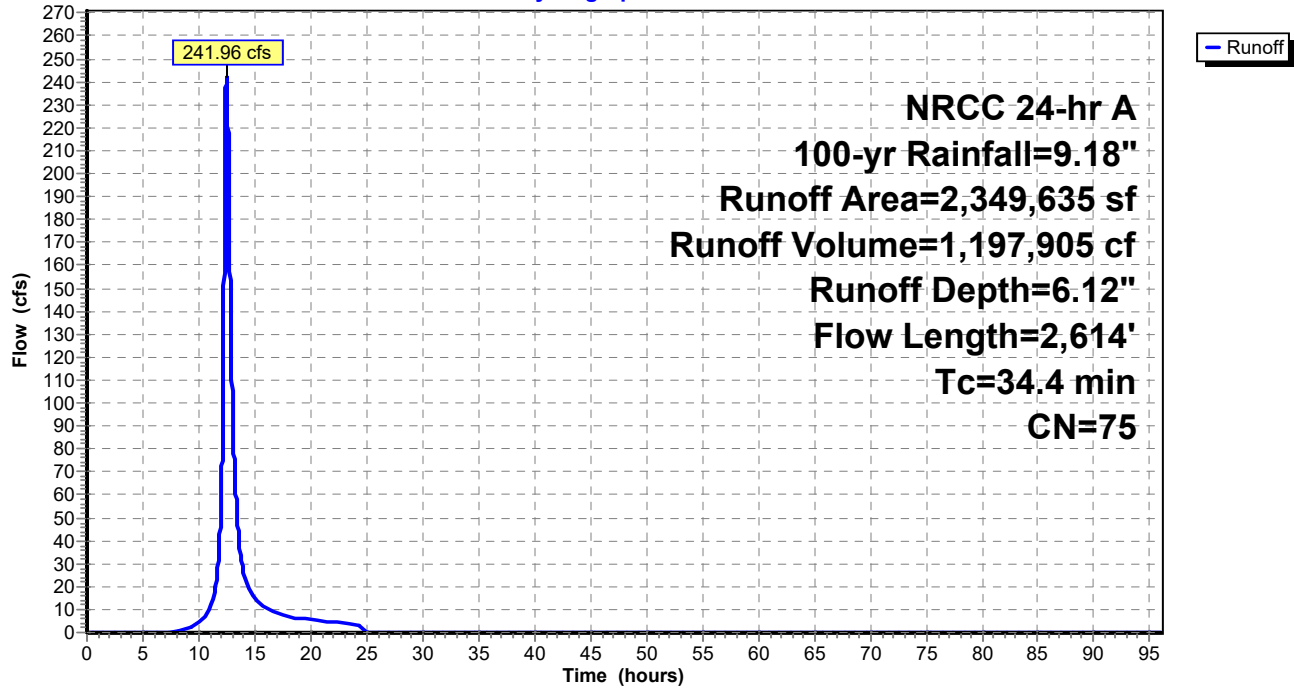
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NRCC 24-hr A 100-yr Rainfall=9.18"

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Subcatchment 2: Pre A

Hydrograph



N60 Phase-1 Pre-Dev A

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NRCC 24-hr A 100-yr Rainfall=9.18"

Printed 3/24/2020

Summary for Link 3: Design Point A

Inflow Area = 3,464,695 sf, 24.35% Impervious, Inflow Depth = 6.54" for 100-yr event

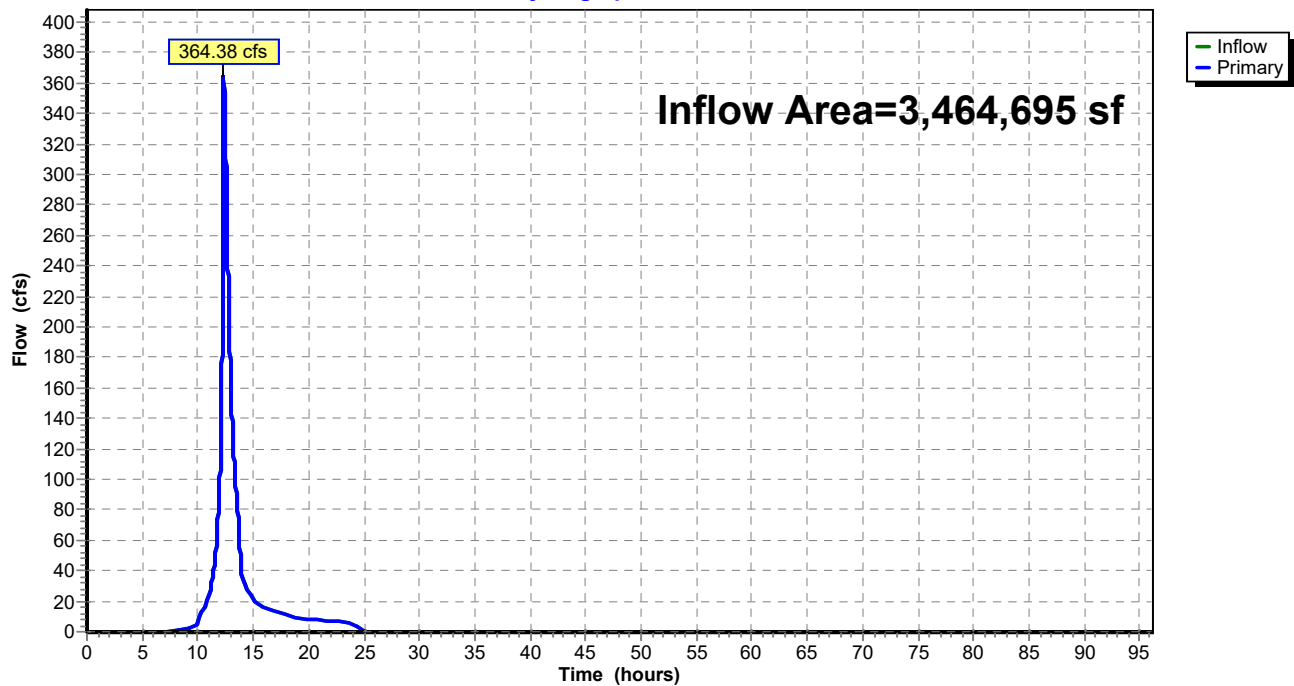
Inflow = 364.38 cfs @ 12.31 hrs, Volume= 1,887,228 cf

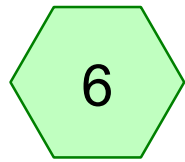
Primary = 364.38 cfs @ 12.31 hrs, Volume= 1,887,228 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

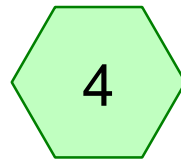
Link 3: Design Point A

Hydrograph

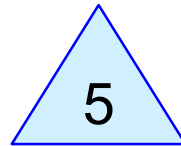
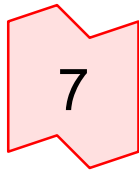




Pre B

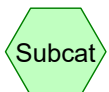


B0 (Offsite)



Design Point B

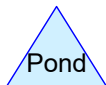
Offsite Pond B



Subcat



Reach



Pond



Link

Routing Diagram for N60 Phase-1 Pre-Dev B

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N60 Phase-1 Pre-Dev B

NRCC 24-hr A 1-yr Rainfall=2.79"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment4: B0 (Offsite)Runoff Area=1,510,771 sf 32.24% Impervious Runoff Depth=1.35"
Flow Length=1,871' Tc=32.3 min CN=84 Runoff=35.54 cfs 169,374 cf**Pond 5: Offsite Pond B**Peak Elev=383.46' Storage=75,292 cf Inflow=35.54 cfs 169,374 cf
36.0" Round Culvert n=0.025 L=158.0' S=0.0127 '/' Outflow=10.77 cfs 168,126 cf**Subcatchment6: Pre B**Runoff Area=1,252,502 sf 0.00% Impervious Runoff Depth=0.60"
Flow Length=2,216' Tc=27.6 min CN=70 Runoff=12.14 cfs 62,706 cf**Link 7: Design Point B**Inflow=17.38 cfs 230,831 cf
Primary=17.38 cfs 230,831 cf**Total Runoff Area = 2,763,273 sf Runoff Volume = 232,080 cf Average Runoff Depth = 1.01"**
82.37% Pervious = 2,276,217 sf 17.63% Impervious = 487,056 sf

N60 Phase-1 Pre-Dev B

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 4: B0 (Offsite)

Runoff = 35.54 cfs @ 12.46 hrs, Volume= 169,374 cf, Depth= 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
487,056	98	Paved parking, HSG C
497,987	77	Woods, Good, HSG D
134,328	70	Woods, Good, HSG C
375,457	80	>75% Grass cover, Good, HSG D
15,943	74	>75% Grass cover, Good, HSG C
1,510,771	84	Weighted Average
1,023,715		67.76% Pervious Area
487,056		32.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.0300	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	848	0.0085	1.48		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	856	0.0093	2.78	3.06	Trap/Vee/Rect Channel Flow, Bot.W=3.00' D=0.33' Z= 1.0 '/' Top.W=3.66' n= 0.022 Earth, clean & straight
0.2	67	0.0150	6.66	64.08	Pipe Channel, 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.025 Corrugated metal
32.3	1,871	Total			

N60 Phase-1 Pre-Dev B

Prepared by {enter your company name here}

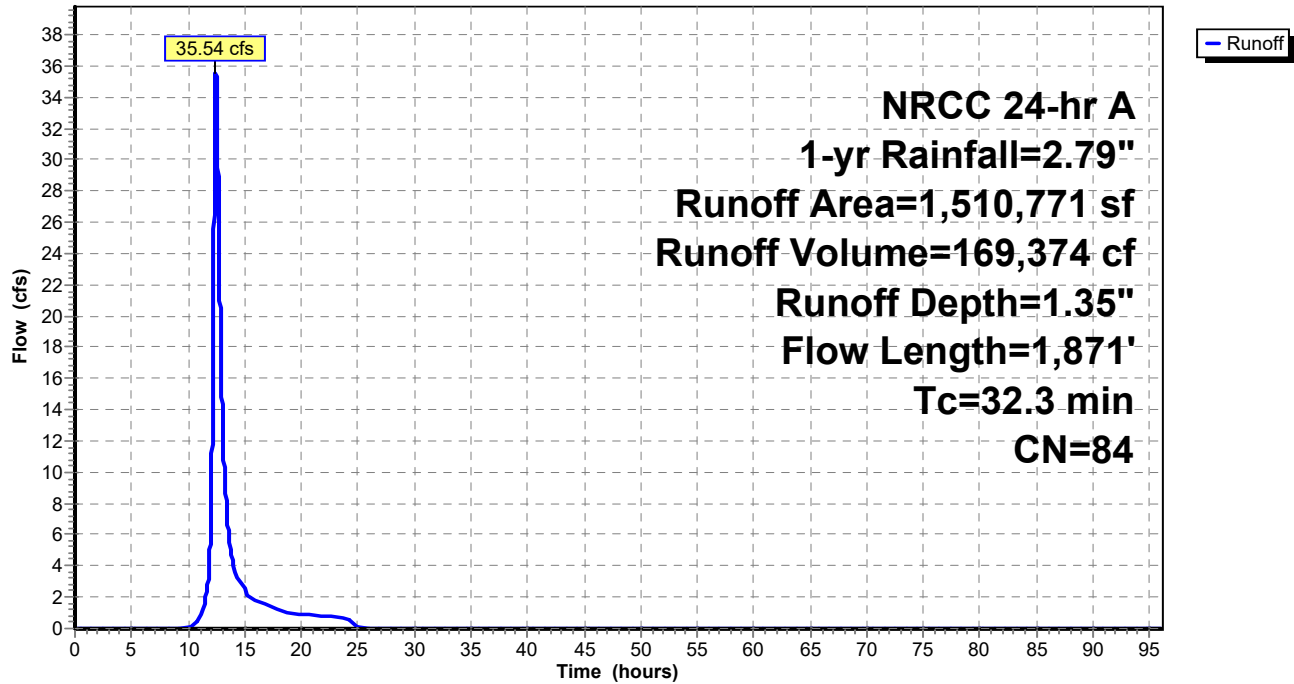
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NRCC 24-hr A 1-yr Rainfall=2.79"

Printed 3/24/2020

Subcatchment 4: B0 (Offsite)

Hydrograph



N60 Phase-1 Pre-Dev B

NRCC 24-hr A 1-yr Rainfall=2.79"

Prepared by {enter your company name here}

Printed 3/24/2020

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Summary for Pond 5: Offsite Pond B

Inflow Area = 1,510,771 sf, 32.24% Impervious, Inflow Depth = 1.35" for 1-yr event
 Inflow = 35.54 cfs @ 12.46 hrs, Volume= 169,374 cf
 Outflow = 10.77 cfs @ 13.17 hrs, Volume= 168,126 cf, Atten= 70%, Lag= 42.8 min
 Primary = 10.77 cfs @ 13.17 hrs, Volume= 168,126 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 383.46' @ 13.17 hrs Surf.Area= 68,005 sf Storage= 75,292 cf

Plug-Flow detention time= 205.3 min calculated for 168,126 cf (99% of inflow)
 Center-of-Mass det. time= 200.8 min (1,049.1 - 848.2)

Volume	Invert	Avail.Storage	Storage Description
#1	382.00'	610,998 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
382.00	36,540	1,177.0	0	0	36,540
384.00	81,987	1,579.0	115,507	115,507	124,748
386.00	96,790	1,622.0	178,572	294,080	136,159
388.00	108,795	1,657.0	205,468	499,548	145,863
389.00	114,127	1,679.0	111,450	610,998	151,937

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	36.0" Round Culvert L= 158.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.00' S= 0.0127 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 7.07 sf

Primary OutFlow Max=10.77 cfs @ 13.17 hrs HW=383.46' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Barrel Controls 10.77 cfs @ 4.60 fps)

N60 Phase-1 Pre-Dev B

Prepared by {enter your company name here}

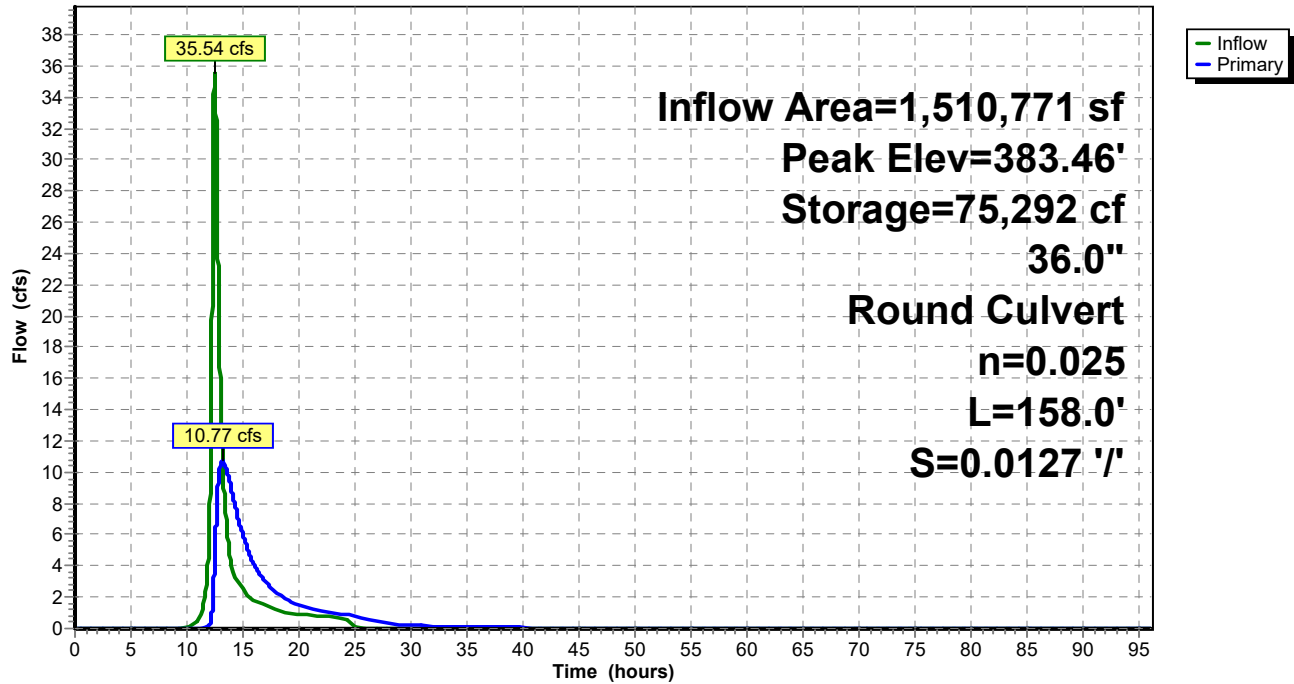
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NRCC 24-hr A 1-yr Rainfall=2.79"

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Pond 5: Offsite Pond B

Hydrograph



N60 Phase-1 Pre-Dev B

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NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 6: Pre B

Runoff = 12.14 cfs @ 12.45 hrs, Volume= 62,706 cf, Depth= 0.60"

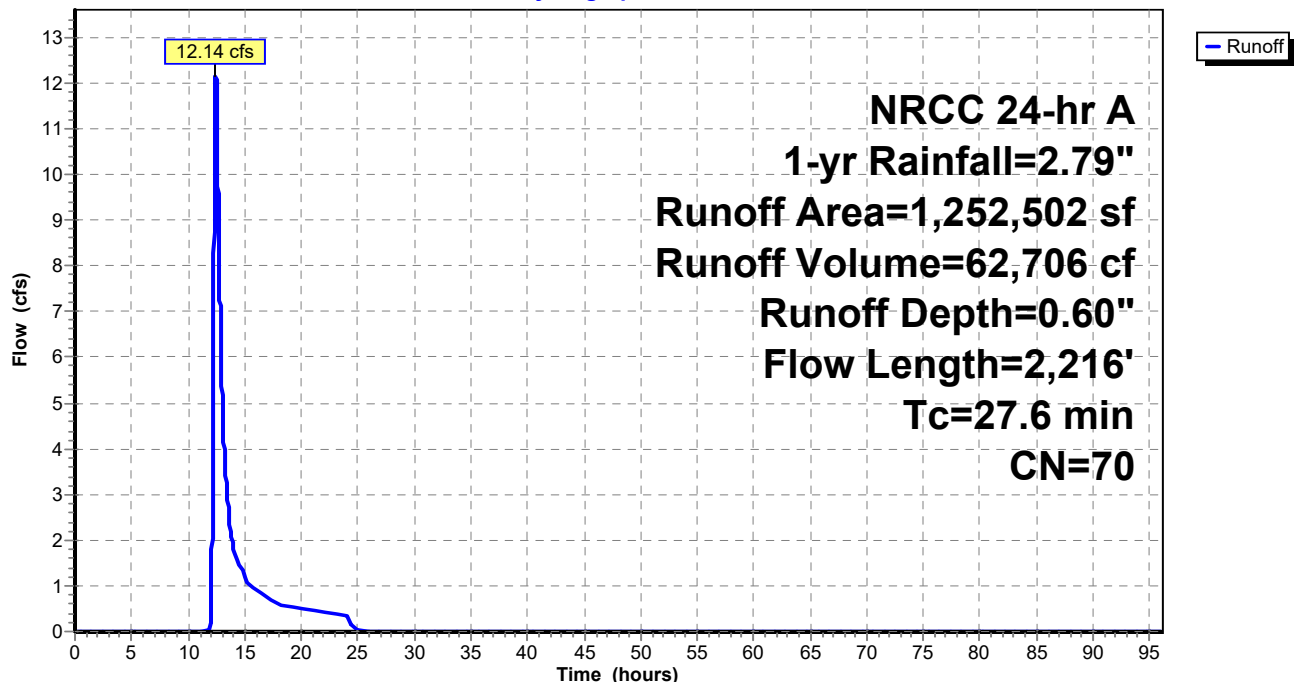
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
31,823	61	>75% Grass cover, Good, HSG B
32,077	55	Woods, Good, HSG B
38,670	91	Newly graded area, HSG C
18,832	91	Newly graded area, HSG C
1,131,100	70	Woods, Good, HSG C
1,252,502	70	Weighted Average
1,252,502		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.2	64	0.1875	6.97		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
11.8	2,052	0.0663	2.90	5.79	Channel Flow, Area= 2.0 sf Perim= 12.0' r= 0.17' n= 0.040 Winding stream, pools & shoals
27.6	2,216	Total			

Subcatchment 6: Pre B

Hydrograph



N60 Phase-1 Pre-Dev B

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NRCC 24-hr A 1-yr Rainfall=2.79"

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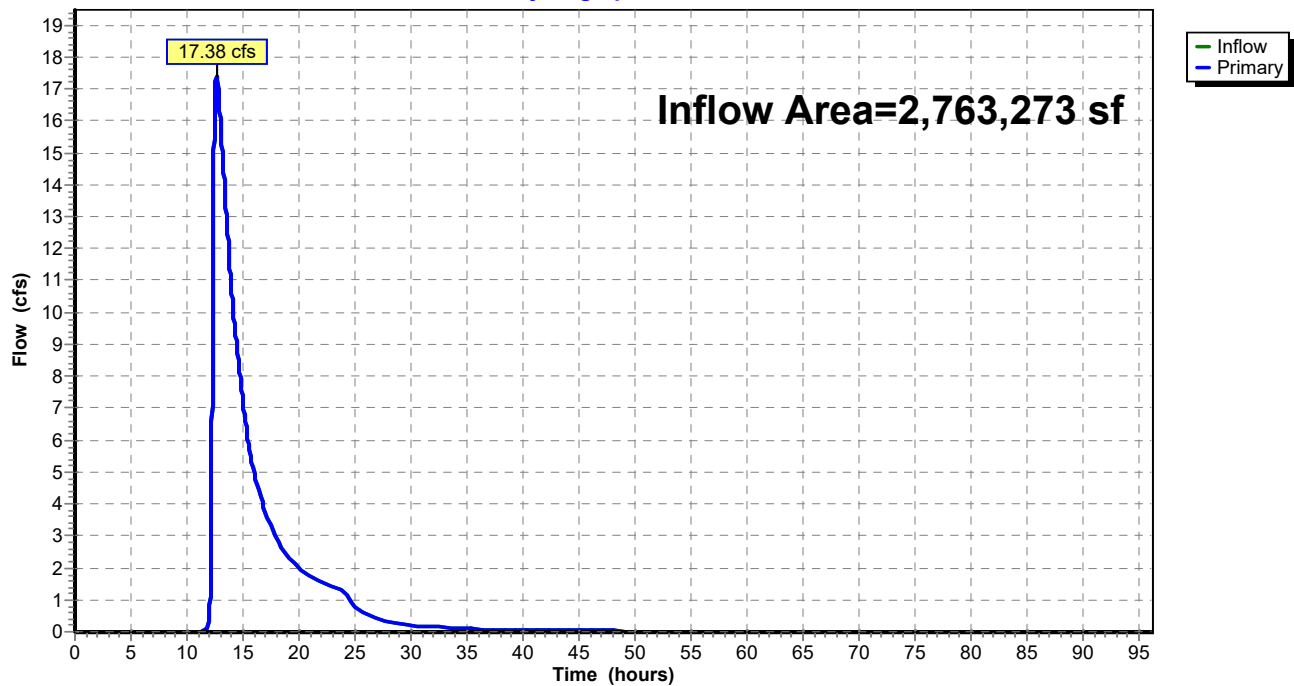
Summary for Link 7: Design Point B

Inflow Area = 2,763,273 sf, 17.63% Impervious, Inflow Depth > 1.00" for 1-yr event
Inflow = 17.38 cfs @ 12.60 hrs, Volume= 230,831 cf
Primary = 17.38 cfs @ 12.60 hrs, Volume= 230,831 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 7: Design Point B

Hydrograph



N60 Phase-1 Pre-Dev B

NRCC 24-hr A 2-yr Rainfall=3.42"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment4: B0 (Offsite)Runoff Area=1,510,771 sf 32.24% Impervious Runoff Depth=1.87"
Flow Length=1,871' Tc=32.3 min CN=84 Runoff=49.64 cfs 235,196 cf**Pond 5: Offsite Pond B**Peak Elev=383.84' Storage=102,972 cf Inflow=49.64 cfs 235,196 cf
36.0" Round Culvert n=0.025 L=158.0' S=0.0127 '/' Outflow=16.27 cfs 233,939 cf**Subcatchment6: Pre B**Runoff Area=1,252,502 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=2,216' Tc=27.6 min CN=70 Runoff=21.10 cfs 100,103 cf**Link 7: Design Point B**Inflow=29.43 cfs 334,042 cf
Primary=29.43 cfs 334,042 cf**Total Runoff Area = 2,763,273 sf Runoff Volume = 335,299 cf Average Runoff Depth = 1.46"**
82.37% Pervious = 2,276,217 sf 17.63% Impervious = 487,056 sf

N60 Phase-1 Pre-Dev B

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 4: B0 (Offsite)

Runoff = 49.64 cfs @ 12.45 hrs, Volume= 235,196 cf, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
487,056	98	Paved parking, HSG C
497,987	77	Woods, Good, HSG D
134,328	70	Woods, Good, HSG C
375,457	80	>75% Grass cover, Good, HSG D
15,943	74	>75% Grass cover, Good, HSG C
1,510,771	84	Weighted Average
1,023,715		67.76% Pervious Area
487,056		32.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.0300	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	848	0.0085	1.48		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	856	0.0093	2.78	3.06	Trap/Vee/Rect Channel Flow, Bot.W=3.00' D=0.33' Z= 1.0 '/' Top.W=3.66' n= 0.022 Earth, clean & straight
0.2	67	0.0150	6.66	64.08	Pipe Channel, 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.025 Corrugated metal
32.3	1,871	Total			

N60 Phase-1 Pre-Dev B

Prepared by {enter your company name here}

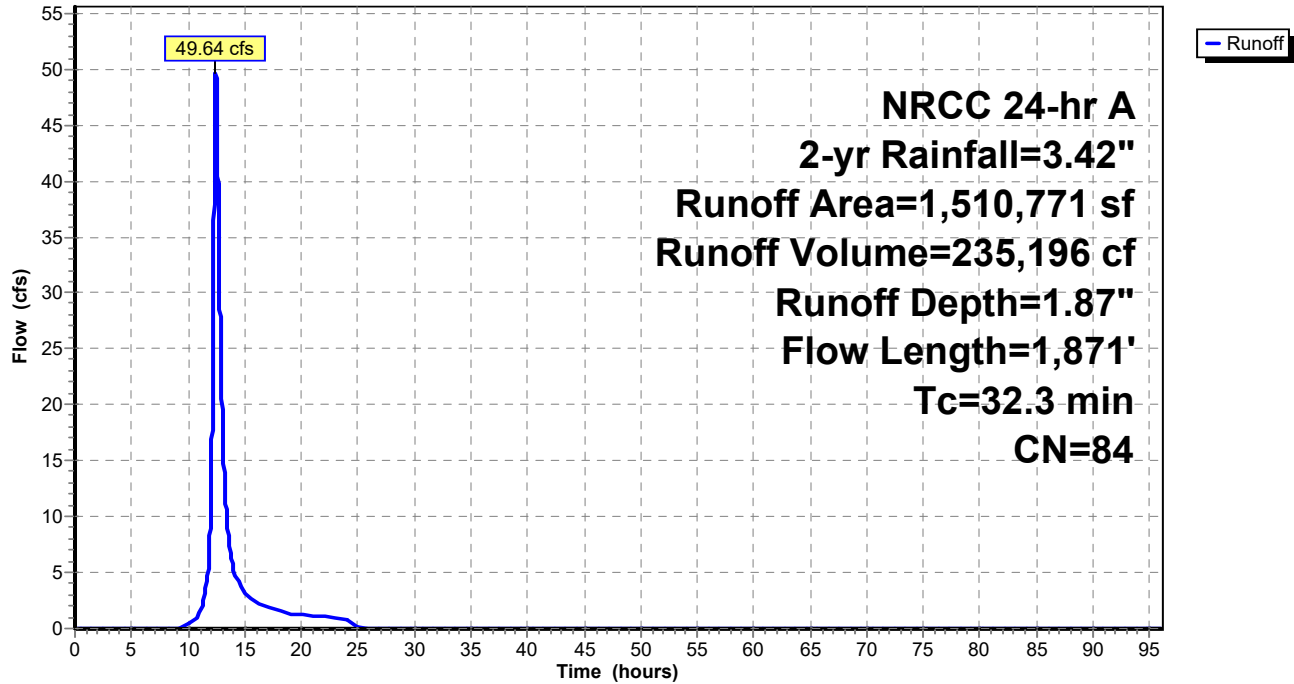
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NRCC 24-hr A 2-yr Rainfall=3.42"

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Subcatchment 4: B0 (Offsite)

Hydrograph



N60 Phase-1 Pre-Dev B

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 5: Offsite Pond B

Inflow Area = 1,510,771 sf, 32.24% Impervious, Inflow Depth = 1.87" for 2-yr event
 Inflow = 49.64 cfs @ 12.45 hrs, Volume= 235,196 cf
 Outflow = 16.27 cfs @ 13.10 hrs, Volume= 233,939 cf, Atten= 67%, Lag= 38.7 min
 Primary = 16.27 cfs @ 13.10 hrs, Volume= 233,939 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 383.84' @ 13.10 hrs Surf.Area= 77,765 sf Storage= 102,972 cf

Plug-Flow detention time= 176.7 min calculated for 233,915 cf (99% of inflow)
 Center-of-Mass det. time= 173.8 min (1,014.1 - 840.3)

Volume	Invert	Avail.Storage	Storage Description
#1	382.00'	610,998 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
382.00	36,540	1,177.0	0	0	36,540
384.00	81,987	1,579.0	115,507	115,507	124,748
386.00	96,790	1,622.0	178,572	294,080	136,159
388.00	108,795	1,657.0	205,468	499,548	145,863
389.00	114,127	1,679.0	111,450	610,998	151,937

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	36.0" Round Culvert L= 158.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.00' S= 0.0127 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 7.07 sf

Primary OutFlow Max=16.27 cfs @ 13.10 hrs HW=383.84' TW=0.00' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 16.27 cfs @ 5.11 fps)

N60 Phase-1 Pre-Dev B

Prepared by {enter your company name here}

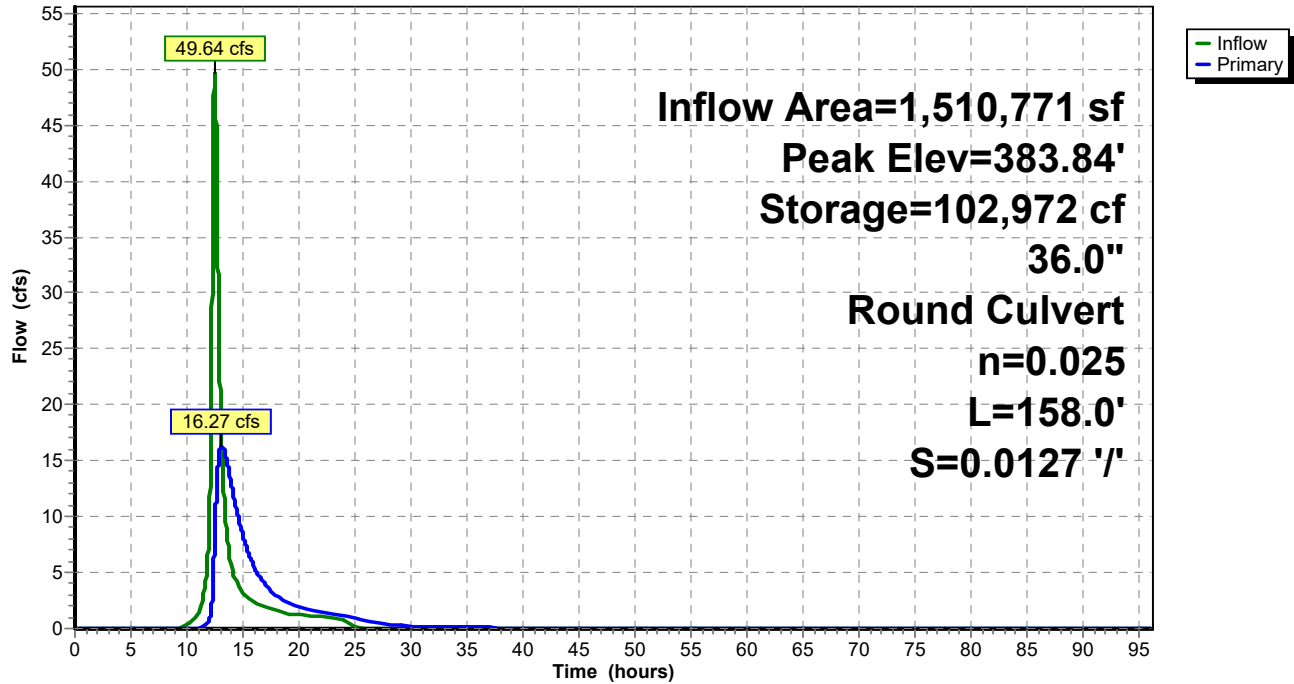
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NRCC 24-hr A 2-yr Rainfall=3.42"

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Pond 5: Offsite Pond B

Hydrograph



N60 Phase-1 Pre-Dev B

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NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 6: Pre B

Runoff = 21.10 cfs @ 12.42 hrs, Volume= 100,103 cf, Depth= 0.96"

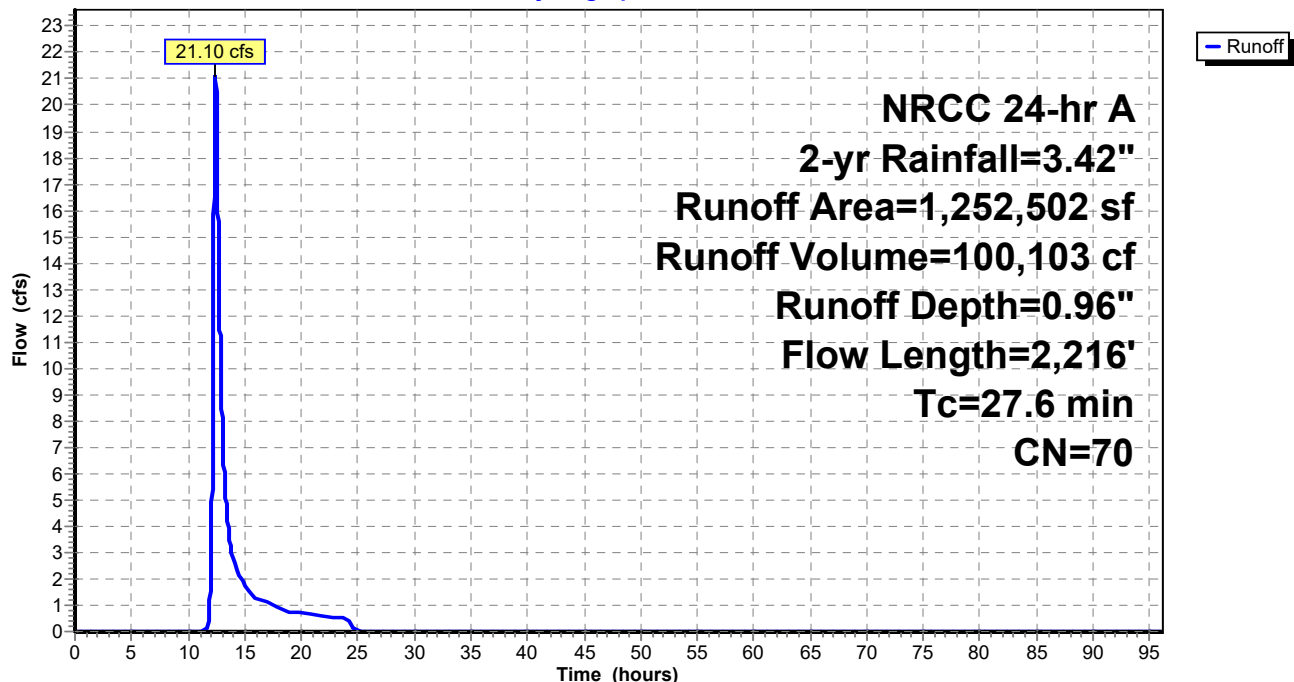
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
31,823	61	>75% Grass cover, Good, HSG B
32,077	55	Woods, Good, HSG B
38,670	91	Newly graded area, HSG C
18,832	91	Newly graded area, HSG C
1,131,100	70	Woods, Good, HSG C
1,252,502	70	Weighted Average
1,252,502		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.2	64	0.1875	6.97		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
11.8	2,052	0.0663	2.90	5.79	Channel Flow, Area= 2.0 sf Perim= 12.0' r= 0.17' n= 0.040 Winding stream, pools & shoals
27.6	2,216	Total			

Subcatchment 6: Pre B

Hydrograph



N60 Phase-1 Pre-Dev B

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NRCC 24-hr A 2-yr Rainfall=3.42"

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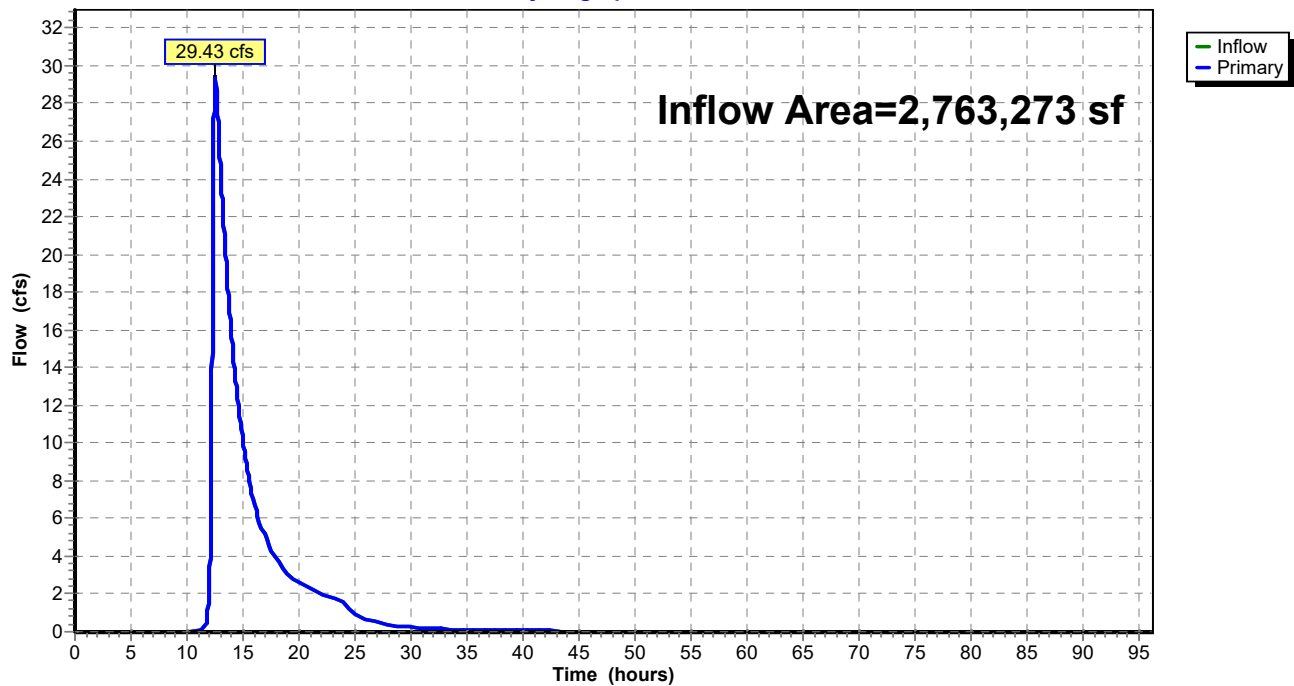
Summary for Link 7: Design Point B

Inflow Area = 2,763,273 sf, 17.63% Impervious, Inflow Depth > 1.45" for 2-yr event
Inflow = 29.43 cfs @ 12.52 hrs, Volume= 334,042 cf
Primary = 29.43 cfs @ 12.52 hrs, Volume= 334,042 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 7: Design Point B

Hydrograph



N60 Phase-1 Pre-Dev B

NRCC 24-hr A 10-yr Rainfall=5.12"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment4: B0 (Offsite)Runoff Area=1,510,771 sf 32.24% Impervious Runoff Depth=3.38"
Flow Length=1,871' Tc=32.3 min CN=84 Runoff=89.40 cfs 425,581 cf**Pond 5: Offsite Pond B**Peak Elev=384.79' Storage=182,615 cf Inflow=89.40 cfs 425,581 cf
36.0" Round Culvert n=0.025 L=158.0' S=0.0127 '/' Outflow=31.40 cfs 424,308 cf**Subcatchment6: Pre B**Runoff Area=1,252,502 sf 0.00% Impervious Runoff Depth=2.13"
Flow Length=2,216' Tc=27.6 min CN=70 Runoff=50.08 cfs 221,873 cf**Link 7: Design Point B**Inflow=68.06 cfs 646,182 cf
Primary=68.06 cfs 646,182 cf**Total Runoff Area = 2,763,273 sf Runoff Volume = 647,455 cf Average Runoff Depth = 2.81"**
82.37% Pervious = 2,276,217 sf 17.63% Impervious = 487,056 sf

N60 Phase-1 Pre-Dev B

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 4: B0 (Offsite)

Runoff = 89.40 cfs @ 12.45 hrs, Volume= 425,581 cf, Depth= 3.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
487,056	98	Paved parking, HSG C
497,987	77	Woods, Good, HSG D
134,328	70	Woods, Good, HSG C
375,457	80	>75% Grass cover, Good, HSG D
15,943	74	>75% Grass cover, Good, HSG C
1,510,771	84	Weighted Average
1,023,715		67.76% Pervious Area
487,056		32.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.0300	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	848	0.0085	1.48		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	856	0.0093	2.78	3.06	Trap/Vee/Rect Channel Flow, Bot.W=3.00' D=0.33' Z= 1.0 '/' Top.W=3.66' n= 0.022 Earth, clean & straight
0.2	67	0.0150	6.66	64.08	Pipe Channel, 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.025 Corrugated metal
32.3	1,871	Total			

N60 Phase-1 Pre-Dev B

Prepared by {enter your company name here}

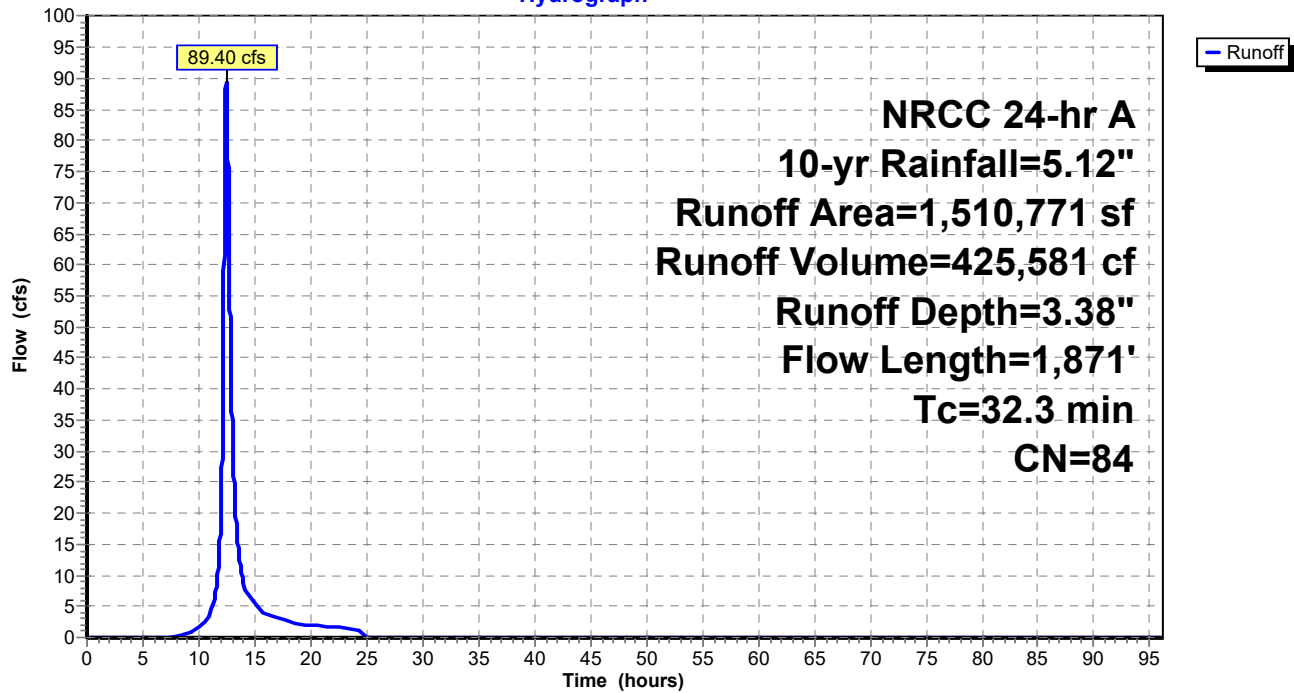
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NRCC 24-hr A 10-yr Rainfall=5.12"

Printed 3/24/2020

Subcatchment 4: B0 (Offsite)

Hydrograph



N60 Phase-1 Pre-Dev B

NRCC 24-hr A 10-yr Rainfall=5.12"

Prepared by {enter your company name here}

Printed 3/24/2020

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Summary for Pond 5: Offsite Pond B

Inflow Area = 1,510,771 sf, 32.24% Impervious, Inflow Depth = 3.38" for 10-yr event
 Inflow = 89.40 cfs @ 12.45 hrs, Volume= 425,581 cf
 Outflow = 31.40 cfs @ 13.03 hrs, Volume= 424,308 cf, Atten= 65%, Lag= 34.8 min
 Primary = 31.40 cfs @ 13.03 hrs, Volume= 424,308 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 384.79' @ 13.03 hrs Surf.Area= 87,696 sf Storage= 182,615 cf

Plug-Flow detention time= 142.8 min calculated for 424,308 cf (100% of inflow)
 Center-of-Mass det. time= 140.8 min (966.9 - 826.0)

Volume	Invert	Avail.Storage	Storage Description		
#1	382.00'	610,998 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
382.00	36,540	1,177.0	0	0	36,540
384.00	81,987	1,579.0	115,507	115,507	124,748
386.00	96,790	1,622.0	178,572	294,080	136,159
388.00	108,795	1,657.0	205,468	499,548	145,863
389.00	114,127	1,679.0	111,450	610,998	151,937

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	36.0" Round Culvert L= 158.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.00' S= 0.0127 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 7.07 sf

Primary OutFlow Max=31.40 cfs @ 13.03 hrs HW=384.79' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Barrel Controls 31.40 cfs @ 5.96 fps)

N60 Phase-1 Pre-Dev B

Prepared by {enter your company name here}

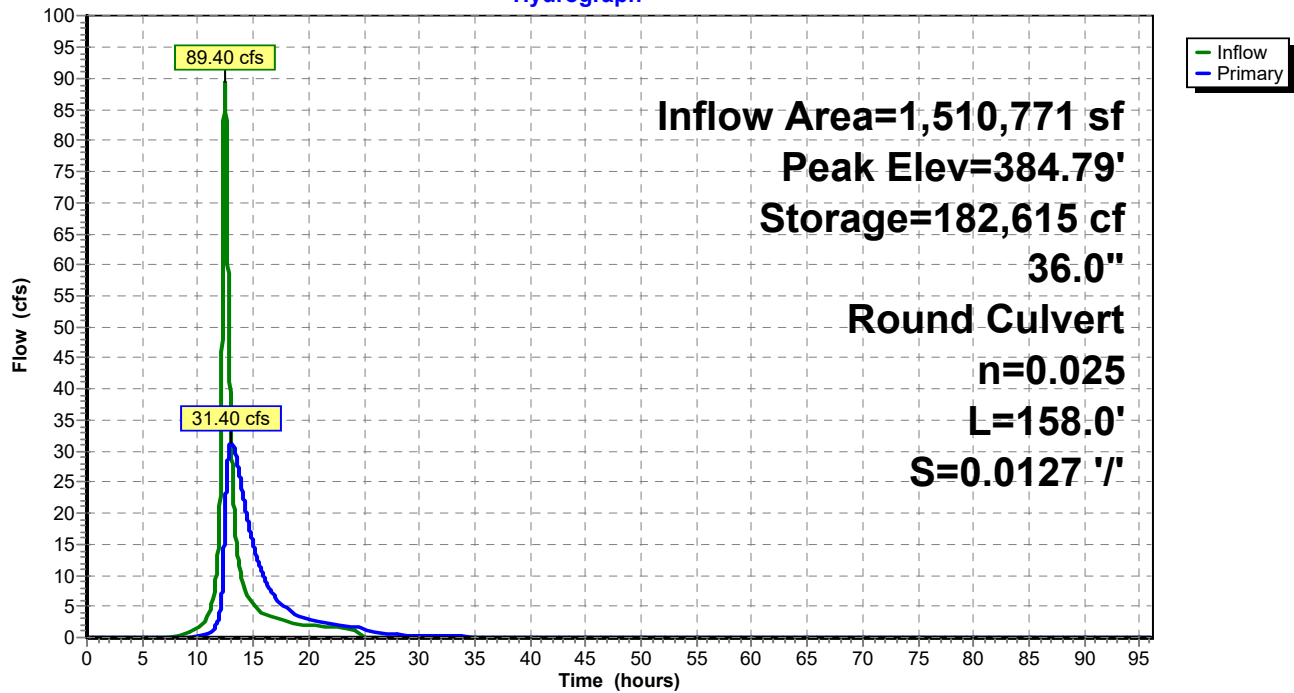
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NRCC 24-hr A 10-yr Rainfall=5.12"

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Pond 5: Offsite Pond B

Hydrograph



N60 Phase-1 Pre-Dev B

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NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 6: Pre B

Runoff = 50.08 cfs @ 12.42 hrs, Volume= 221,873 cf, Depth= 2.13"

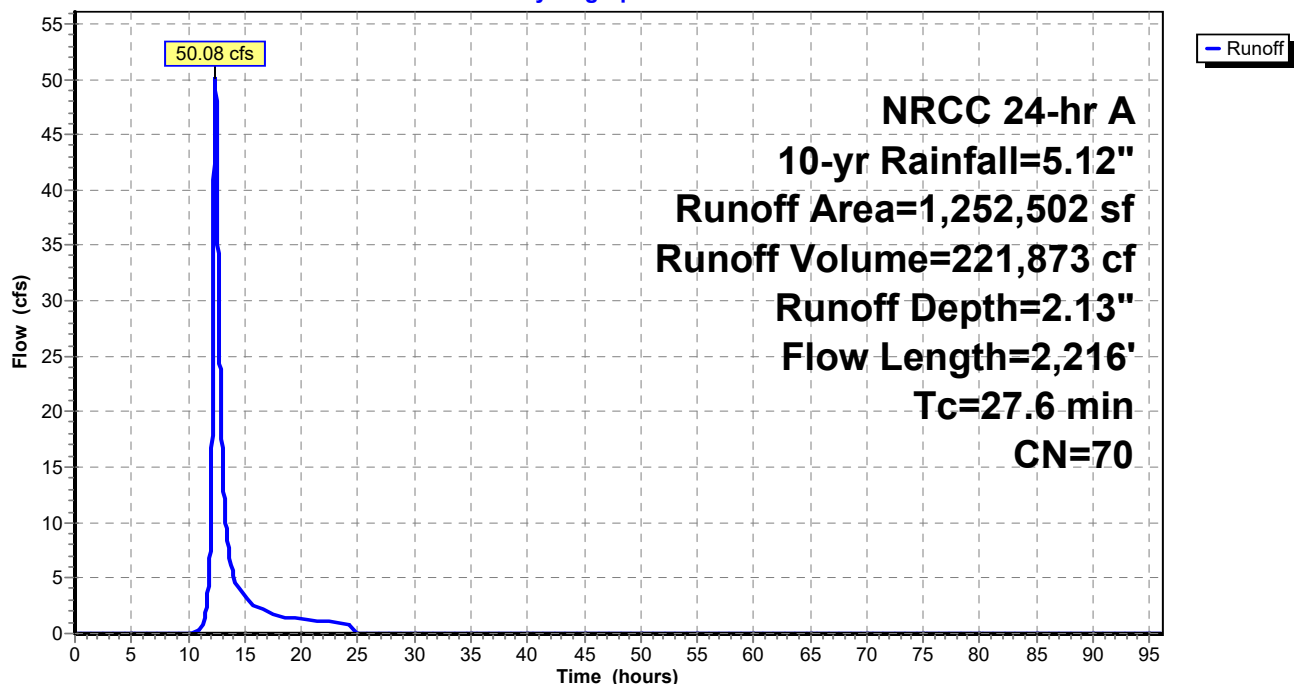
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
31,823	61	>75% Grass cover, Good, HSG B
32,077	55	Woods, Good, HSG B
38,670	91	Newly graded area, HSG C
18,832	91	Newly graded area, HSG C
1,131,100	70	Woods, Good, HSG C
1,252,502	70	Weighted Average
1,252,502		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.2	64	0.1875	6.97		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
11.8	2,052	0.0663	2.90	5.79	Channel Flow, Area= 2.0 sf Perim= 12.0' r= 0.17' n= 0.040 Winding stream, pools & shoals
27.6	2,216	Total			

Subcatchment 6: Pre B

Hydrograph



N60 Phase-1 Pre-Dev B

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NRCC 24-hr A 10-yr Rainfall=5.12"

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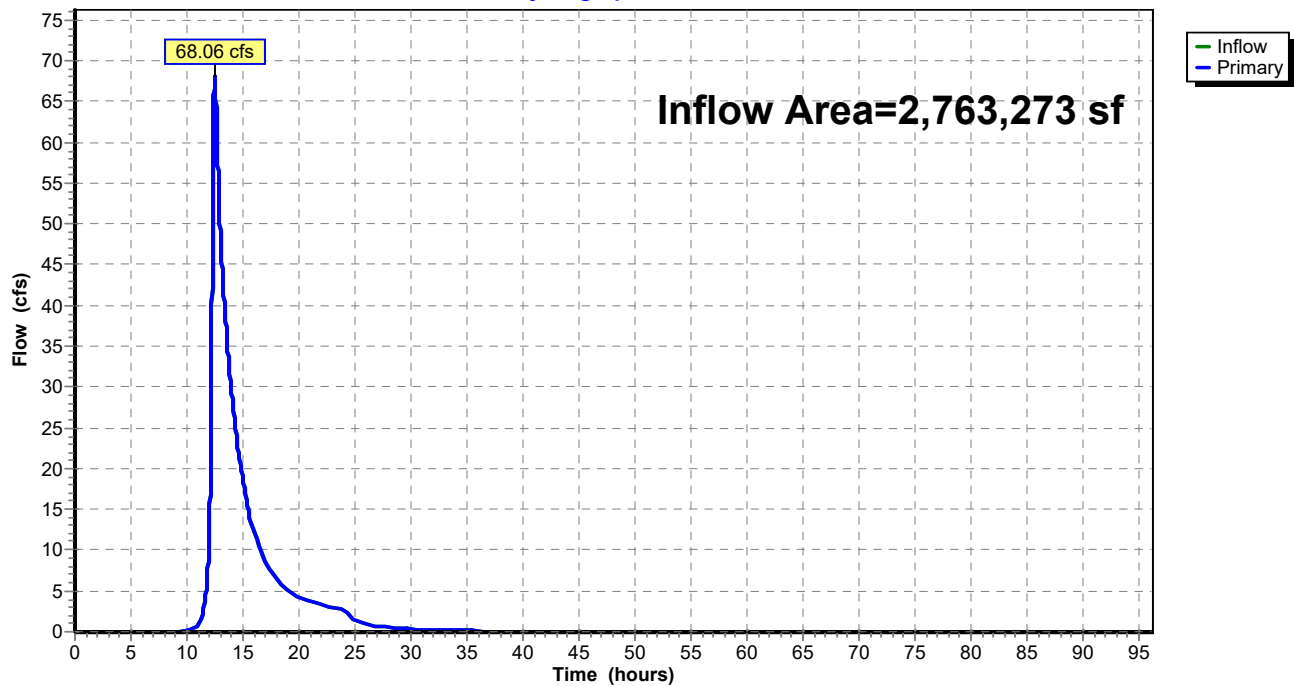
Summary for Link 7: Design Point B

Inflow Area = 2,763,273 sf, 17.63% Impervious, Inflow Depth = 2.81" for 10-yr event
Inflow = 68.06 cfs @ 12.48 hrs, Volume= 646,182 cf
Primary = 68.06 cfs @ 12.48 hrs, Volume= 646,182 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 7: Design Point B

Hydrograph



N60 Phase-1 Pre-Dev B

NRCC 24-hr A 25-yr Rainfall=6.46"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment4: B0 (Offsite)Runoff Area=1,510,771 sf 32.24% Impervious Runoff Depth=4.63"
Flow Length=1,871' Tc=32.3 min CN=84 Runoff=121.32 cfs 582,745 cf**Pond 5: Offsite Pond B**Peak Elev=385.54' Storage=249,913 cf Inflow=121.32 cfs 582,745 cf
36.0" Round Culvert n=0.025 L=158.0' S=0.0127 '/' Outflow=41.02 cfs 581,464 cf**Subcatchment6: Pre B**Runoff Area=1,252,502 sf 0.00% Impervious Runoff Depth=3.17"
Flow Length=2,216' Tc=27.6 min CN=70 Runoff=75.66 cfs 331,347 cf**Link 7: Design Point B**Inflow=101.38 cfs 912,811 cf
Primary=101.38 cfs 912,811 cf**Total Runoff Area = 2,763,273 sf Runoff Volume = 914,091 cf Average Runoff Depth = 3.97"**
82.37% Pervious = 2,276,217 sf 17.63% Impervious = 487,056 sf

N60 Phase-1 Pre-Dev B

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 4: B0 (Offsite)

Runoff = 121.32 cfs @ 12.45 hrs, Volume= 582,745 cf, Depth= 4.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
487,056	98	Paved parking, HSG C
497,987	77	Woods, Good, HSG D
134,328	70	Woods, Good, HSG C
375,457	80	>75% Grass cover, Good, HSG D
15,943	74	>75% Grass cover, Good, HSG C
1,510,771	84	Weighted Average
1,023,715		67.76% Pervious Area
487,056		32.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.0300	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	848	0.0085	1.48		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	856	0.0093	2.78	3.06	Trap/Vee/Rect Channel Flow, Bot.W=3.00' D=0.33' Z= 1.0 '/' Top.W=3.66' n= 0.022 Earth, clean & straight
0.2	67	0.0150	6.66	64.08	Pipe Channel, 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.025 Corrugated metal
32.3	1,871	Total			

N60 Phase-1 Pre-Dev B

Prepared by {enter your company name here}

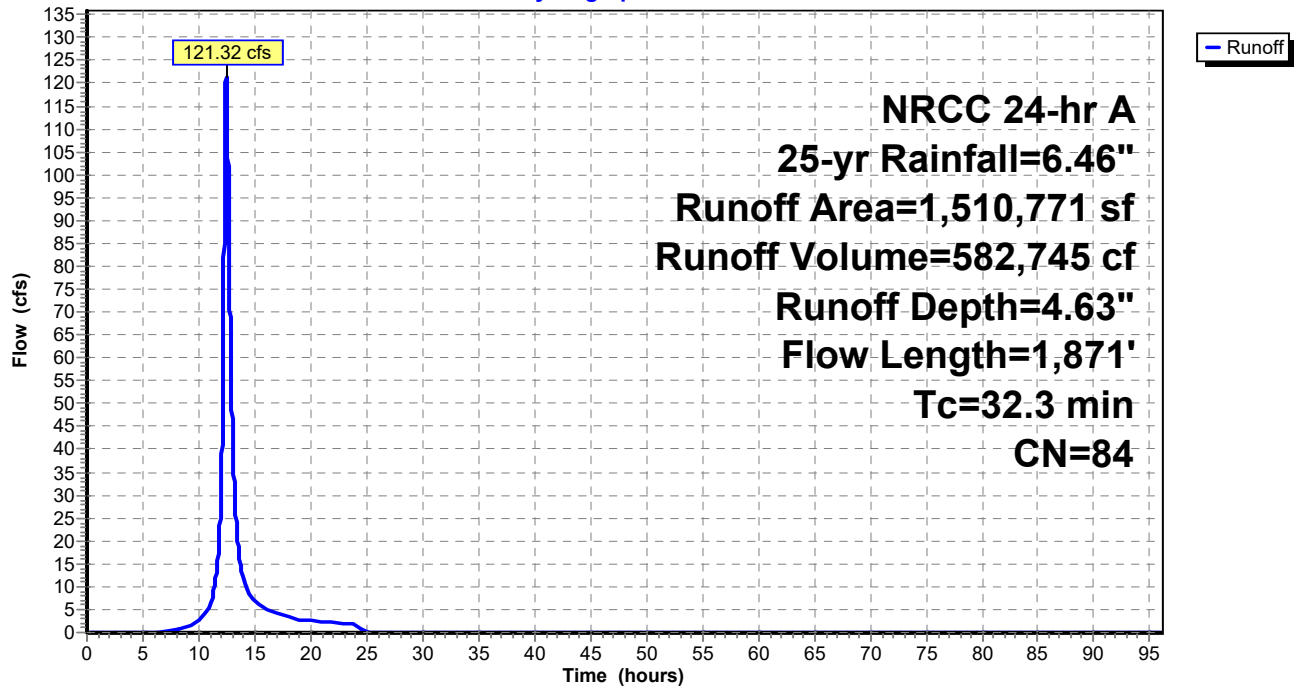
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NRCC 24-hr A 25-yr Rainfall=6.46"

Printed 3/24/2020

Subcatchment 4: B0 (Offsite)

Hydrograph



N60 Phase-1 Pre-Dev B

NRCC 24-hr A 25-yr Rainfall=6.46"

Prepared by {enter your company name here}

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Summary for Pond 5: Offsite Pond B

Inflow Area = 1,510,771 sf, 32.24% Impervious, Inflow Depth = 4.63" for 25-yr event
 Inflow = 121.32 cfs @ 12.45 hrs, Volume= 582,745 cf
 Outflow = 41.02 cfs @ 13.04 hrs, Volume= 581,464 cf, Atten= 66%, Lag= 35.3 min
 Primary = 41.02 cfs @ 13.04 hrs, Volume= 581,464 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 385.54' @ 13.04 hrs Surf.Area= 93,240 sf Storage= 249,913 cf

Plug-Flow detention time= 132.1 min calculated for 581,464 cf (100% of inflow)
 Center-of-Mass det. time= 130.6 min (949.2 - 818.5)

Volume	Invert	Avail.Storage	Storage Description		
#1	382.00'	610,998 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
382.00	36,540	1,177.0	0	0	36,540
384.00	81,987	1,579.0	115,507	115,507	124,748
386.00	96,790	1,622.0	178,572	294,080	136,159
388.00	108,795	1,657.0	205,468	499,548	145,863
389.00	114,127	1,679.0	111,450	610,998	151,937

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	36.0" Round Culvert L= 158.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.00' S= 0.0127 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 7.07 sf

Primary OutFlow Max=41.02 cfs @ 13.04 hrs HW=385.54' TW=0.00' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 41.02 cfs @ 6.21 fps)

N60 Phase-1 Pre-Dev B

Prepared by {enter your company name here}

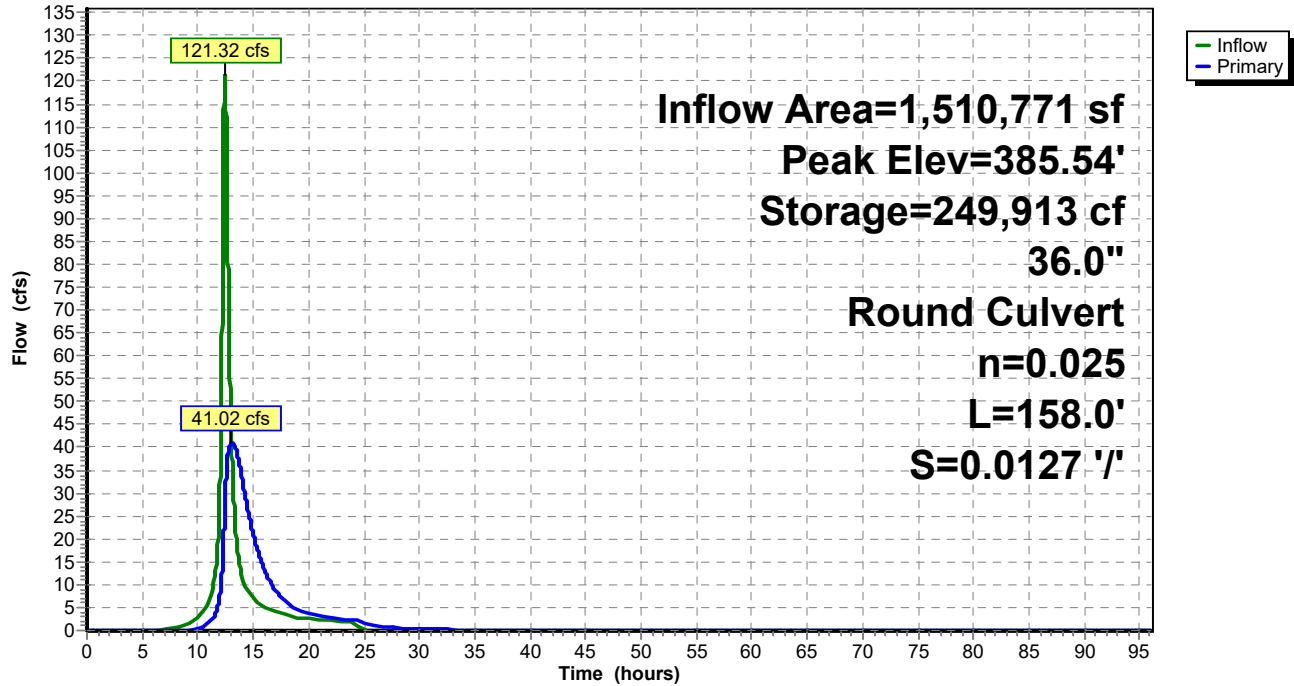
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NRCC 24-hr A 25-yr Rainfall=6.46"

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Pond 5: Offsite Pond B

Hydrograph



N60 Phase-1 Pre-Dev B

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NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 6: Pre B

Runoff = 75.66 cfs @ 12.41 hrs, Volume= 331,347 cf, Depth= 3.17"

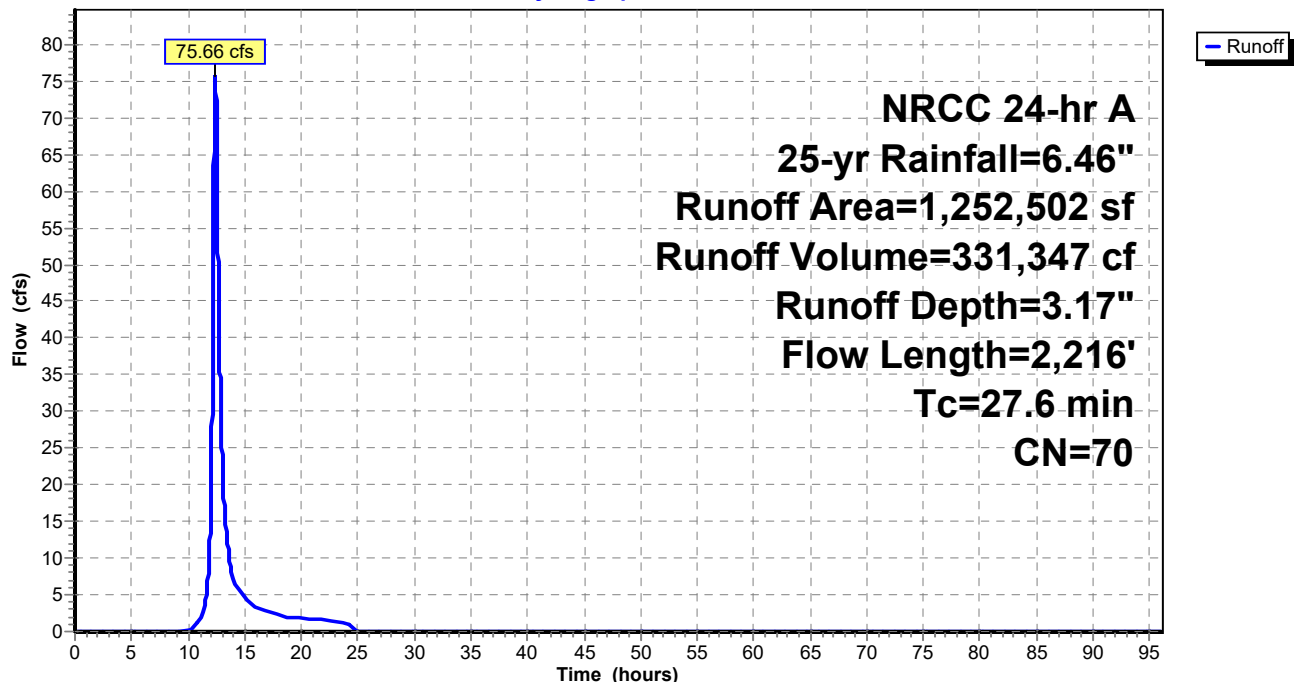
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
31,823	61	>75% Grass cover, Good, HSG B
32,077	55	Woods, Good, HSG B
38,670	91	Newly graded area, HSG C
18,832	91	Newly graded area, HSG C
1,131,100	70	Woods, Good, HSG C
1,252,502	70	Weighted Average
1,252,502		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.2	64	0.1875	6.97		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
11.8	2,052	0.0663	2.90	5.79	Channel Flow, Area= 2.0 sf Perim= 12.0' r= 0.17' n= 0.040 Winding stream, pools & shoals
27.6	2,216	Total			

Subcatchment 6: Pre B

Hydrograph



N60 Phase-1 Pre-Dev B

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NRCC 24-hr A 25-yr Rainfall=6.46"

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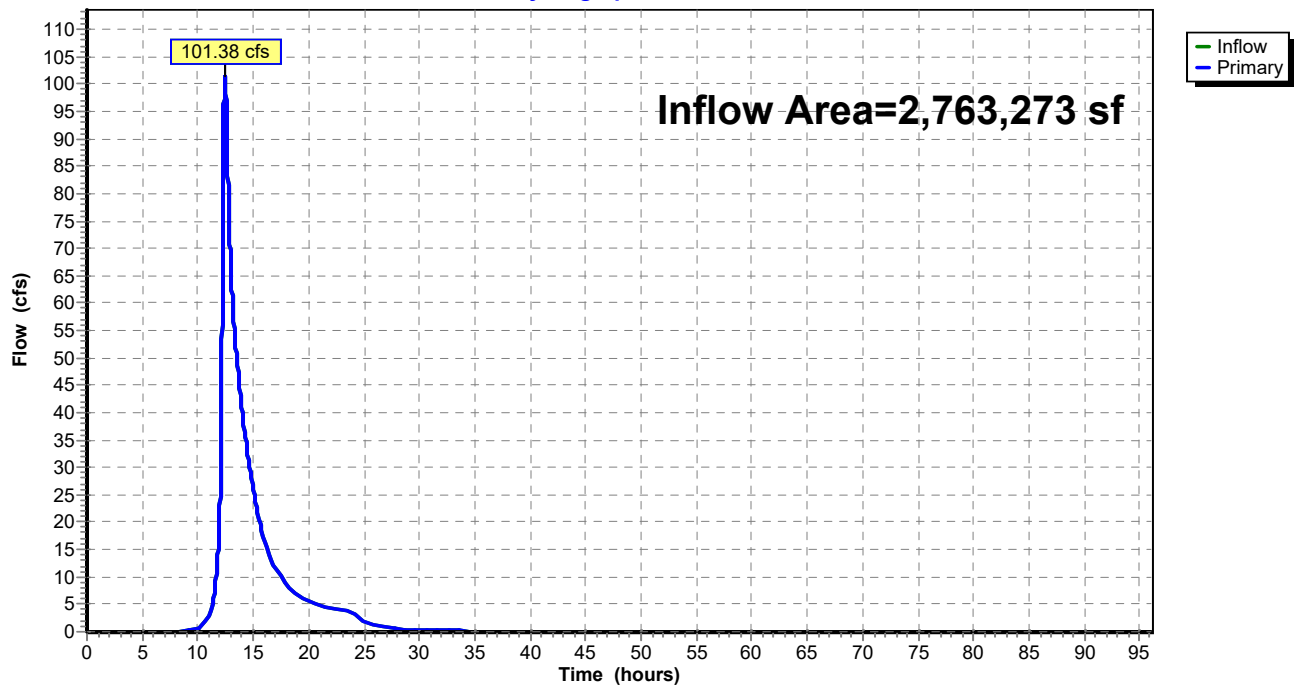
Summary for Link 7: Design Point B

Inflow Area = 2,763,273 sf, 17.63% Impervious, Inflow Depth = 3.96" for 25-yr event
Inflow = 101.38 cfs @ 12.45 hrs, Volume= 912,811 cf
Primary = 101.38 cfs @ 12.45 hrs, Volume= 912,811 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 7: Design Point B

Hydrograph



N60 Phase-1 Pre-Dev B

NRCC 24-hr A 50-yr Rainfall=7.70"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment4: B0 (Offsite)Runoff Area=1,510,771 sf 32.24% Impervious Runoff Depth=5.81"
Flow Length=1,871' Tc=32.3 min CN=84 Runoff=150.90 cfs 731,166 cf**Pond 5: Offsite Pond B**Peak Elev=386.31' Storage=324,023 cf Inflow=150.90 cfs 731,166 cf
36.0" Round Culvert n=0.025 L=158.0' S=0.0127 '/' Outflow=43.05 cfs 729,880 cf**Subcatchment6: Pre B**Runoff Area=1,252,502 sf 0.00% Impervious Runoff Depth=4.21"
Flow Length=2,216' Tc=27.6 min CN=70 Runoff=100.65 cfs 439,170 cf**Link 7: Design Point B**Inflow=133.15 cfs 1,169,050 cf
Primary=133.15 cfs 1,169,050 cf**Total Runoff Area = 2,763,273 sf Runoff Volume = 1,170,336 cf Average Runoff Depth = 5.08"**
82.37% Pervious = 2,276,217 sf 17.63% Impervious = 487,056 sf

N60 Phase-1 Pre-Dev B

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 4: B0 (Offsite)

Runoff = 150.90 cfs @ 12.45 hrs, Volume= 731,166 cf, Depth= 5.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
487,056	98	Paved parking, HSG C
497,987	77	Woods, Good, HSG D
134,328	70	Woods, Good, HSG C
375,457	80	>75% Grass cover, Good, HSG D
15,943	74	>75% Grass cover, Good, HSG C
1,510,771	84	Weighted Average
1,023,715		67.76% Pervious Area
487,056		32.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.0300	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	848	0.0085	1.48		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	856	0.0093	2.78	3.06	Trap/Vee/Rect Channel Flow, Bot.W=3.00' D=0.33' Z= 1.0 '/' Top.W=3.66' n= 0.022 Earth, clean & straight
0.2	67	0.0150	6.66	64.08	Pipe Channel, 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.025 Corrugated metal
32.3	1,871	Total			

N60 Phase-1 Pre-Dev B

Prepared by {enter your company name here}

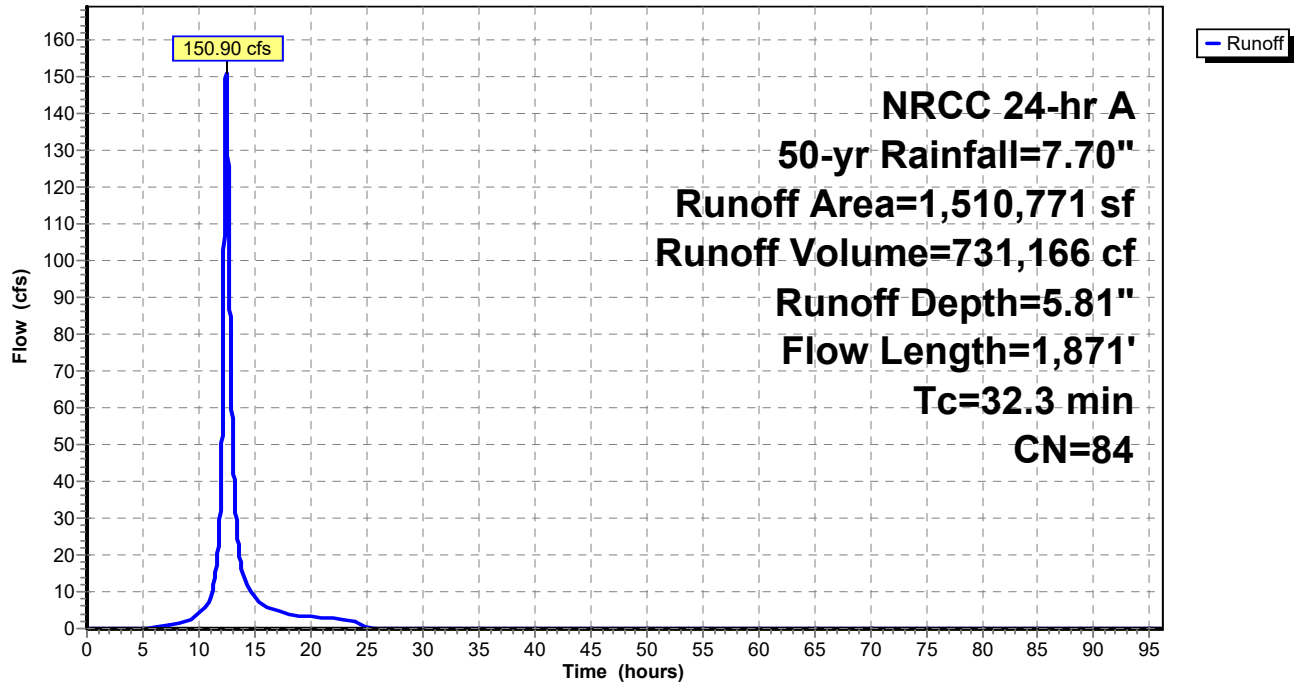
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NRCC 24-hr A 50-yr Rainfall=7.70"

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Subcatchment 4: B0 (Offsite)

Hydrograph



N60 Phase-1 Pre-Dev B

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Pond 5: Offsite Pond B

Inflow Area = 1,510,771 sf, 32.24% Impervious, Inflow Depth = 5.81" for 50-yr event
 Inflow = 150.90 cfs @ 12.45 hrs, Volume= 731,166 cf
 Outflow = 43.05 cfs @ 13.12 hrs, Volume= 729,880 cf, Atten= 71%, Lag= 40.3 min
 Primary = 43.05 cfs @ 13.12 hrs, Volume= 729,880 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 386.31' @ 13.12 hrs Surf.Area= 98,584 sf Storage= 324,023 cf

Plug-Flow detention time= 131.2 min calculated for 729,804 cf (100% of inflow)
 Center-of-Mass det. time= 130.5 min (943.6 - 813.2)

Volume	Invert	Avail.Storage	Storage Description		
#1	382.00'	610,998 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
382.00	36,540	1,177.0	0	0	36,540
384.00	81,987	1,579.0	115,507	115,507	124,748
386.00	96,790	1,622.0	178,572	294,080	136,159
388.00	108,795	1,657.0	205,468	499,548	145,863
389.00	114,127	1,679.0	111,450	610,998	151,937

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	36.0" Round Culvert L= 158.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.00' S= 0.0127 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 7.07 sf

Primary OutFlow Max=43.05 cfs @ 13.12 hrs HW=386.31' TW=0.00' (Dynamic Tailwater)
 ↑**1=Culvert** (Barrel Controls 43.05 cfs @ 6.09 fps)

N60 Phase-1 Pre-Dev B

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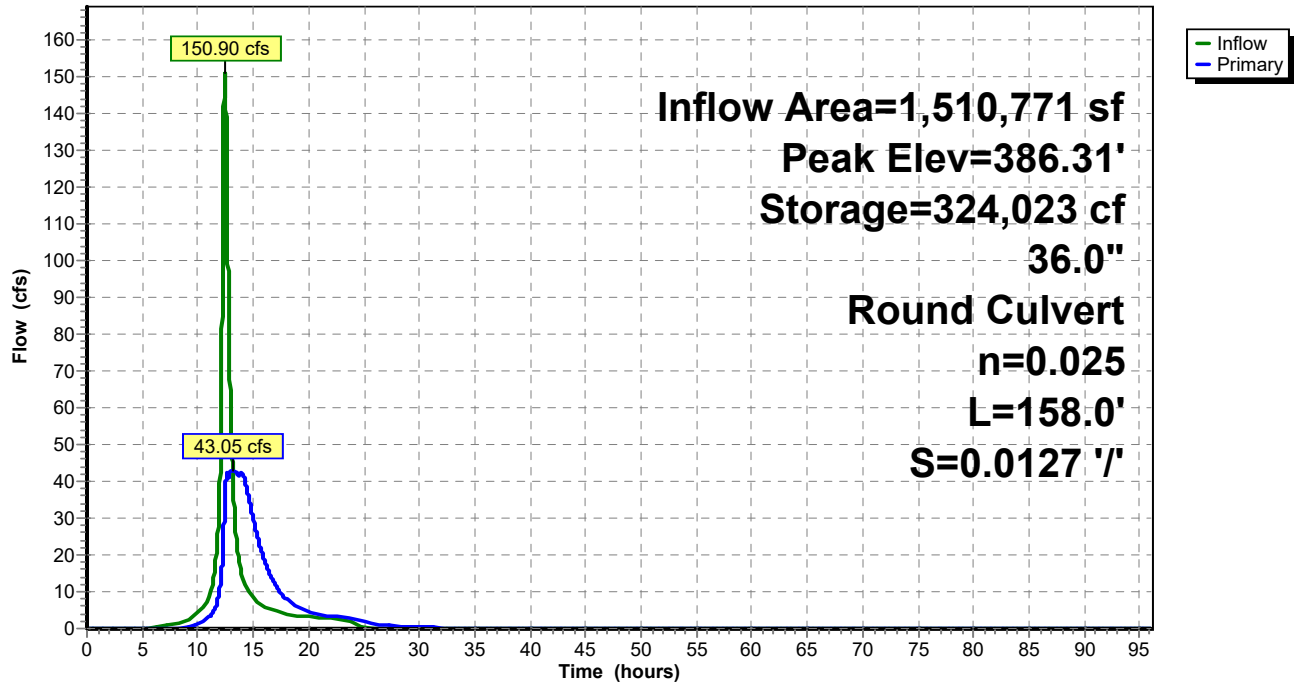
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NRCC 24-hr A 50-yr Rainfall=7.70"

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Pond 5: Offsite Pond B

Hydrograph



N60 Phase-1 Pre-Dev B

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NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 6: Pre B

Runoff = 100.65 cfs @ 12.39 hrs, Volume= 439,170 cf, Depth= 4.21"

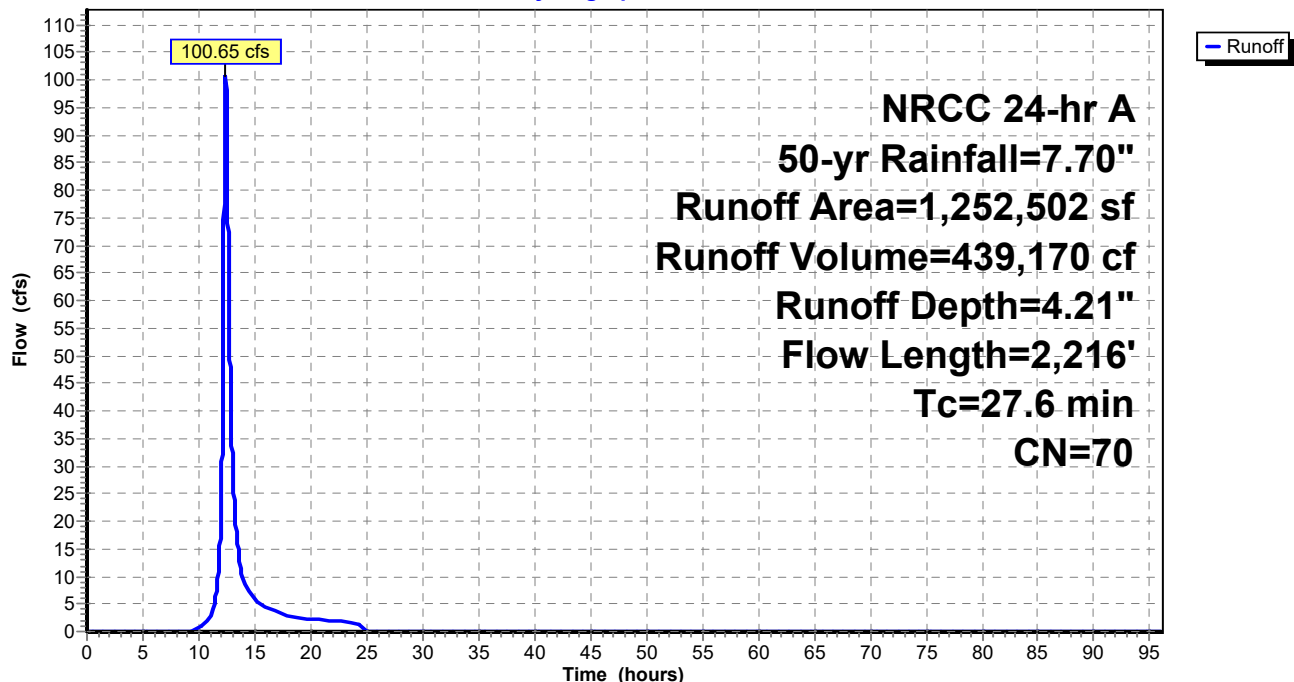
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
31,823	61	>75% Grass cover, Good, HSG B
32,077	55	Woods, Good, HSG B
38,670	91	Newly graded area, HSG C
18,832	91	Newly graded area, HSG C
1,131,100	70	Woods, Good, HSG C
1,252,502	70	Weighted Average
1,252,502		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.2	64	0.1875	6.97		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
11.8	2,052	0.0663	2.90	5.79	Channel Flow, Area= 2.0 sf Perim= 12.0' r= 0.17' n= 0.040 Winding stream, pools & shoals
27.6	2,216	Total			

Subcatchment 6: Pre B

Hydrograph



N60 Phase-1 Pre-Dev B

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NRCC 24-hr A 50-yr Rainfall=7.70"

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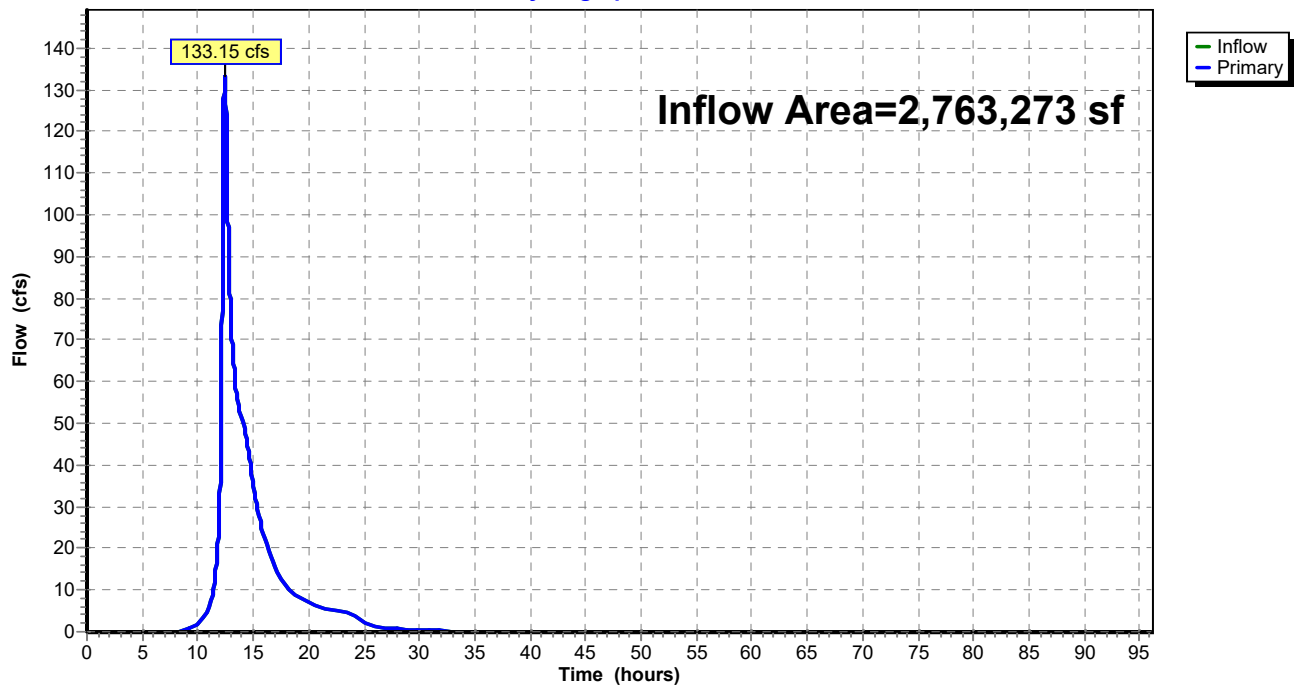
Summary for Link 7: Design Point B

Inflow Area = 2,763,273 sf, 17.63% Impervious, Inflow Depth = 5.08" for 50-yr event
Inflow = 133.15 cfs @ 12.42 hrs, Volume= 1,169,050 cf
Primary = 133.15 cfs @ 12.42 hrs, Volume= 1,169,050 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 7: Design Point B

Hydrograph



N60 Phase-1 Pre-Dev B

NRCC 24-hr A 100-yr Rainfall=9.18"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment4: B0 (Offsite)Runoff Area=1,510,771 sf 32.24% Impervious Runoff Depth=7.23"
Flow Length=1,871' Tc=32.3 min CN=84 Runoff=186.10 cfs 910,648 cf**Pond 5: Offsite Pond B**Peak Elev=387.20' Storage=414,374 cf Inflow=186.10 cfs 910,648 cf
36.0" Round Culvert n=0.025 L=158.0' S=0.0127 '/' Outflow=48.51 cfs 909,356 cf**Subcatchment6: Pre B**Runoff Area=1,252,502 sf 0.00% Impervious Runoff Depth=5.49"
Flow Length=2,216' Tc=27.6 min CN=70 Runoff=131.36 cfs 573,424 cf**Link 7: Design Point B**Inflow=170.39 cfs 1,482,781 cf
Primary=170.39 cfs 1,482,781 cf**Total Runoff Area = 2,763,273 sf Runoff Volume = 1,484,072 cf Average Runoff Depth = 6.44"**
82.37% Pervious = 2,276,217 sf 17.63% Impervious = 487,056 sf

N60 Phase-1 Pre-Dev B

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 4: B0 (Offsite)

Runoff = 186.10 cfs @ 12.45 hrs, Volume= 910,648 cf, Depth= 7.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
487,056	98	Paved parking, HSG C
497,987	77	Woods, Good, HSG D
134,328	70	Woods, Good, HSG C
375,457	80	>75% Grass cover, Good, HSG D
15,943	74	>75% Grass cover, Good, HSG C
1,510,771	84	Weighted Average
1,023,715		67.76% Pervious Area
487,056		32.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.0300	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	848	0.0085	1.48		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	856	0.0093	2.78	3.06	Trap/Vee/Rect Channel Flow, Bot.W=3.00' D=0.33' Z= 1.0 '/' Top.W=3.66' n= 0.022 Earth, clean & straight
0.2	67	0.0150	6.66	64.08	Pipe Channel, 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.025 Corrugated metal
32.3	1,871	Total			

N60 Phase-1 Pre-Dev B

Prepared by {enter your company name here}

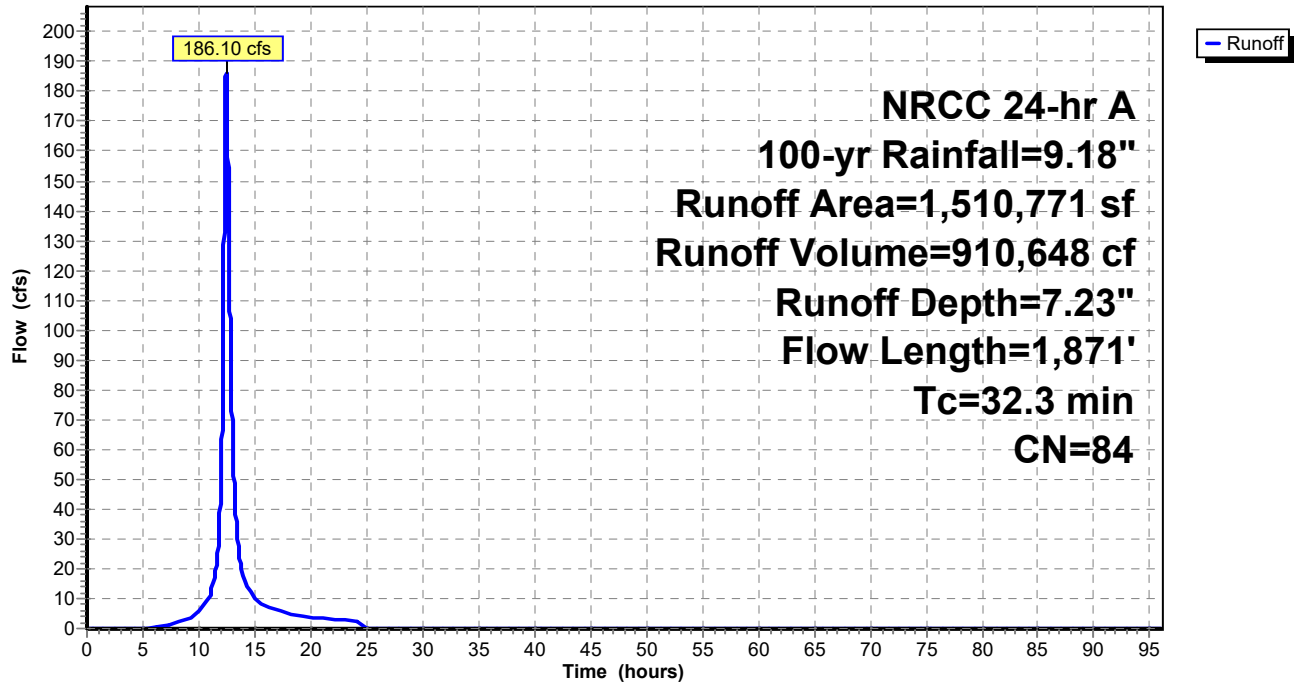
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NRCC 24-hr A 100-yr Rainfall=9.18"

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Subcatchment 4: B0 (Offsite)

Hydrograph



N60 Phase-1 Pre-Dev B

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 5: Offsite Pond B

Inflow Area = 1,510,771 sf, 32.24% Impervious, Inflow Depth = 7.23" for 100-yr event
 Inflow = 186.10 cfs @ 12.45 hrs, Volume= 910,648 cf
 Outflow = 48.51 cfs @ 13.17 hrs, Volume= 909,356 cf, Atten= 74%, Lag= 43.1 min
 Primary = 48.51 cfs @ 13.17 hrs, Volume= 909,356 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 387.20' @ 13.17 hrs Surf.Area= 103,903 sf Storage= 414,374 cf

Plug-Flow detention time= 134.0 min calculated for 909,261 cf (100% of inflow)
 Center-of-Mass det. time= 133.5 min (941.5 - 808.0)

Volume	Invert	Avail.Storage	Storage Description
#1	382.00'	610,998 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
382.00	36,540	1,177.0	0	0	36,540
384.00	81,987	1,579.0	115,507	115,507	124,748
386.00	96,790	1,622.0	178,572	294,080	136,159
388.00	108,795	1,657.0	205,468	499,548	145,863
389.00	114,127	1,679.0	111,450	610,998	151,937

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	36.0" Round Culvert L= 158.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.00' S= 0.0127 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 7.07 sf

Primary OutFlow Max=48.51 cfs @ 13.17 hrs HW=387.20' TW=0.00' (Dynamic Tailwater)
 1=Culvert (Barrel Controls 48.51 cfs @ 6.86 fps)

N60 Phase-1 Pre-Dev B

Prepared by {enter your company name here}

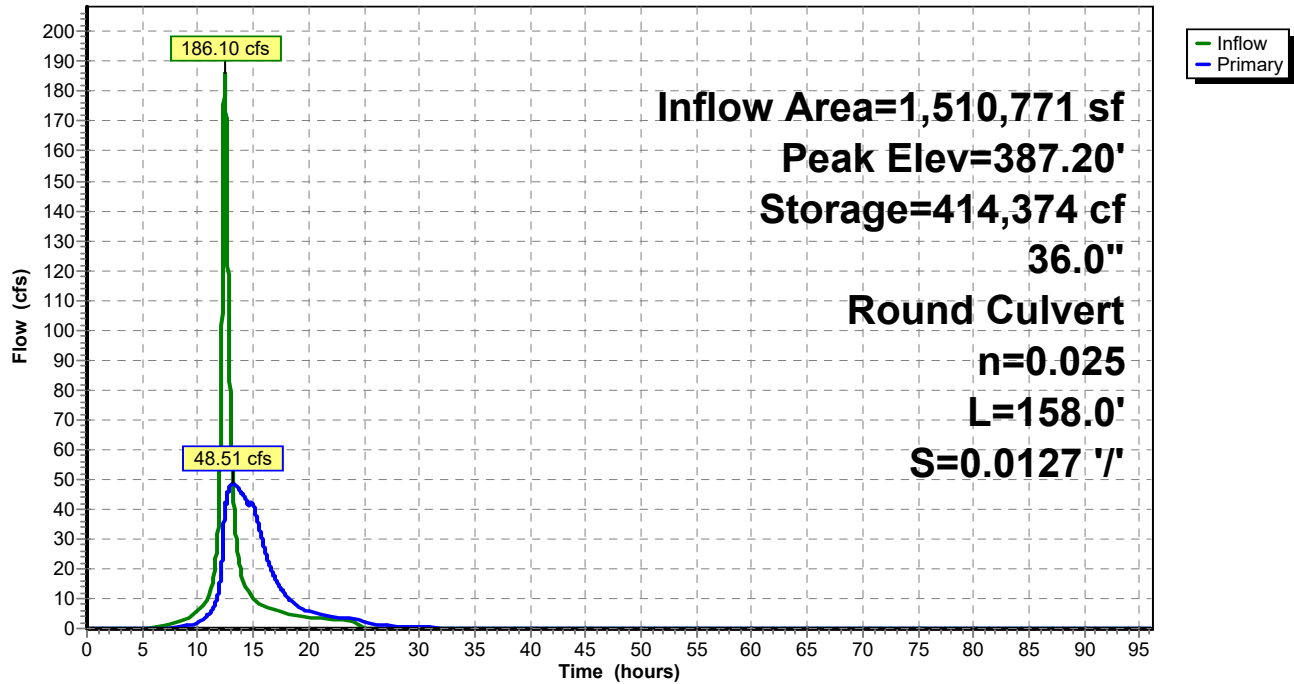
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NRCC 24-hr A 100-yr Rainfall=9.18"

Printed 3/24/2020

Pond 5: Offsite Pond B

Hydrograph



N60 Phase-1 Pre-Dev B

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 6: Pre B

Runoff = 131.36 cfs @ 12.39 hrs, Volume= 573,424 cf, Depth= 5.49"

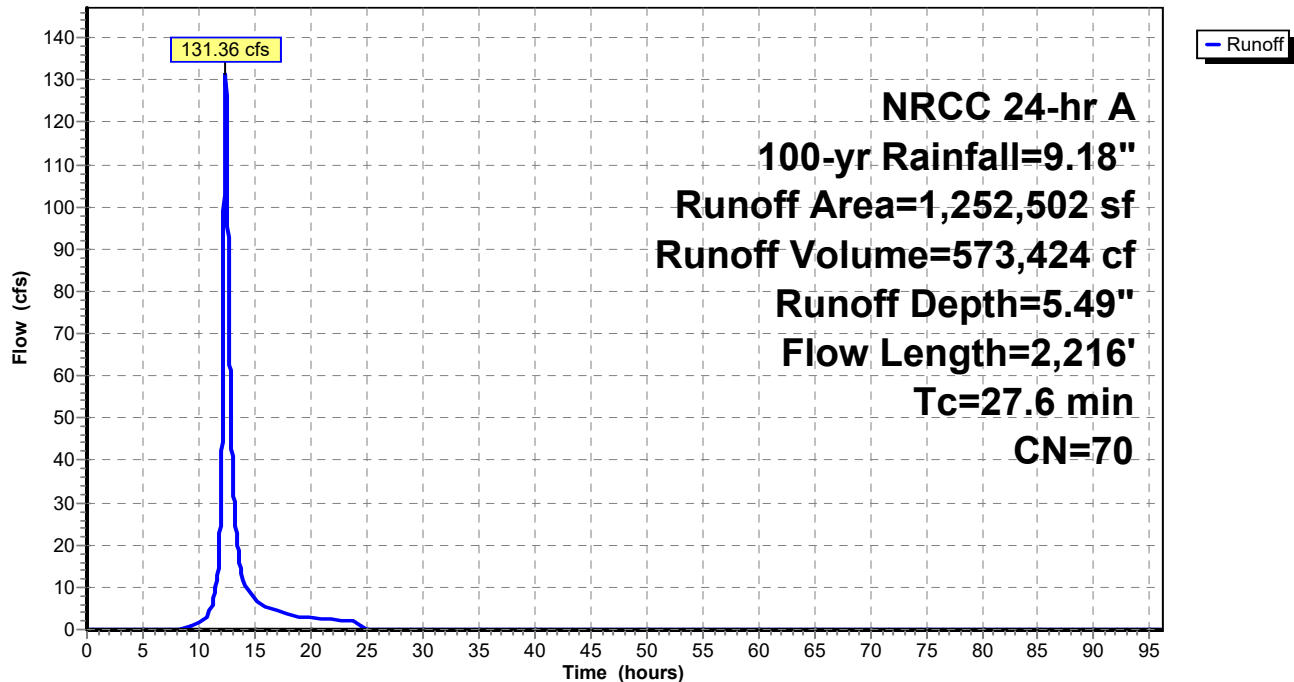
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
31,823	61	>75% Grass cover, Good, HSG B
32,077	55	Woods, Good, HSG B
38,670	91	Newly graded area, HSG C
18,832	91	Newly graded area, HSG C
1,131,100	70	Woods, Good, HSG C
1,252,502	70	Weighted Average
1,252,502		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.2	64	0.1875	6.97		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
11.8	2,052	0.0663	2.90	5.79	Channel Flow, Area= 2.0 sf Perim= 12.0' r= 0.17' n= 0.040 Winding stream, pools & shoals
27.6	2,216	Total			

Subcatchment 6: Pre B

Hydrograph



N60 Phase-1 Pre-Dev B

Prepared by {enter your company name here}

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NRCC 24-hr A 100-yr Rainfall=9.18"

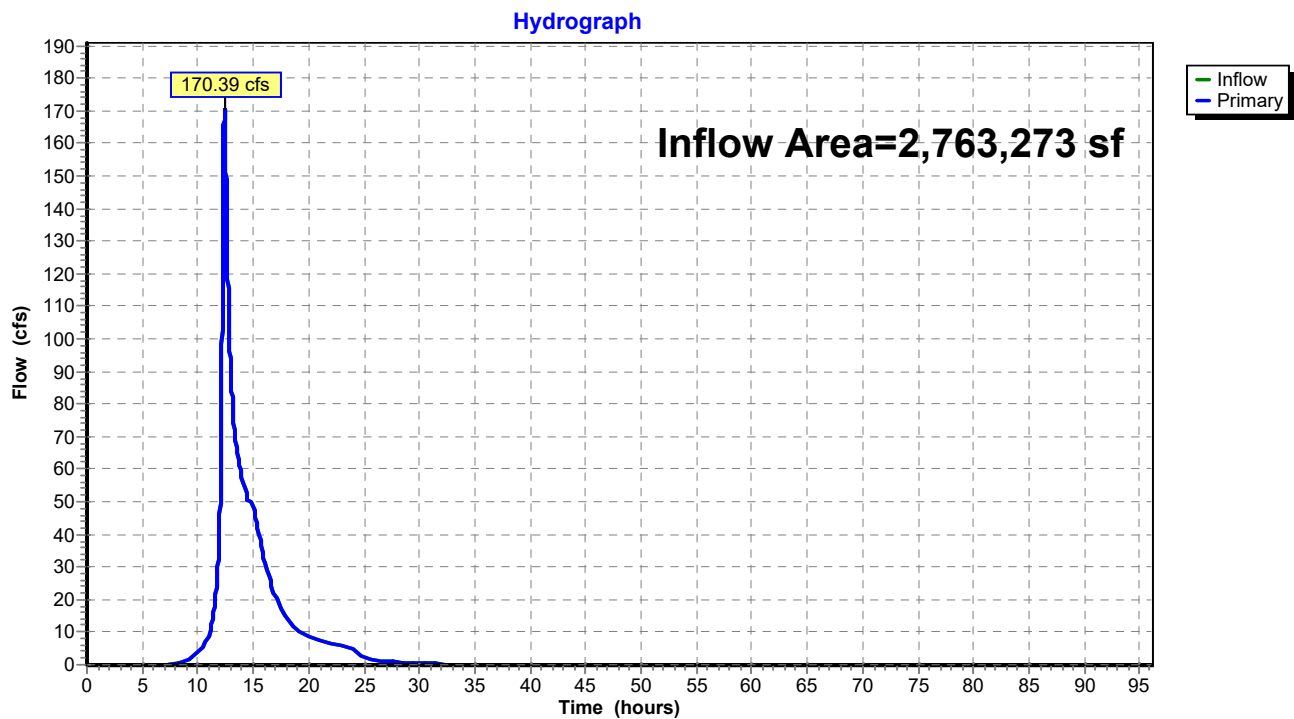
Printed 3/24/2020

Summary for Link 7: Design Point B

Inflow Area = 2,763,273 sf, 17.63% Impervious, Inflow Depth = 6.44" for 100-yr event
Inflow = 170.39 cfs @ 12.42 hrs, Volume= 1,482,781 cf
Primary = 170.39 cfs @ 12.42 hrs, Volume= 1,482,781 cf, Atten= 0%, Lag= 0.0 min

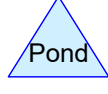
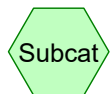
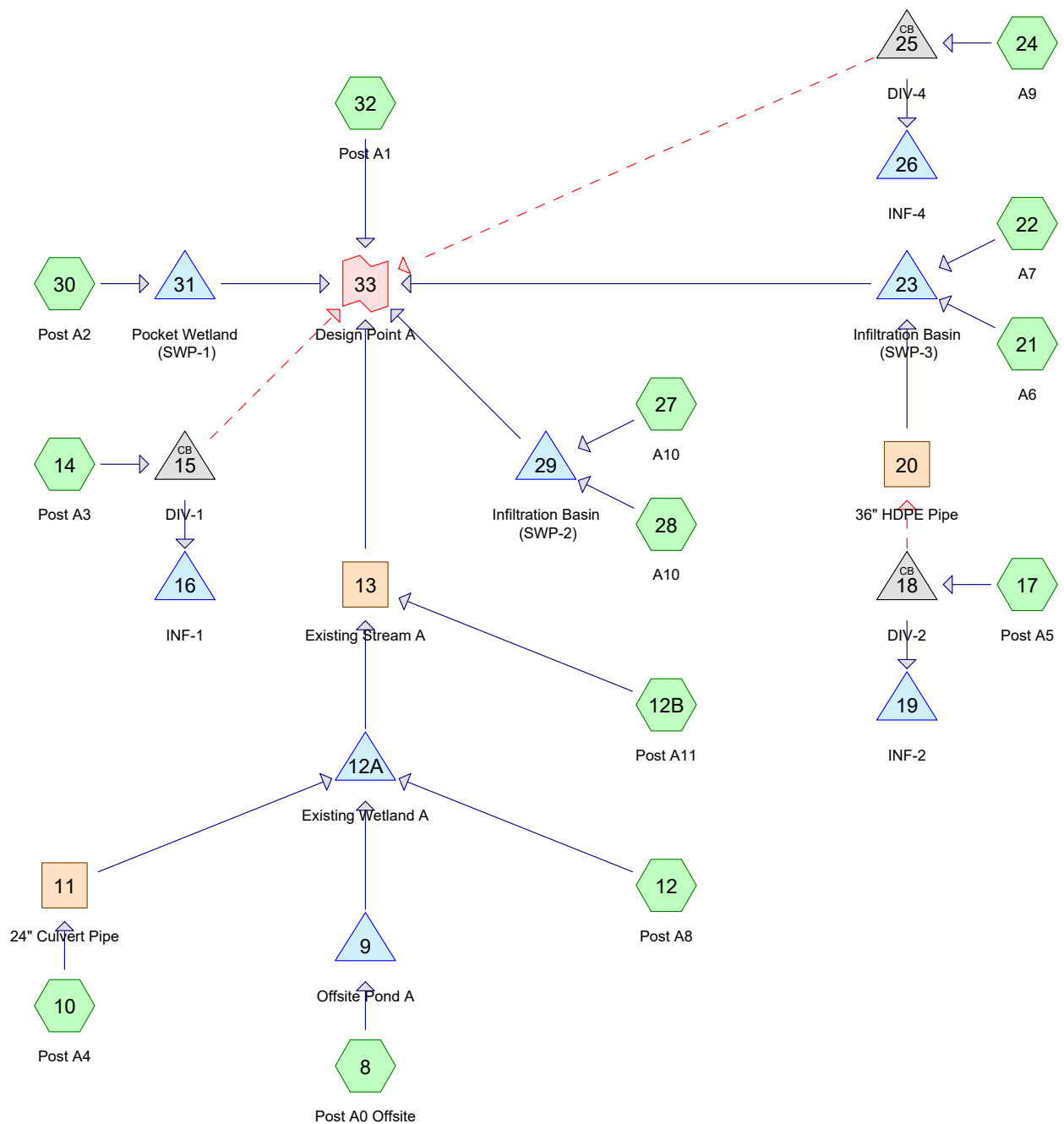
Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 7: Design Point B





Appendix A-2:
Post-Development
HydroCAD Output Reports



N60 P1 Post-A 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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 8: Post A0 Offsite

Runoff Area=1,115,060 sf 57.87% Impervious Runoff Depth=1.79"
 Flow Length=1,018' Tc=12.5 min CN=90 Runoff=55.28 cfs 166,539 cf

Pond 9: Offsite Pond A

Peak Elev=360.61' Storage=63,532 cf Inflow=55.28 cfs 166,539 cf
 Outflow=36.32 cfs 115,344 cf

Subcatchment 10: Post A4

Runoff Area=164,583 sf 10.25% Impervious Runoff Depth=0.88"
 Flow Length=340' Tc=20.5 min CN=76 Runoff=3.04 cfs 12,019 cf

Reach 11: 24" Culvert Pipe

Avg. Flow Depth=0.39' Max Vel=7.11 fps Inflow=3.04 cfs 12,019 cf
 24.0" Round Pipe n=0.013 L=112.0' S=0.0268 ' Capacity=37.02 cfs Outflow=3.04 cfs 12,019 cf

Subcatchment 12: Post A8

Runoff Area=403,480 sf 2.55% Impervious Runoff Depth=0.73"
 Flow Length=320' Tc=21.4 min CN=73 Runoff=5.82 cfs 24,586 cf

Pond 12A: Existing Wetland A

Peak Elev=324.05' Storage=6,325 cf Inflow=45.15 cfs 151,948 cf
 36.0" Round Culvert n=0.013 L=168.0' S=0.0655 ' Outflow=42.41 cfs 151,948 cf

Subcatchment 12B: Post A11

Runoff Area=722,164 sf 1.29% Impervious Runoff Depth=0.60"
 Flow Length=475' Tc=19.8 min CN=70 Runoff=8.37 cfs 36,155 cf

Reach 13: Existing Stream A

Avg. Flow Depth=1.02' Max Vel=8.01 fps Inflow=50.07 cfs 188,103 cf
 n=0.040 L=1,360.0' S=0.0721 ' Capacity=291.69 cfs Outflow=49.46 cfs 188,103 cf

Subcatchment 14: Post A3

Runoff Area=106,378 sf 85.91% Impervious Runoff Depth=2.24"
 Tc=6.0 min CN=95 Runoff=7.98 cfs 19,899 cf

Pond 15: DIV-1

Peak Elev=327.23' Inflow=7.98 cfs 19,899 cf
 Primary=5.63 cfs 19,145 cf Secondary=2.41 cfs 754 cf Outflow=7.98 cfs 19,899 cf

Pond 16: INF-1

Peak Elev=325.81' Storage=5,325 cf Inflow=5.63 cfs 19,145 cf
 Outflow=1.18 cfs 19,145 cf

Subcatchment 17: Post A5

Runoff Area=92,926 sf 100.00% Impervious Runoff Depth=2.56"
 Tc=6.0 min CN=98 Runoff=7.44 cfs 19,818 cf

Pond 18: DIV-2

Peak Elev=368.16' Inflow=7.44 cfs 19,818 cf
 Primary=6.11 cfs 19,483 cf Secondary=1.44 cfs 335 cf Outflow=7.44 cfs 19,818 cf

Pond 19: INF-2

Peak Elev=366.42' Storage=5,843 cf Inflow=6.11 cfs 19,483 cf
 Outflow=0.99 cfs 19,483 cf

Reach 20: 36" HDPE Pipe

Avg. Flow Depth=0.16' Max Vel=8.69 fps Inflow=1.44 cfs 335 cf
 36.0" Round Pipe n=0.013 L=805.0' S=0.1205 ' Capacity=231.53 cfs Outflow=1.22 cfs 335 cf

Subcatchment 21: A6

Runoff Area=384,686 sf 86.44% Impervious Runoff Depth=2.35"
 Tc=6.0 min CN=96 Runoff=29.63 cfs 75,193 cf

N60 P1 Post-A 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

Prepared by {enter your company name here}

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Subcatchment22: A7Runoff Area=103,728 sf 0.00% Impervious Runoff Depth=0.52"
Tc=6.0 min CN=68 Runoff=1.69 cfs 4,508 cf**Pond 23: Infiltration Basin (SWP-3)**Peak Elev=258.38' Storage=27,054 cf Inflow=32.29 cfs 80,035 cf
Discarded=4.64 cfs 80,035 cf Primary=0.00 cfs 0 cf Outflow=4.64 cfs 80,035 cf**Subcatchment24: A9**Runoff Area=33,825 sf 87.77% Impervious Runoff Depth=2.24"
Tc=6.0 min CN=95 Runoff=2.54 cfs 6,327 cf**Pond 25: DIV-4**Peak Elev=350.72' Inflow=2.54 cfs 6,327 cf
Primary=2.54 cfs 6,327 cf Secondary=0.00 cfs 0 cf Outflow=2.54 cfs 6,327 cf**Pond 26: INF-4**Peak Elev=350.07' Storage=1,537 cf Inflow=2.54 cfs 6,327 cf
Outflow=0.52 cfs 6,327 cf**Subcatchment27: A10**Runoff Area=43,060 sf 0.00% Impervious Runoff Depth=0.78"
Tc=6.0 min CN=74 Runoff=1.17 cfs 2,791 cf**Subcatchment28: A10**Runoff Area=104,468 sf 87.52% Impervious Runoff Depth=2.24"
Tc=6.0 min CN=95 Runoff=7.84 cfs 19,542 cf**Pond 29: Infiltration Basin (SWP-2)**Peak Elev=317.34' Storage=6,180 cf Inflow=8.99 cfs 22,333 cf
Discarded=1.82 cfs 22,333 cf Primary=0.00 cfs 0 cf Outflow=1.82 cfs 22,333 cf**Subcatchment30: Post A2**Runoff Area=231,706 sf 20.73% Impervious Runoff Depth=0.93"
Flow Length=817' Tc=17.7 min CN=77 Runoff=4.93 cfs 17,922 cf**Pond 31: Pocket Wetland (SWP-1)**Peak Elev=236.00' Storage=24,186 cf Inflow=4.93 cfs 17,922 cf
Outflow=0.04 cfs 10,030 cf**Subcatchment32: Post A1**Runoff Area=20,740 sf 35.22% Impervious Runoff Depth=1.22"
Tc=6.0 min CN=82 Runoff=0.91 cfs 2,101 cf**Link 33: Design Point A**Inflow=49.69 cfs 200,988 cf
Primary=49.69 cfs 200,988 cf**Total Runoff Area = 3,526,804 sf Runoff Volume = 407,398 cf Average Runoff Depth = 1.39"**
61.01% Pervious = 2,151,703 sf 38.99% Impervious = 1,375,101 sf

N60 P1 Post-A 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 8: Post A0 Offsite

Runoff = 55.28 cfs @ 12.20 hrs, Volume= 166,539 cf, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
645,334	98	Paved parking, HSG C
443,611	80	>75% Grass cover, Good, HSG D
23,572	74	>75% Grass cover, Good, HSG C
2,543	61	>75% Grass cover, Good, HSG B
1,115,060	90	Weighted Average
469,726		42.13% Pervious Area
645,334		57.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.0150	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	148	0.0574	3.86		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	740	0.0270	10.25	32.22	Pipe Channel, 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.015 Concrete sewer w/manholes & inlets
12.5	1,018	Total			

N60 P1 Post-A 3-17-20

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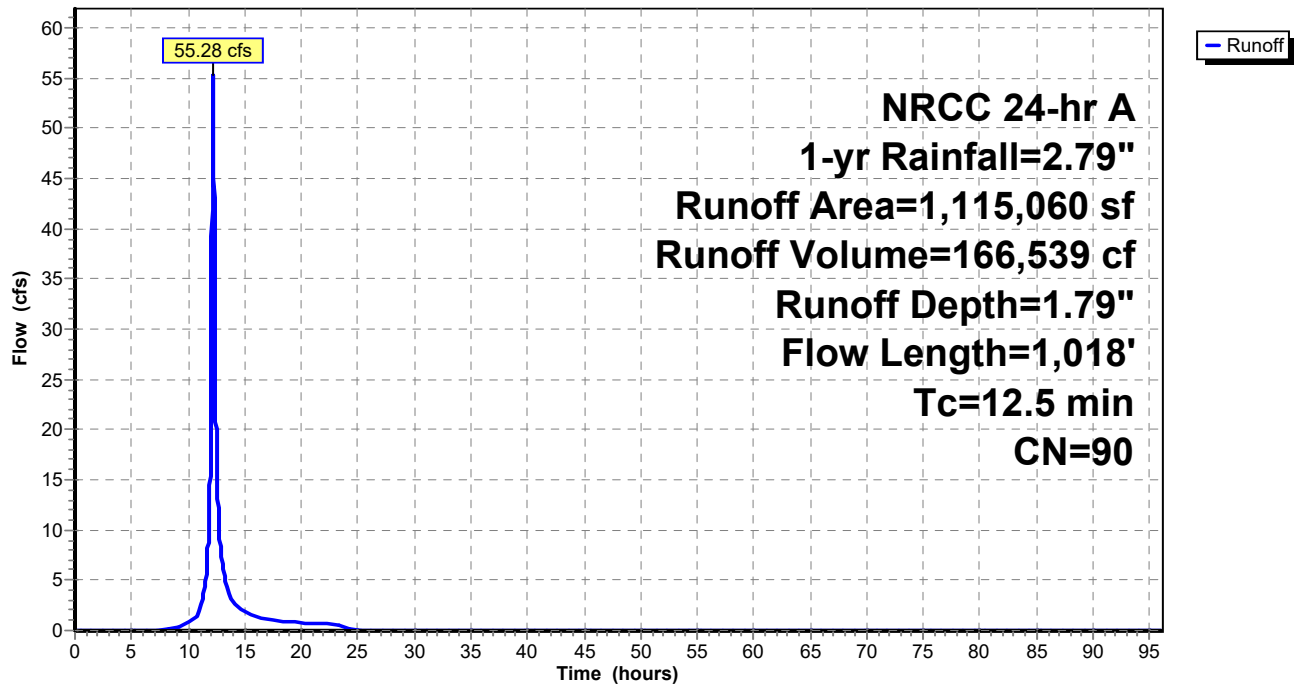
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NRCC 24-hr A 1-yr Rainfall=2.79"

Printed 3/24/2020

Subcatchment 8: Post A0 Offsite

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Pond 9: Offsite Pond A

Inflow Area = 1,115,060 sf, 57.87% Impervious, Inflow Depth = 1.79" for 1-yr event
 Inflow = 55.28 cfs @ 12.20 hrs, Volume= 166,539 cf
 Outflow = 36.32 cfs @ 12.33 hrs, Volume= 115,344 cf, Atten= 34%, Lag= 7.3 min
 Primary = 36.32 cfs @ 12.33 hrs, Volume= 115,344 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 360.61' @ 12.33 hrs Surf.Area= 20,903 sf Storage= 63,532 cf

Plug-Flow detention time= 143.7 min calculated for 115,332 cf (69% of inflow)
 Center-of-Mass det. time= 59.3 min (869.2 - 810.0)

Volume	Invert	Avail.Storage	Storage Description		
#1	357.00'	221,816 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
357.00	14,633	679.0	0	0	14,633
358.00	16,652	698.0	15,632	15,632	16,826
359.00	17,534	715.0	17,091	32,723	18,864
360.00	19,427	745.0	18,472	51,195	22,425
362.00	24,453	804.0	43,784	94,979	29,861
364.00	28,701	854.0	53,097	148,076	36,663
365.00	36,602	901.0	32,572	180,648	43,285
366.00	45,910	1,262.0	41,168	221,816	105,432

Device	Routing	Invert	Outlet Devices
#1	Primary	357.00'	30.0" Round Culvert L= 125.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 357.00' / 351.00' S= 0.0480 ' S= 0.0480 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#2	Device 1	360.00'	36.0" x 48.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#3	Primary	364.75'	150.0' long x 36.0' 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=36.32 cfs @ 12.33 hrs HW=360.61' TW=323.84' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 36.32 cfs @ 7.40 fps)
 2=Orifice/Grate (Passes 36.32 cfs of 43.79 cfs potential flow)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

N60 P1 Post-A 3-17-20

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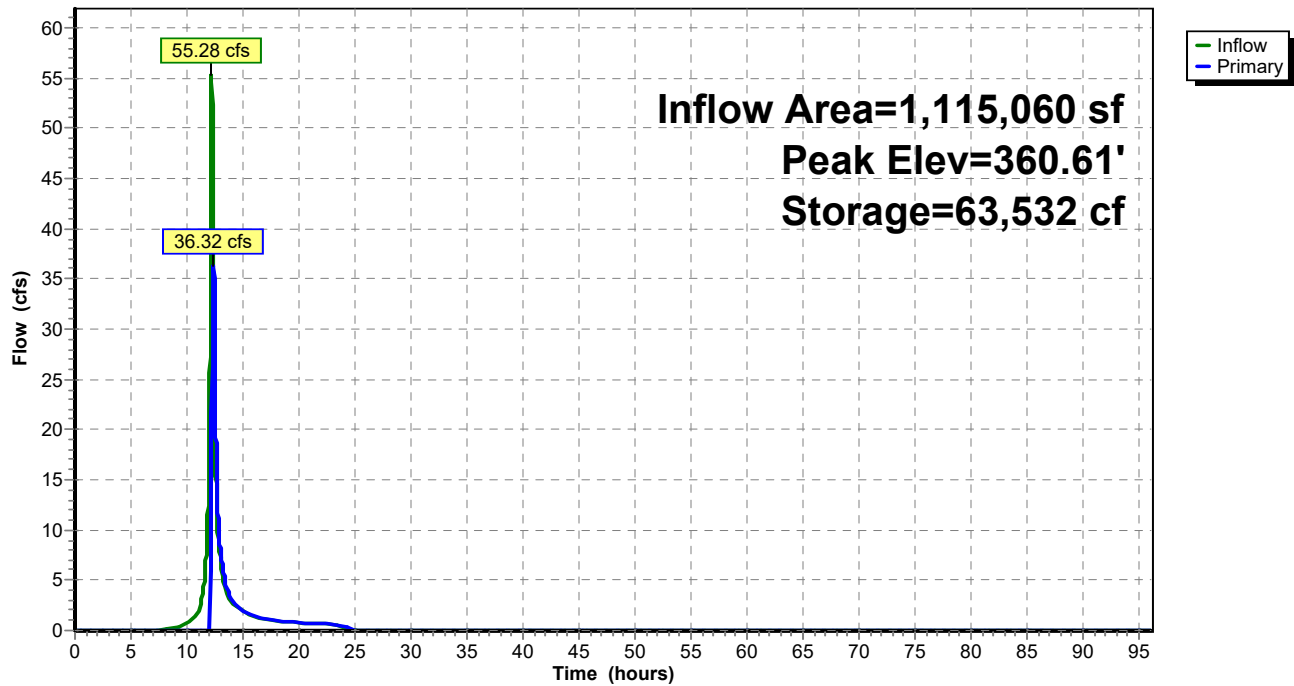
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NRCC 24-hr A 1-yr Rainfall=2.79"

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Pond 9: Offsite Pond A

Hydrograph



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NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 10: Post A4

Runoff = 3.04 cfs @ 12.32 hrs, Volume= 12,019 cf, Depth= 0.88"

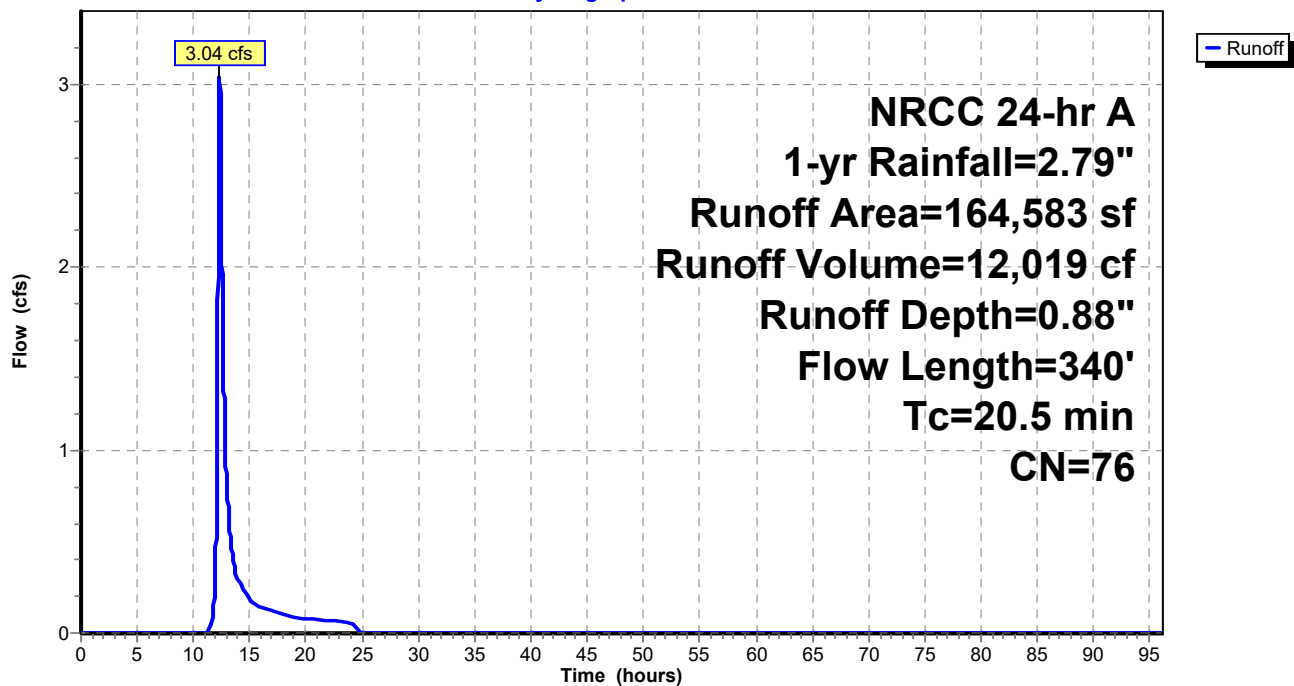
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
15,990	74	>75% Grass cover, Good, HSG C
65,271	70	Woods, Good, HSG C
66,457	77	Woods, Good, HSG D
16,865	98	Water Surface, HSG D
164,583	76	Weighted Average
147,718		89.75% Pervious Area
16,865		10.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.7	240	0.0208	2.32		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
20.5	340	Total			

Subcatchment 10: Post A4

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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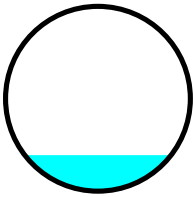
Summary for Reach 11: 24" Culvert Pipe

Inflow Area = 164,583 sf, 10.25% Impervious, Inflow Depth = 0.88" for 1-yr event
Inflow = 3.04 cfs @ 12.32 hrs, Volume= 12,019 cf
Outflow = 3.04 cfs @ 12.33 hrs, Volume= 12,019 cf, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.11 fps, Min. Travel Time= 0.3 min
Avg. Velocity= 2.80 fps, Avg. Travel Time= 0.7 min

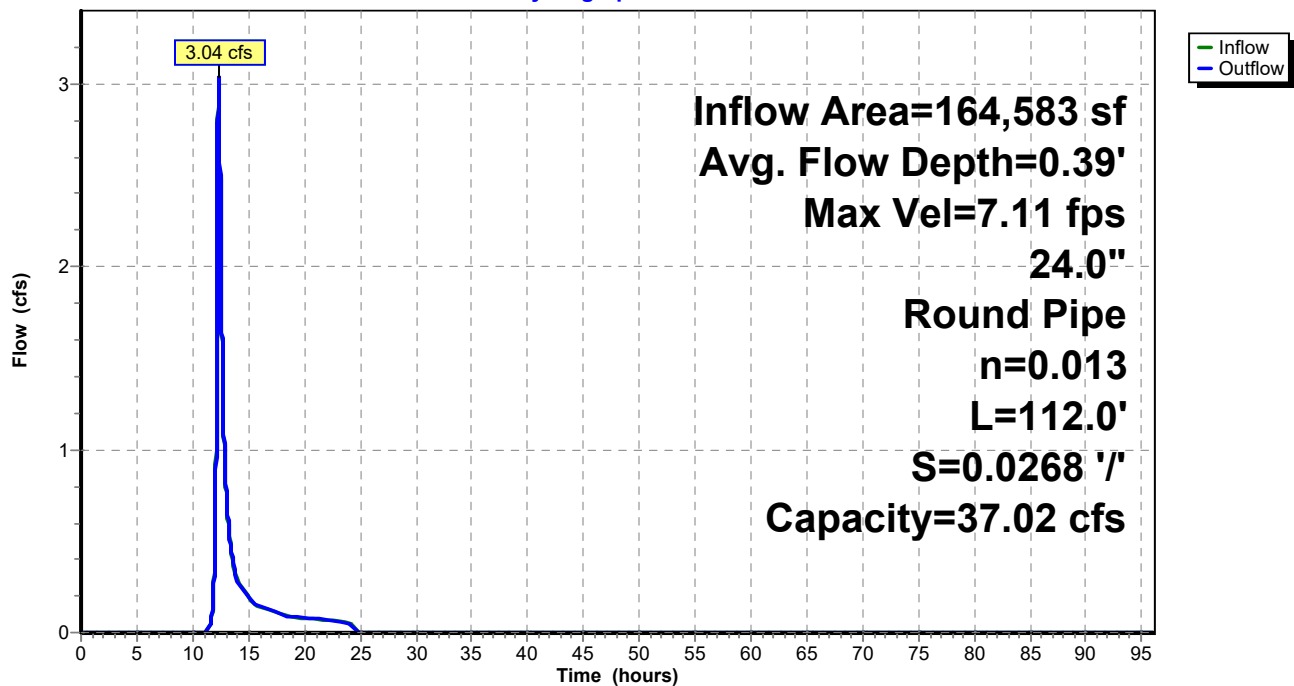
Peak Storage= 48 cf @ 12.33 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 37.02 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 112.0' Slope= 0.0268 '/'
Inlet Invert= 349.00', Outlet Invert= 346.00'



Reach 11: 24" Culvert Pipe

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 12: Post A8

Runoff = 5.82 cfs @ 12.34 hrs, Volume= 24,586 cf, Depth= 0.73"

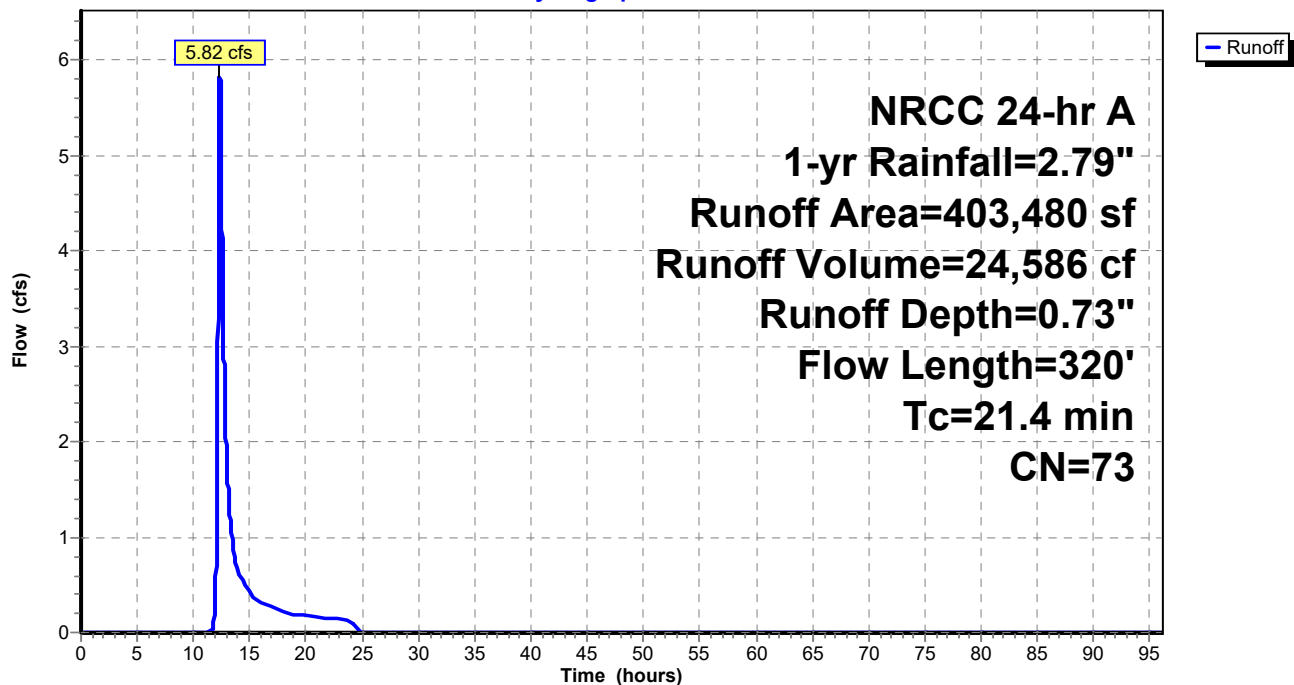
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
278,057	70	Woods, Good, HSG C
108,143	77	Woods, Good, HSG D
10,280	98	Paved parking, HSG D
6,532	74	>75% Grass cover, Good, HSG C
468	80	>75% Grass cover, Good, HSG D
403,480	73	Weighted Average
393,200		97.45% Pervious Area
10,280		2.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.9	220	0.0636	4.06		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
21.4	320	Total			

Subcatchment 12: Post A8

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Pond 12A: Existing Wetland A

Inflow Area = 1,683,123 sf, 39.95% Impervious, Inflow Depth = 1.08" for 1-yr event
 Inflow = 45.15 cfs @ 12.33 hrs, Volume= 151,948 cf
 Outflow = 42.41 cfs @ 12.41 hrs, Volume= 151,948 cf, Atten= 6%, Lag= 4.8 min
 Primary = 42.41 cfs @ 12.41 hrs, Volume= 151,948 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 324.05' @ 12.41 hrs Surf.Area= 5,049 sf Storage= 6,325 cf

Plug-Flow detention time= 1.8 min calculated for 151,948 cf (100% of inflow)
 Center-of-Mass det. time= 1.6 min (870.7 - 869.0)

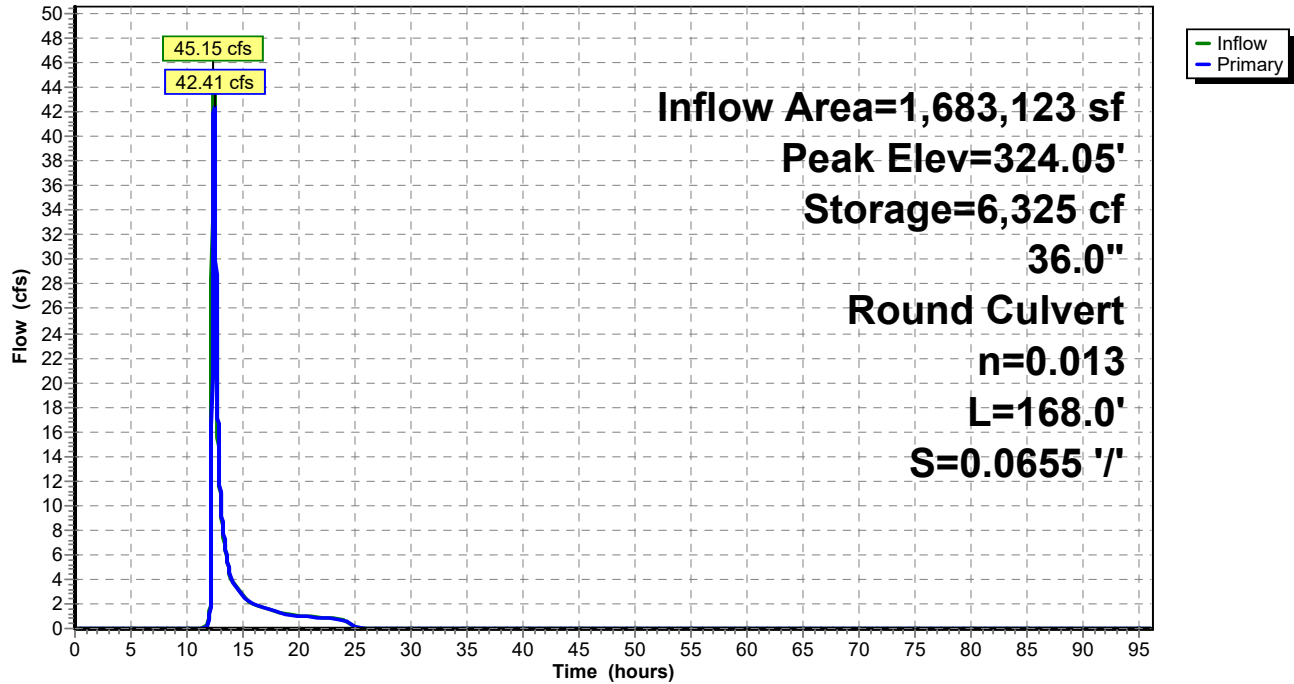
Volume	Invert	Avail.Storage	Storage Description		
#1	321.00'	190,307 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
321.00	124	53.2	0	0	124
322.00	1,084	175.8	525	525	2,361
324.00	4,913	341.5	5,536	6,061	9,202
326.00	11,332	638.2	15,804	21,866	32,354
328.00	20,583	804.3	31,458	53,324	51,475
330.00	34,086	1,075.5	54,104	107,428	92,087
332.00	49,257	1,268.5	82,879	190,307	128,164

Device	Routing	Invert	Outlet Devices
#1	Primary	321.00'	36.0" Round Culvert L= 168.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 321.00' / 310.00' S= 0.0655 ' S= 0.0655 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=42.40 cfs @ 12.41 hrs HW=324.05' TW=313.02' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 42.40 cfs @ 6.00 fps)

Pond 12A: Existing Wetland A

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 12B: Post A11

Runoff = 8.37 cfs @ 12.34 hrs, Volume= 36,155 cf, Depth= 0.60"

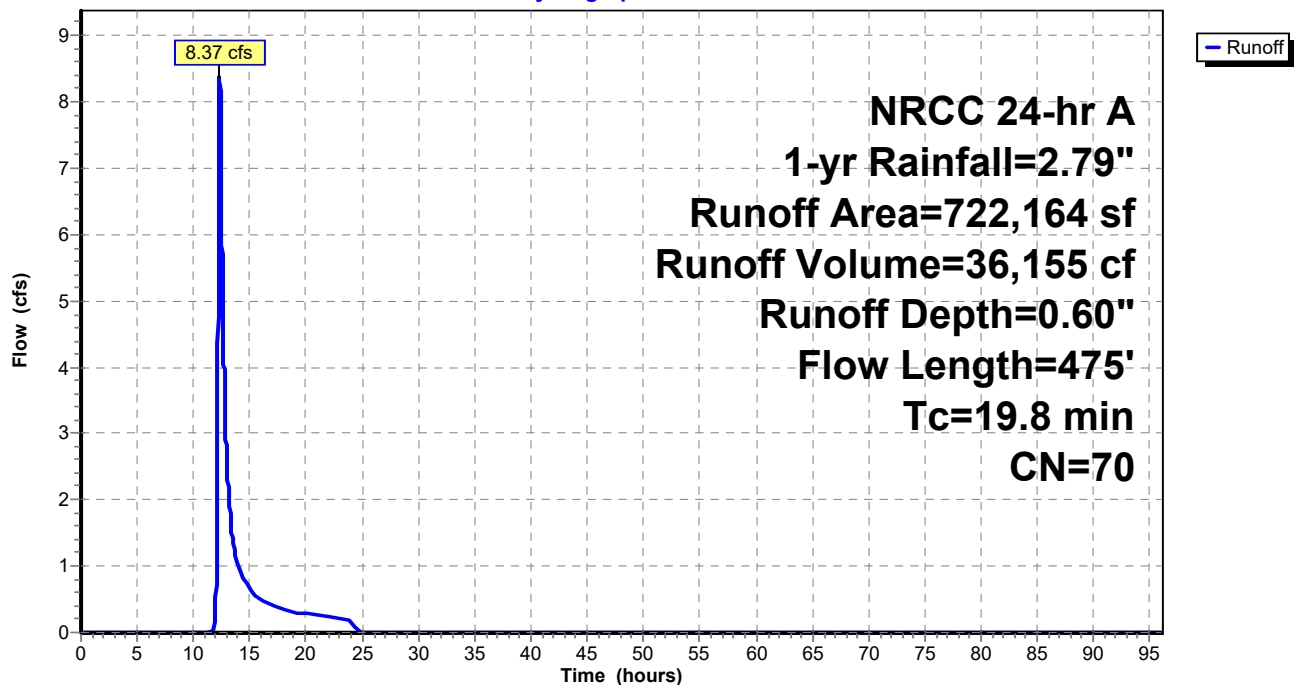
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
17,361	55	Woods, Good, HSG B
681,082	70	Woods, Good, HSG C
11,683	77	Woods, Good, HSG D
9,345	98	Paved parking, HSG C
2,693	74	>75% Grass cover, Good, HSG C
722,164	70	Weighted Average
712,819		98.71% Pervious Area
9,345		1.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.0	375	0.1400	6.02		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
19.8	475	Total			

Subcatchment 12B: Post A11

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Reach 13: Existing Stream A

Inflow Area = 2,405,287 sf, 28.35% Impervious, Inflow Depth = 0.94" for 1-yr event
Inflow = 50.07 cfs @ 12.40 hrs, Volume= 188,103 cf
Outflow = 49.46 cfs @ 12.43 hrs, Volume= 188,103 cf, Atten= 1%, Lag= 1.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.01 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 1.98 fps, Avg. Travel Time= 11.5 min

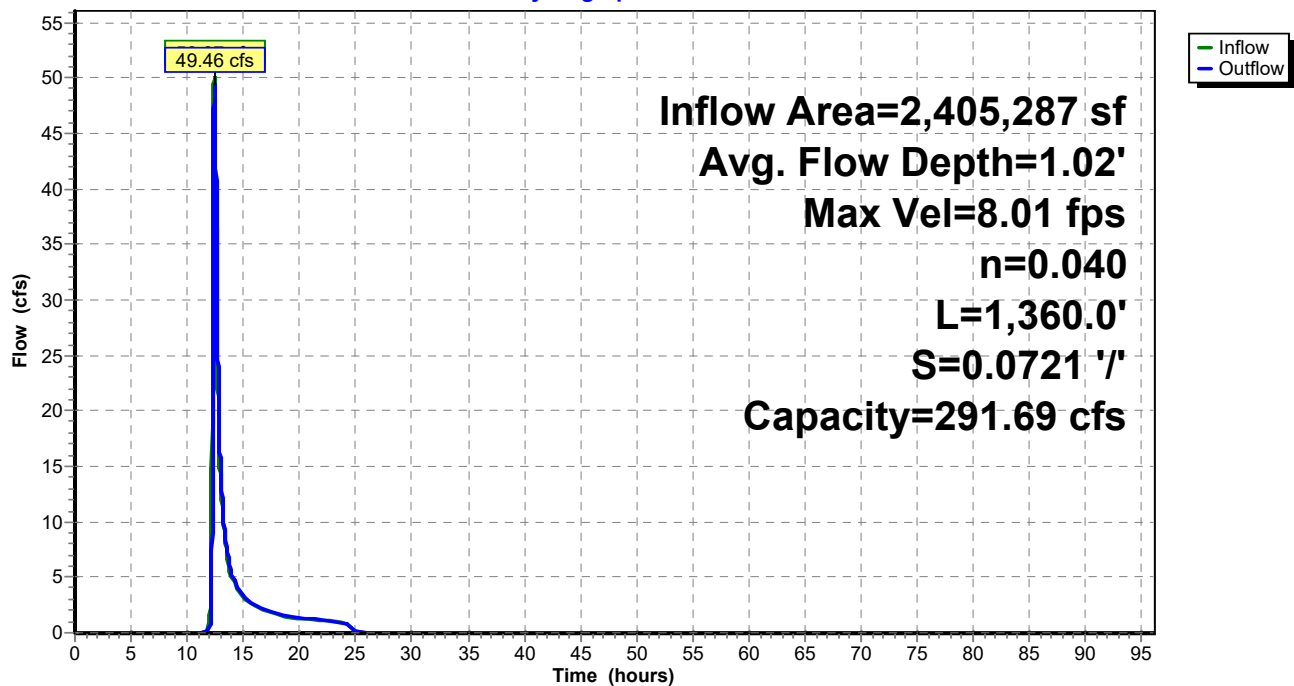
Peak Storage= 8,393 cf @ 12.43 hrs
Average Depth at Peak Storage= 1.02'
Bank-Full Depth= 2.50' Flow Area= 22.5 sf, Capacity= 291.69 cfs

4.00' x 2.50' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 ' ' Top Width= 14.00'
Length= 1,360.0' Slope= 0.0721 ' '
Inlet Invert= 312.00', Outlet Invert= 214.00'



Reach 13: Existing Stream A

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 14: Post A3

Runoff = 7.98 cfs @ 12.13 hrs, Volume= 19,899 cf, Depth= 2.24"

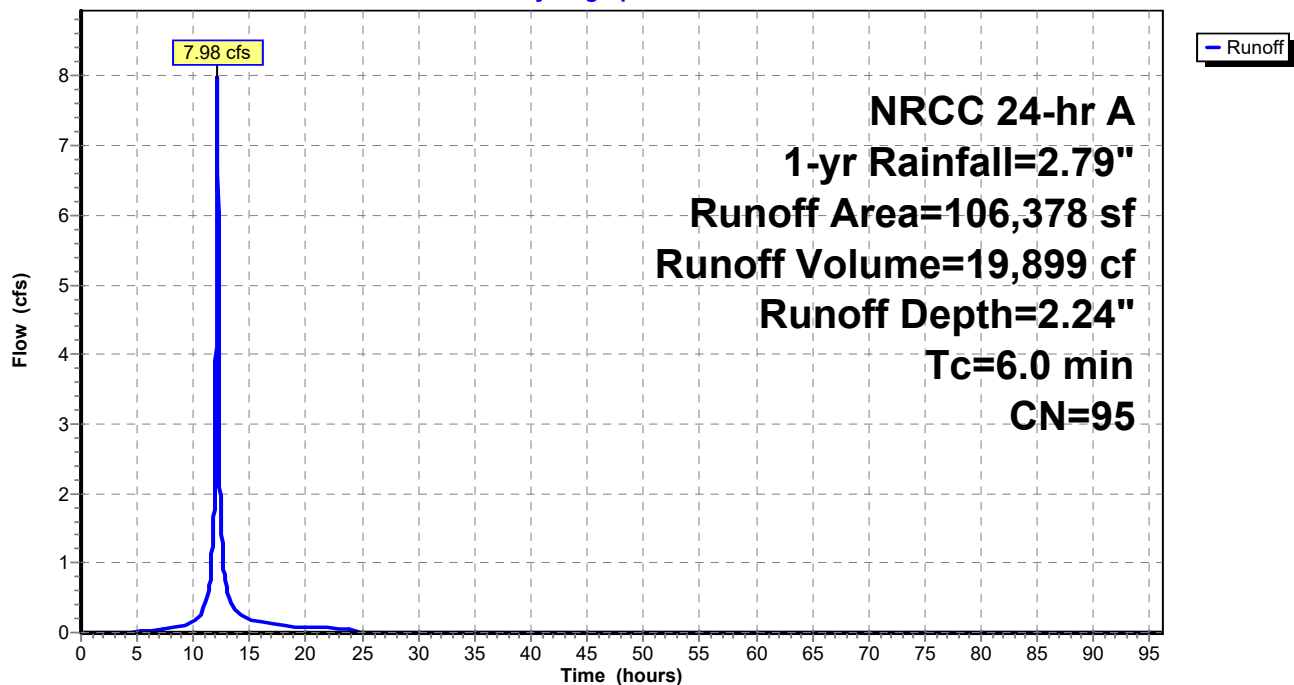
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
91,392	98	Paved parking, HSG C
14,986	74	>75% Grass cover, Good, HSG C
106,378	95	Weighted Average
14,986		14.09% Pervious Area
91,392		85.91% Impervious Area

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

Subcatchment 14: Post A3

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Pond 15: DIV-1

Inflow Area = 106,378 sf, 85.91% Impervious, Inflow Depth = 2.24" for 1-yr event
 Inflow = 7.98 cfs @ 12.13 hrs, Volume= 19,899 cf
 Outflow = 7.98 cfs @ 12.13 hrs, Volume= 19,899 cf, Atten= 0%, Lag= 0.0 min
 Primary = 5.63 cfs @ 12.12 hrs, Volume= 19,145 cf
 Secondary = 2.41 cfs @ 12.13 hrs, Volume= 754 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 327.23' @ 12.13 hrs

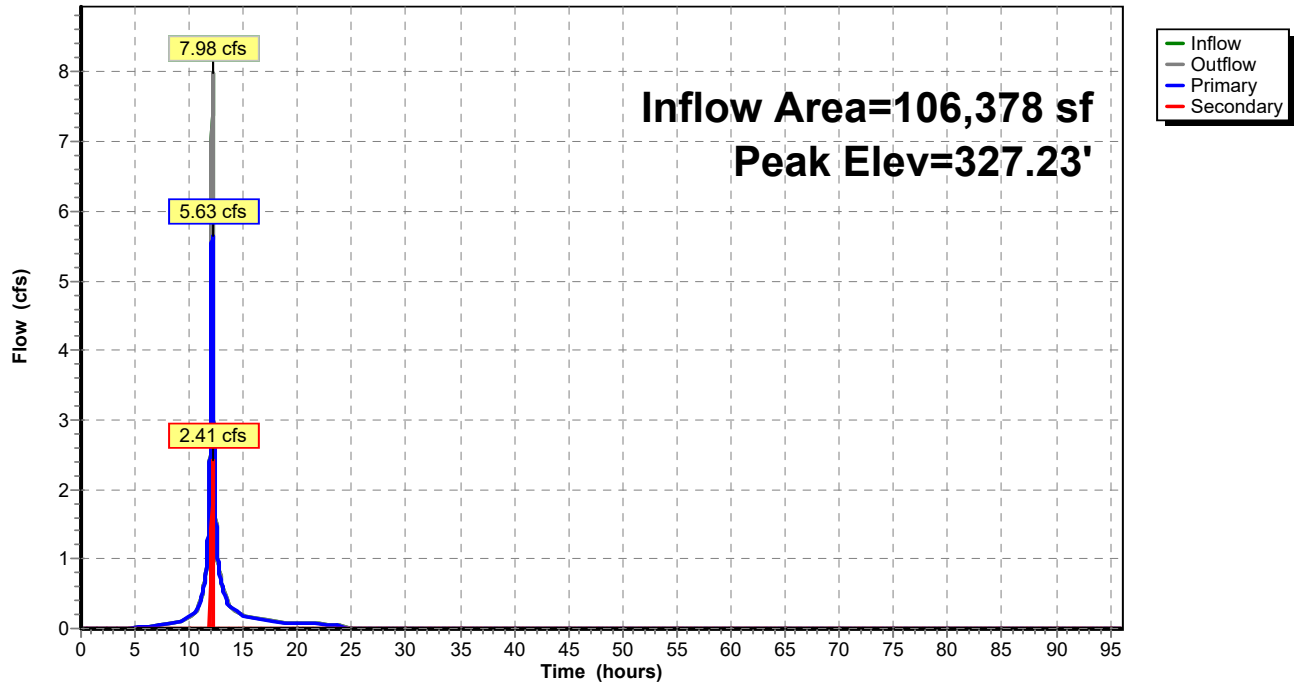
Flood Elev= 330.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 324.50' / 324.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	324.50'	24.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 324.50' / 320.00' S= 0.0900 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	327.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.58 cfs @ 12.12 hrs HW=327.21' TW=325.04' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 5.58 cfs @ 7.11 fps)**Secondary OutFlow** Max=2.40 cfs @ 12.13 hrs HW=327.22' TW=0.00' (Dynamic Tailwater)↑**2=Culvert** (Passes 2.40 cfs of 19.86 cfs potential flow)↑**3=Broad-Crested Rectangular Weir** (Weir Controls 2.40 cfs @ 1.33 fps)

Pond 15: DIV-1

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Pond 16: INF-1

Inflow Area = 106,378 sf, 85.91% Impervious, Inflow Depth = 2.16" for 1-yr event
 Inflow = 5.63 cfs @ 12.12 hrs, Volume= 19,145 cf
 Outflow = 1.18 cfs @ 11.79 hrs, Volume= 19,145 cf, Atten= 79%, Lag= 0.0 min
 Discarded = 1.18 cfs @ 11.79 hrs, Volume= 19,145 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 325.81' @ 12.58 hrs Surf.Area= 4,245 sf Storage= 5,325 cf

Plug-Flow detention time= 27.3 min calculated for 19,143 cf (100% of inflow)
 Center-of-Mass det. time= 27.3 min (810.3 - 783.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	324.00'	4,688 cf	36.75'W x 115.50'L x 4.33'H Field A 18,393 cf Overall - 6,674 cf Embedded = 11,720 cf x 40.0% Voids
#2A	324.50'	6,674 cf	Cultec R-360HD x 180 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 180 Chambers in 6 Rows Cap Storage= +6.5 cf x 2 x 6 rows = 77.5 cf
		11,361 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	324.00'	12.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=1.18 cfs @ 11.79 hrs HW=324.05' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 1.18 cfs)

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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Pond 16: INF-1 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 6 rows = 77.5 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

30 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 112.50' Row Length +18.0" End Stone x 2 = 115.50' Base Length

6 Rows x 60.0" Wide + 9.0" Spacing x 5 + 18.0" Side Stone x 2 = 36.75' Base Width

6.0" Base + 36.0" Chamber Height + 10.0" Cover = 4.33' Field Height

180 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 6 Rows = 6,673.6 cf Chamber Storage

18,393.4 cf Field - 6,673.6 cf Chambers = 11,719.8 cf Stone x 40.0% Voids = 4,687.9 cf Stone Storage

Chamber Storage + Stone Storage = 11,361.5 cf = 0.261 af

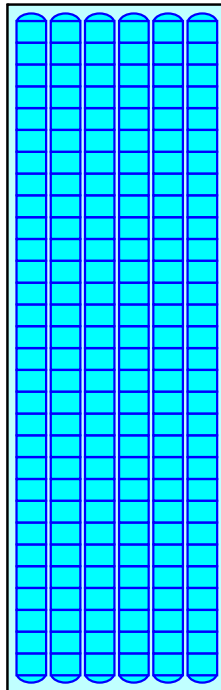
Overall Storage Efficiency = 61.8%

Overall System Size = 115.50' x 36.75' x 4.33'

180 Chambers

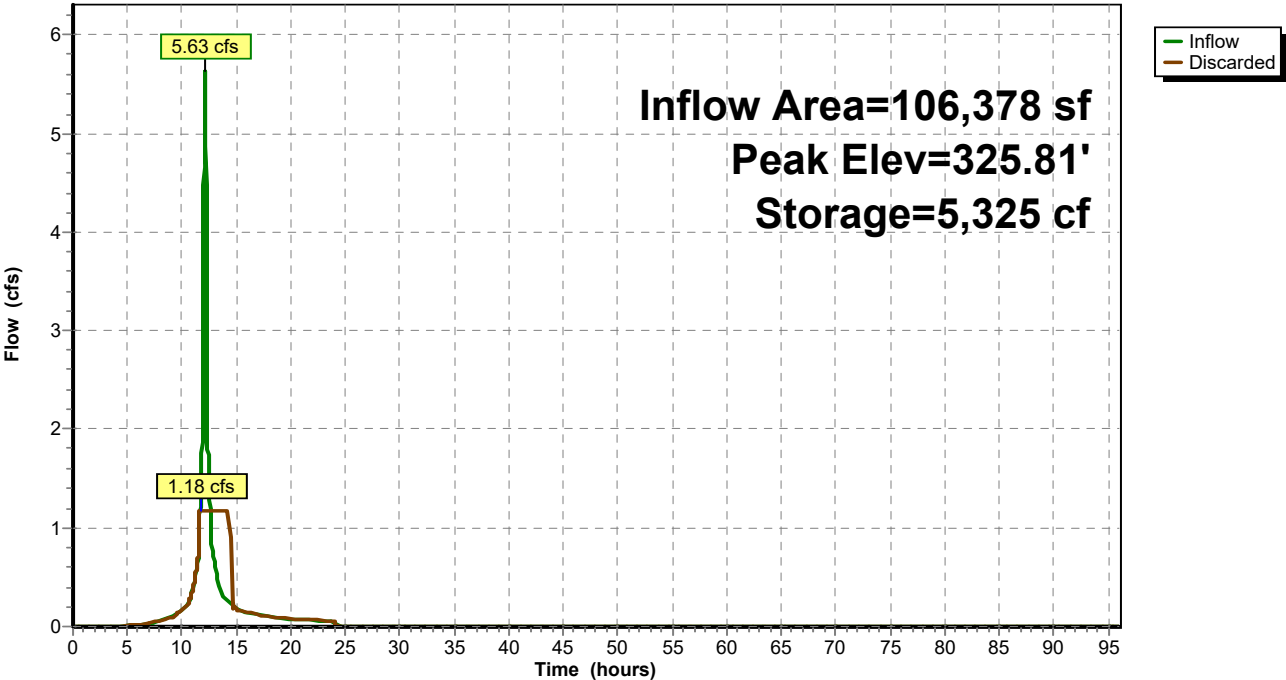
681.2 cy Field

434.1 cy Stone



Pond 16: INF-1

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 17: Post A5

Runoff = 7.44 cfs @ 12.13 hrs, Volume= 19,818 cf, Depth= 2.56"

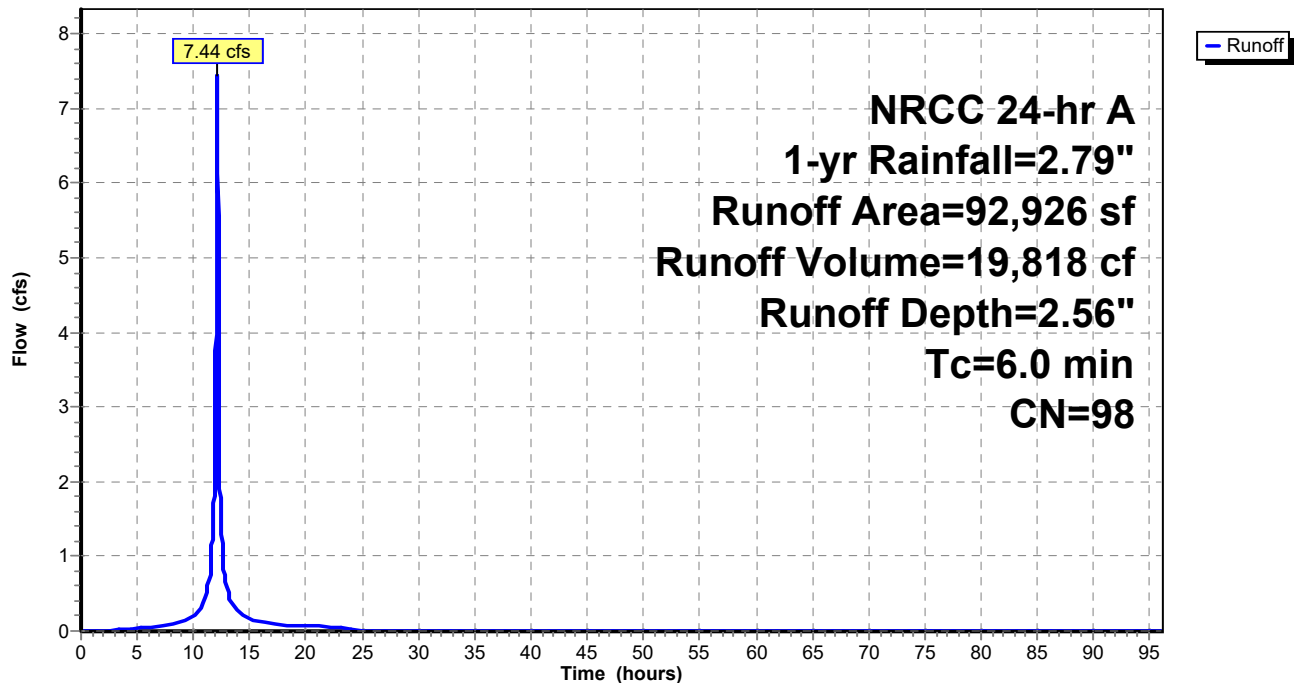
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
92,926	98	Roofs, HSG C
92,926		100.00% Impervious Area

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

Subcatchment 17: Post A5

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Pond 18: DIV-2

Inflow Area = 92,926 sf, 100.00% Impervious, Inflow Depth = 2.56" for 1-yr event
 Inflow = 7.44 cfs @ 12.13 hrs, Volume= 19,818 cf
 Outflow = 7.44 cfs @ 12.13 hrs, Volume= 19,818 cf, Atten= 0%, Lag= 0.0 min
 Primary = 6.11 cfs @ 12.10 hrs, Volume= 19,483 cf
 Secondary = 1.44 cfs @ 12.13 hrs, Volume= 335 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 368.16' @ 12.13 hrs

Flood Elev= 371.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	365.00'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 365.00' / 365.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	366.50'	24.0" Round Culvert L= 550.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 366.50' / 355.00' S= 0.0209 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	368.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=6.06 cfs @ 12.10 hrs HW=368.12' TW=365.55' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 6.06 cfs @ 7.72 fps)**Secondary OutFlow** Max=1.42 cfs @ 12.13 hrs HW=368.16' TW=355.14' (Dynamic Tailwater)↑**2=Culvert** (Passes 1.42 cfs of 12.22 cfs potential flow)↑**3=Broad-Crested Rectangular Weir** (Weir Controls 1.42 cfs @ 1.12 fps)

N60 P1 Post-A 3-17-20

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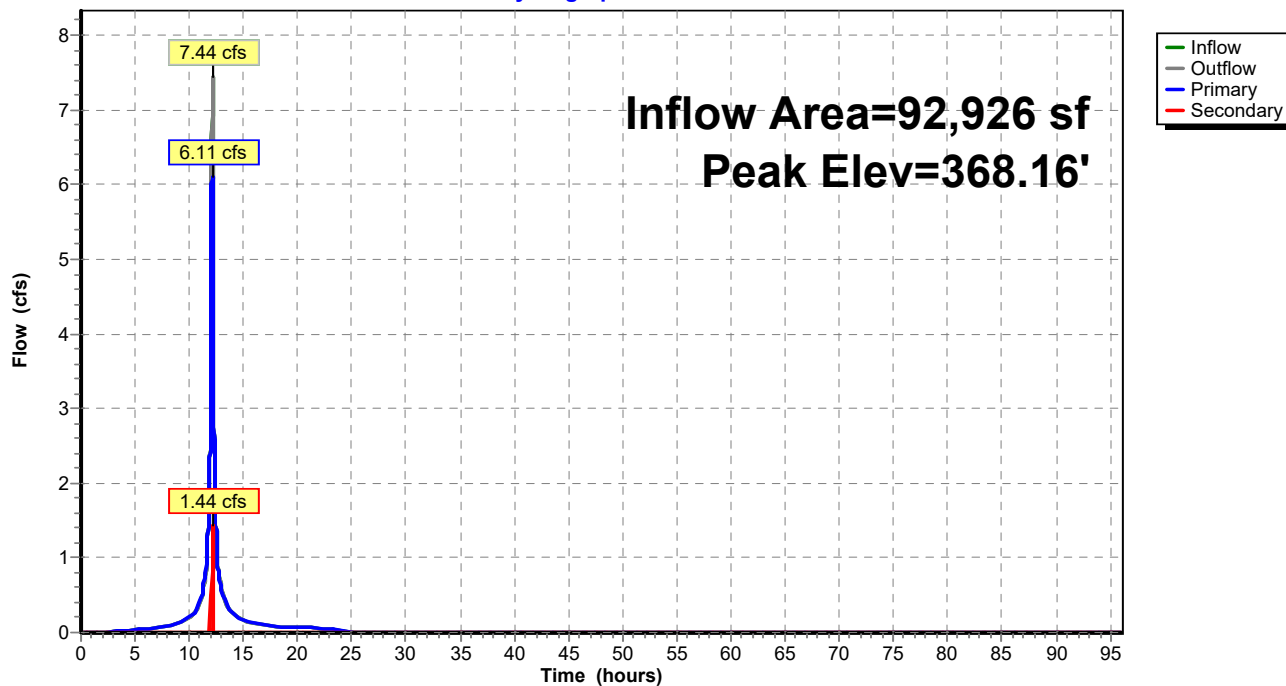
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NRCC 24-hr A 1-yr Rainfall=2.79"

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Pond 18: DIV-2

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Pond 19: INF-2

Inflow Area = 92,926 sf, 100.00% Impervious, Inflow Depth = 2.52" for 1-yr event
 Inflow = 6.11 cfs @ 12.10 hrs, Volume= 19,483 cf
 Outflow = 0.99 cfs @ 11.69 hrs, Volume= 19,483 cf, Atten= 84%, Lag= 0.0 min
 Discarded = 0.99 cfs @ 11.69 hrs, Volume= 19,483 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 366.42' @ 12.60 hrs Surf.Area= 4,295 sf Storage= 5,843 cf

Plug-Flow detention time= 35.2 min calculated for 19,481 cf (100% of inflow)
 Center-of-Mass det. time= 35.2 min (793.6 - 758.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	364.50'	4,639 cf	41.50'W x 103.50'L x 4.33'H Field A 18,613 cf Overall - 7,016 cf Embedded = 11,596 cf x 40.0% Voids
#2A	365.00'	7,016 cf	Cultec R-360HD x 189 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 189 Chambers in 7 Rows Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf
		11,655 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	364.50'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=0.99 cfs @ 11.69 hrs HW=364.55' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.99 cfs)

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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Pond 19: INF-2 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

27 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 101.50' Row Length +12.0" End Stone x 2 = 103.50' Base Length

7 Rows x 60.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 41.50' Base Width

6.0" Base + 36.0" Chamber Height + 10.0" Cover = 4.33' Field Height

189 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 7 Rows = 7,016.3 cf Chamber Storage

18,612.7 cf Field - 7,016.3 cf Chambers = 11,596.5 cf Stone x 40.0% Voids = 4,638.6 cf Stone Storage

Chamber Storage + Stone Storage = 11,654.9 cf = 0.268 af

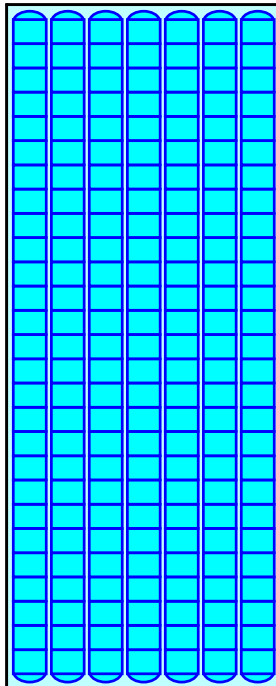
Overall Storage Efficiency = 62.6%

Overall System Size = 103.50' x 41.50' x 4.33'

189 Chambers

689.4 cy Field

429.5 cy Stone



N60 P1 Post-A 3-17-20

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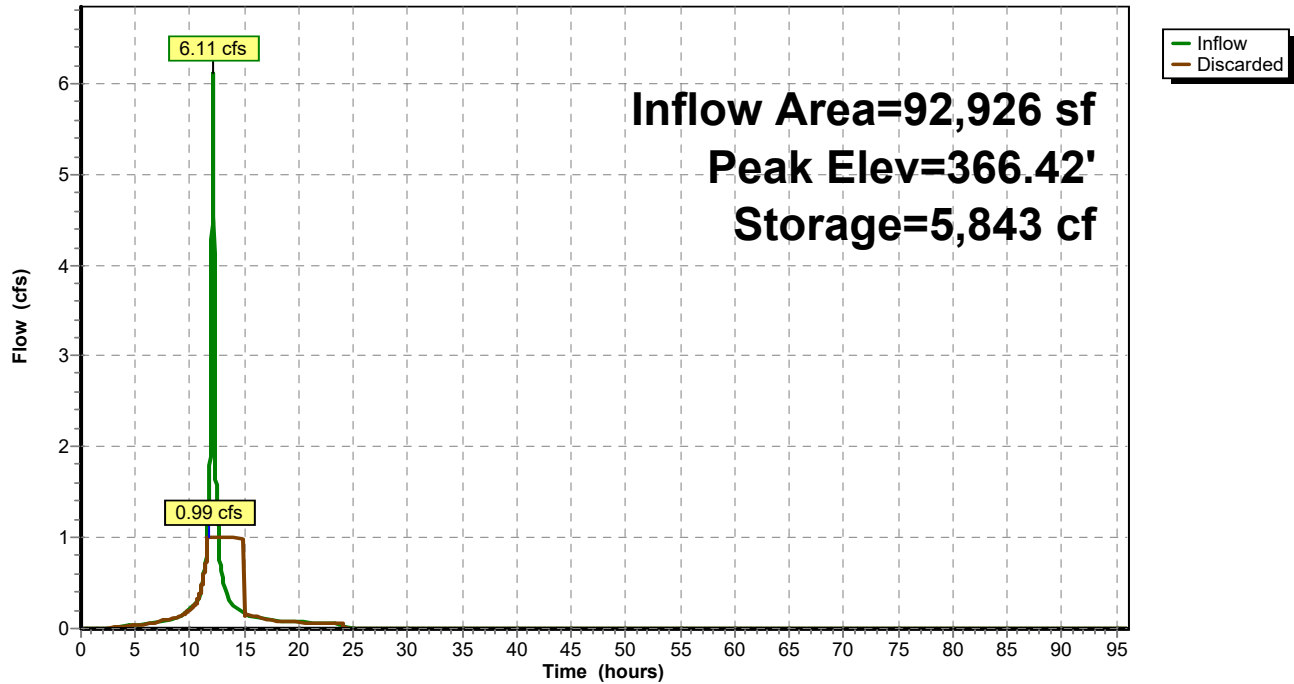
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NRCC 24-hr A 1-yr Rainfall=2.79"

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Pond 19: INF-2

Hydrograph



N60 P1 Post-A 3-17-20

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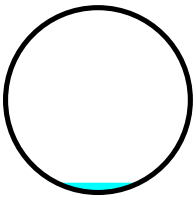
Summary for Reach 20: 36" HDPE Pipe

Inflow = 1.44 cfs @ 12.13 hrs, Volume= 335 cf
Outflow = 1.22 cfs @ 12.15 hrs, Volume= 335 cf, Atten= 15%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.69 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 3.92 fps, Avg. Travel Time= 3.4 min

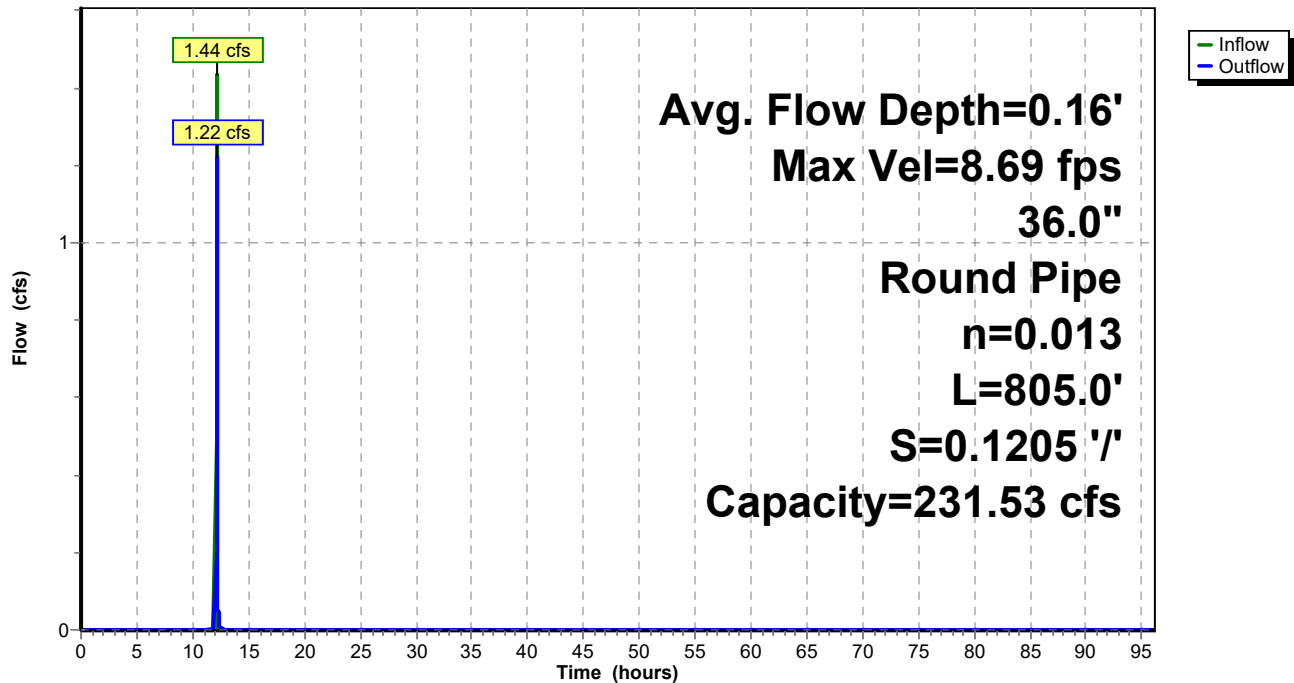
Peak Storage= 113 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 231.53 cfs

36.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 805.0' Slope= 0.1205 '/'
Inlet Invert= 355.00', Outlet Invert= 258.00'



Reach 20: 36" HDPE Pipe

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 21: A6

Runoff = 29.63 cfs @ 12.13 hrs, Volume= 75,193 cf, Depth= 2.35"

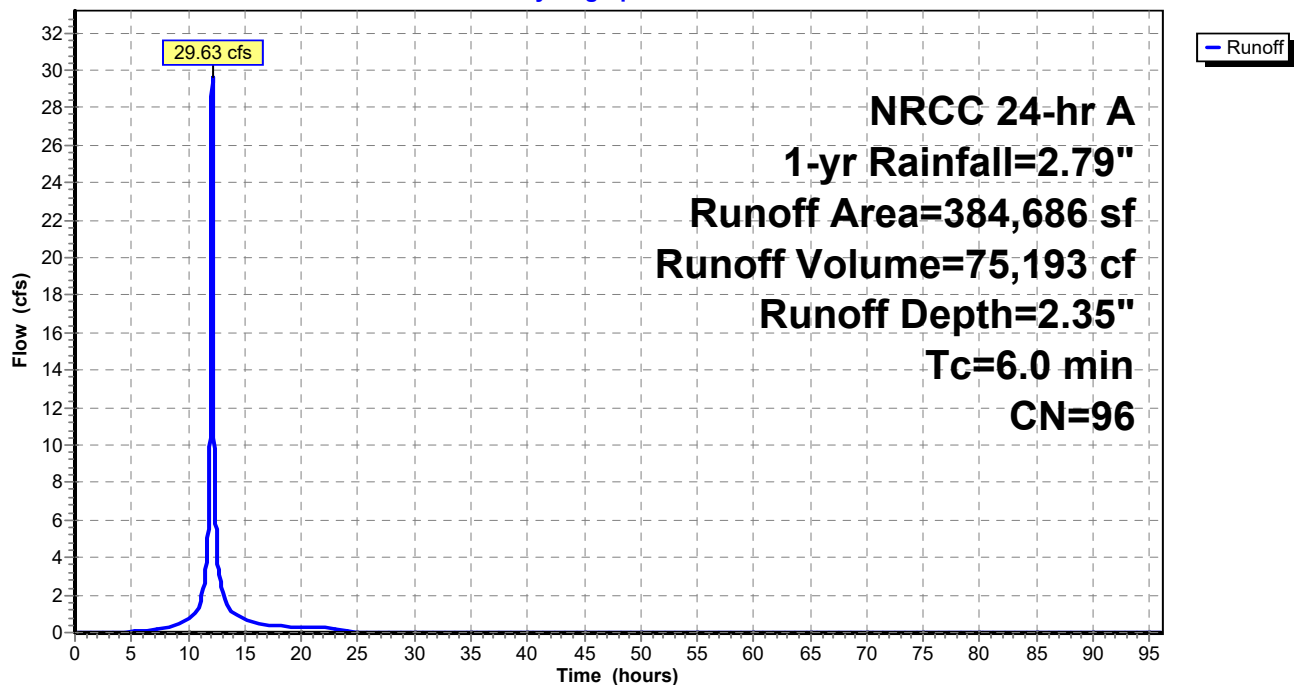
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
332,512	98	Paved parking, HSG C
52,174	86	<50% Grass cover, Poor, HSG C
384,686	96	Weighted Average
52,174		13.56% Pervious Area
332,512		86.44% Impervious Area

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

Subcatchment 21: A6

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 22: A7

Runoff = 1.69 cfs @ 12.14 hrs, Volume= 4,508 cf, Depth= 0.52"

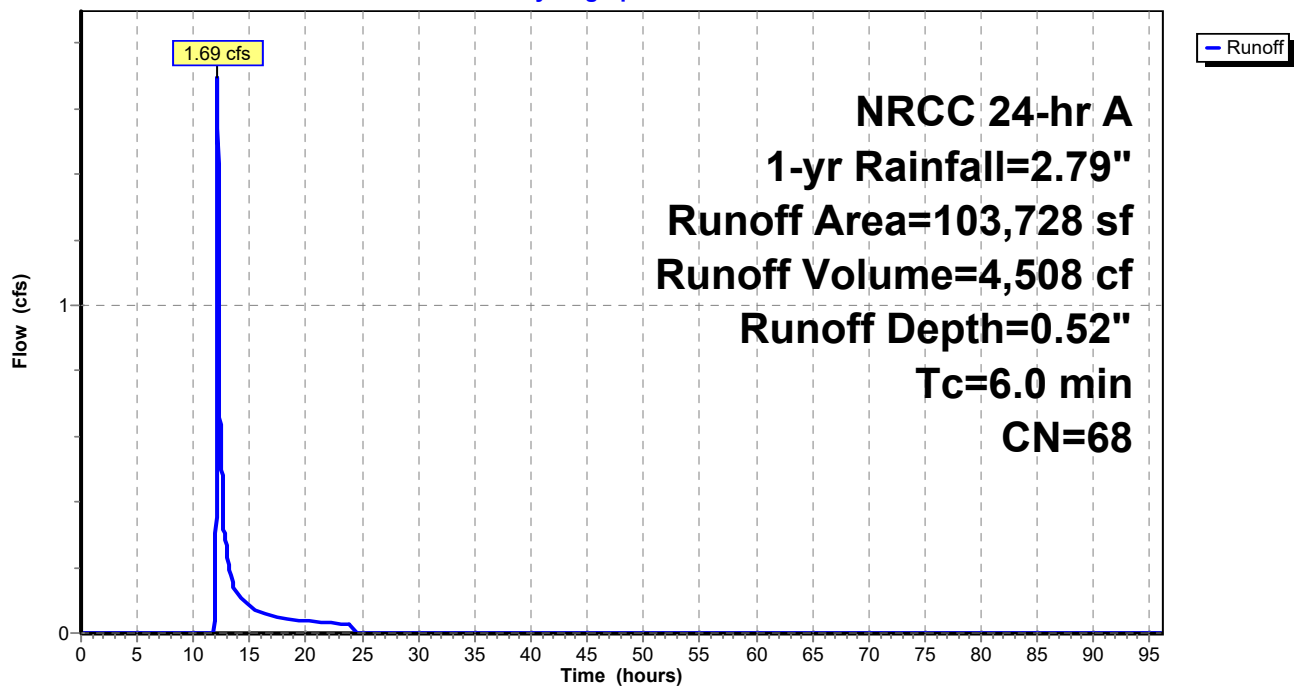
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
35,128	65	Brush, Good, HSG C
68,600	70	Woods, Good, HSG C
103,728	68	Weighted Average
103,728		100.00% Pervious Area

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

Subcatchment 22: A7

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Pond 23: Infiltration Basin (SWP-3)

Inflow Area = 488,414 sf, 68.08% Impervious, Inflow Depth = 1.97" for 1-yr event
 Inflow = 32.29 cfs @ 12.13 hrs, Volume= 80,035 cf
 Outflow = 4.64 cfs @ 12.59 hrs, Volume= 80,035 cf, Atten= 86%, Lag= 27.3 min
 Discarded = 4.64 cfs @ 12.59 hrs, Volume= 80,035 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 258.38' @ 12.59 hrs Surf.Area= 13,364 sf Storage= 27,054 cf

Plug-Flow detention time= 43.5 min calculated for 80,027 cf (100% of inflow)
 Center-of-Mass det. time= 43.5 min (823.6 - 780.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	256.00'	87,144 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
256.00	9,450	527.9	0	0	9,450
258.00	12,731	565.7	22,100	22,100	12,917
260.00	16,238	603.5	28,898	50,998	16,623
262.00	19,973	641.3	36,147	87,144	20,569

Device	Routing	Invert	Outlet Devices
#1	Primary	254.00'	36.0" Round Culvert X 2.00 L= 95.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 254.00' / 244.00' S= 0.1053 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	260.00'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	260.00'	3.0' long x 0.5' breadth Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	259.40'	6.0" Vert. Orifice/Grate C= 0.600
#5	Device 1	261.00'	36.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Discarded	256.00'	15.000 in/hr Exfiltration over Surface area Phase-In= 0.10'

Discarded OutFlow Max=4.64 cfs @ 12.59 hrs HW=258.38' (Free Discharge)

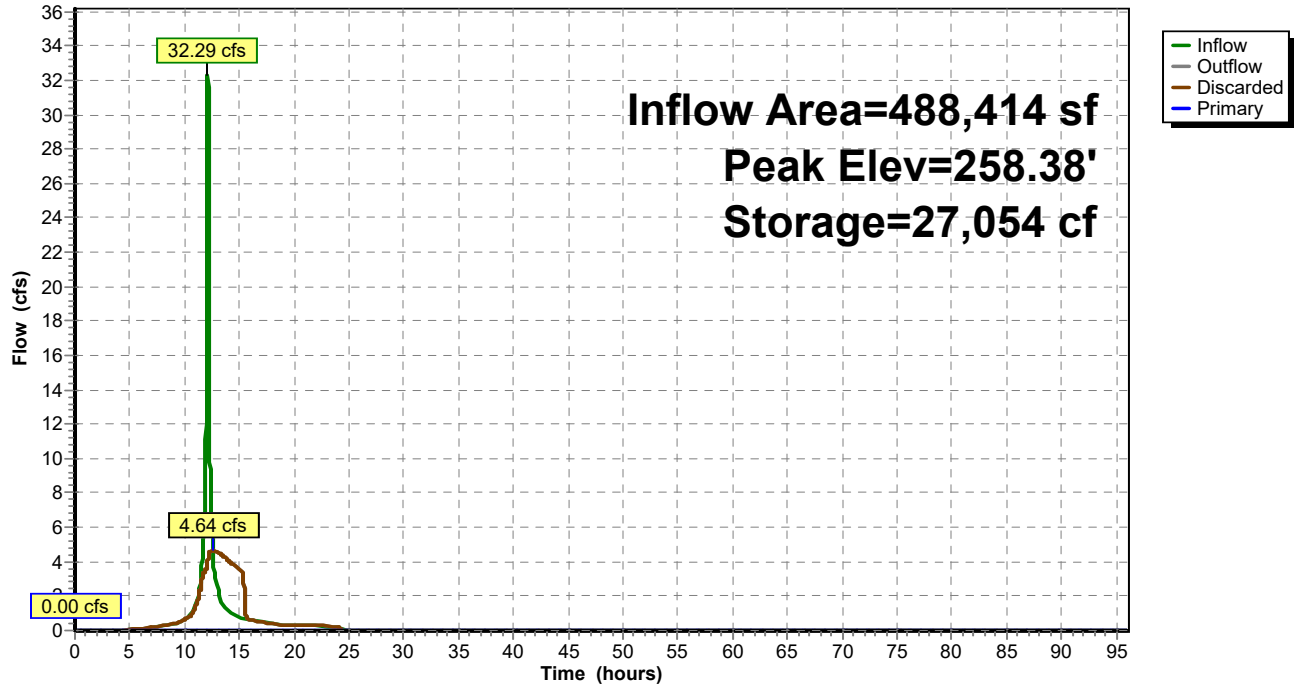
↳ **6=Exfiltration** (Exfiltration Controls 4.64 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=256.00' TW=0.00' (Dynamic Tailwater)

↳ **1=Culvert** (Passes 0.00 cfs of 48.21 cfs potential flow)
 ↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **4=Orifice/Grate** (Controls 0.00 cfs)
 ↳ **5=Orifice/Grate** (Controls 0.00 cfs)

Pond 23: Infiltration Basin (SWP-3)

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 24: A9

Runoff = 2.54 cfs @ 12.13 hrs, Volume= 6,327 cf, Depth= 2.24"

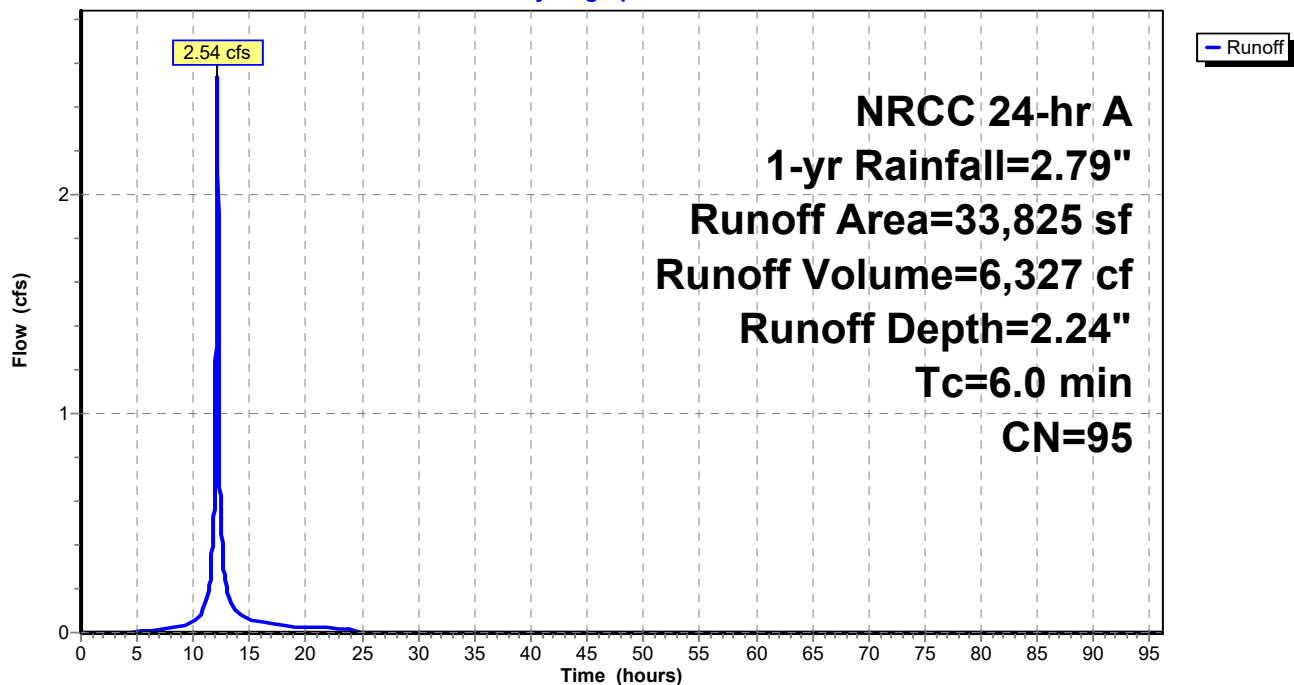
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
29,687	98	Paved parking, HSG C
4,138	74	>75% Grass cover, Good, HSG C
33,825	95	Weighted Average
4,138		12.23% Pervious Area
29,687		87.77% Impervious Area

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

Subcatchment 24: A9

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Pond 25: DIV-4

Inflow Area = 33,825 sf, 87.77% Impervious, Inflow Depth = 2.24" for 1-yr event
 Inflow = 2.54 cfs @ 12.13 hrs, Volume= 6,327 cf
 Outflow = 2.54 cfs @ 12.13 hrs, Volume= 6,327 cf, Atten= 0%, Lag= 0.0 min
 Primary = 2.54 cfs @ 12.13 hrs, Volume= 6,327 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 350.72' @ 12.13 hrs

Flood Elev= 355.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	349.50'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 349.50' / 349.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	349.50'	18.0" Round Culvert L= 128.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 349.50' / 344.00' S= 0.0430 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	352.50'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=2.54 cfs @ 12.13 hrs HW=350.72' TW=349.71' (Dynamic Tailwater)↑**1=Culvert** (Barrel Controls 2.54 cfs @ 3.37 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=349.50' TW=0.00' (Dynamic Tailwater)↑**2=Culvert** (Controls 0.00 cfs)↑**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

N60 P1 Post-A 3-17-20

Prepared by {enter your company name here}

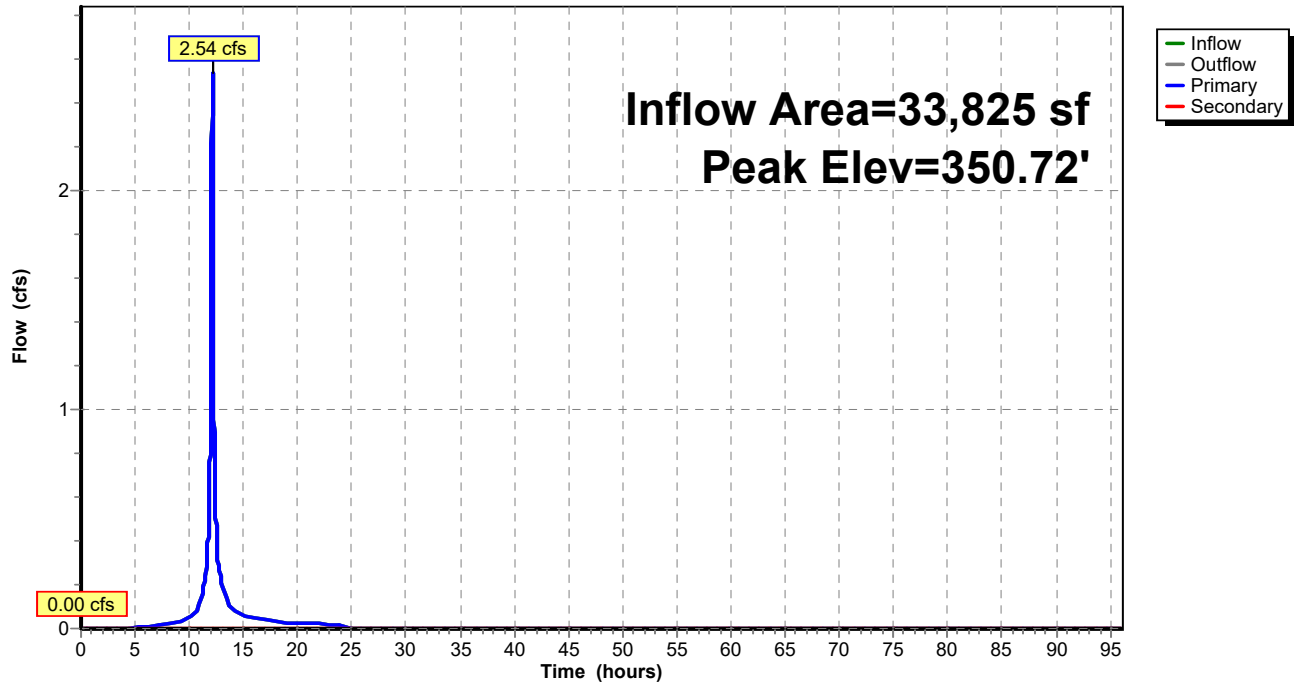
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NRCC 24-hr A 1-yr Rainfall=2.79"

Printed 3/24/2020

Pond 25: DIV-4

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Pond 26: INF-4

Inflow Area = 33,825 sf, 87.77% Impervious, Inflow Depth = 2.24" for 1-yr event
 Inflow = 2.54 cfs @ 12.13 hrs, Volume= 6,327 cf
 Outflow = 0.52 cfs @ 11.89 hrs, Volume= 6,327 cf, Atten= 80%, Lag= 0.0 min
 Discarded = 0.52 cfs @ 11.89 hrs, Volume= 6,327 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 350.07' @ 12.42 hrs Surf.Area= 2,242 sf Storage= 1,537 cf

Plug-Flow detention time= 16.7 min calculated for 6,327 cf (100% of inflow)
 Center-of-Mass det. time= 16.7 min (797.6 - 780.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	349.00'	2,196 cf	30.50'W x 73.50'L x 3.88'H Field A 8,687 cf Overall - 3,196 cf Embedded = 5,490 cf x 40.0% Voids
#2A	349.50'	3,196 cf	Cultec R-330XLHD x 60 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
		5,393 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	349.00'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=0.52 cfs @ 11.89 hrs HW=349.04' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.52 cfs)

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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Pond 26: INF-4 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

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

10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length

6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width

6.0" Base + 30.5" Chamber Height + 10.0" Cover = 3.88' Field Height

60 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 3,196.5 cf Chamber Storage

8,686.8 cf Field - 3,196.5 cf Chambers = 5,490.3 cf Stone x 40.0% Voids = 2,196.1 cf Stone Storage

Chamber Storage + Stone Storage = 5,392.6 cf = 0.124 af

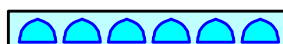
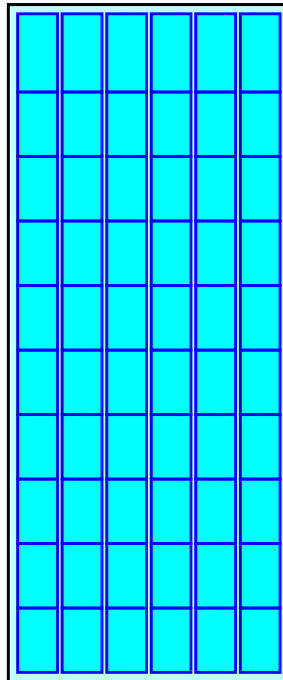
Overall Storage Efficiency = 62.1%

Overall System Size = 73.50' x 30.50' x 3.88'

60 Chambers

321.7 cy Field

203.3 cy Stone



N60 P1 Post-A 3-17-20

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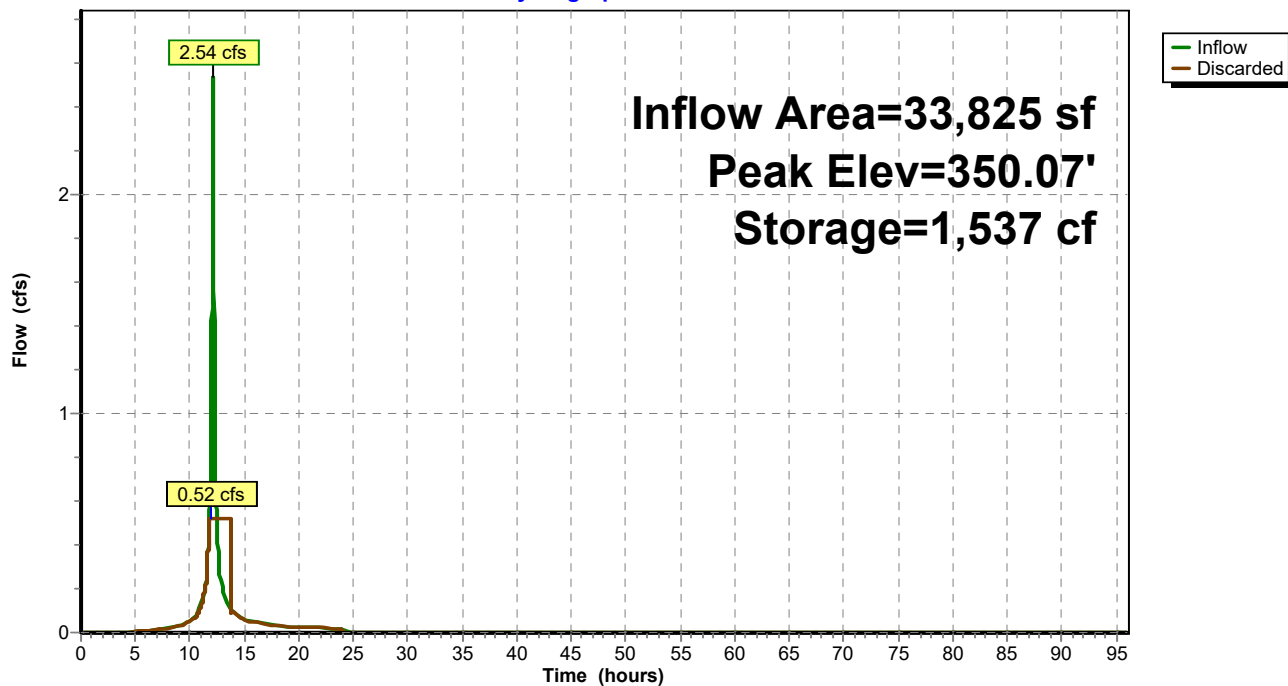
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NRCC 24-hr A 1-yr Rainfall=2.79"

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Pond 26: INF-4

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 27: A10

Runoff = 1.17 cfs @ 12.14 hrs, Volume= 2,791 cf, Depth= 0.78"

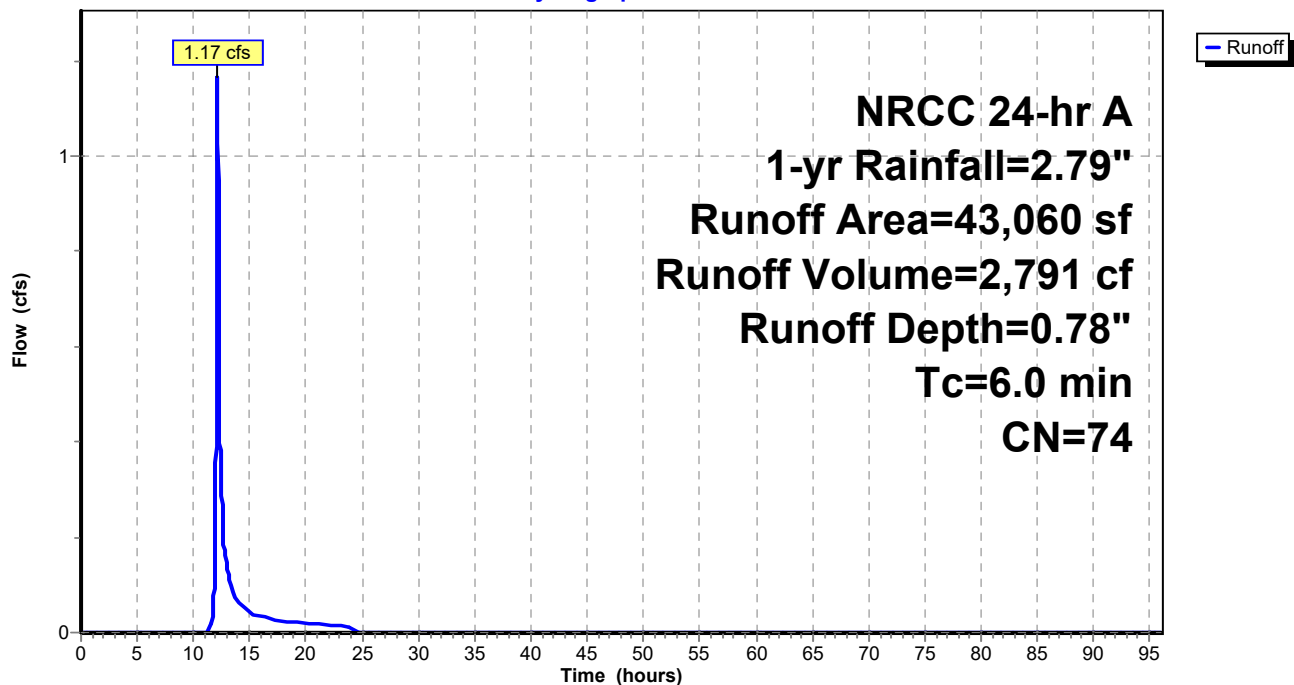
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
16,120	73	Brush, Good, HSG D
19,715	77	Brush, Poor, HSG C
7,225	70	Woods, Good, HSG C
43,060	74	Weighted Average
43,060		100.00% Pervious Area

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

Subcatchment 27: A10

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 28: A10

Runoff = 7.84 cfs @ 12.13 hrs, Volume= 19,542 cf, Depth= 2.24"

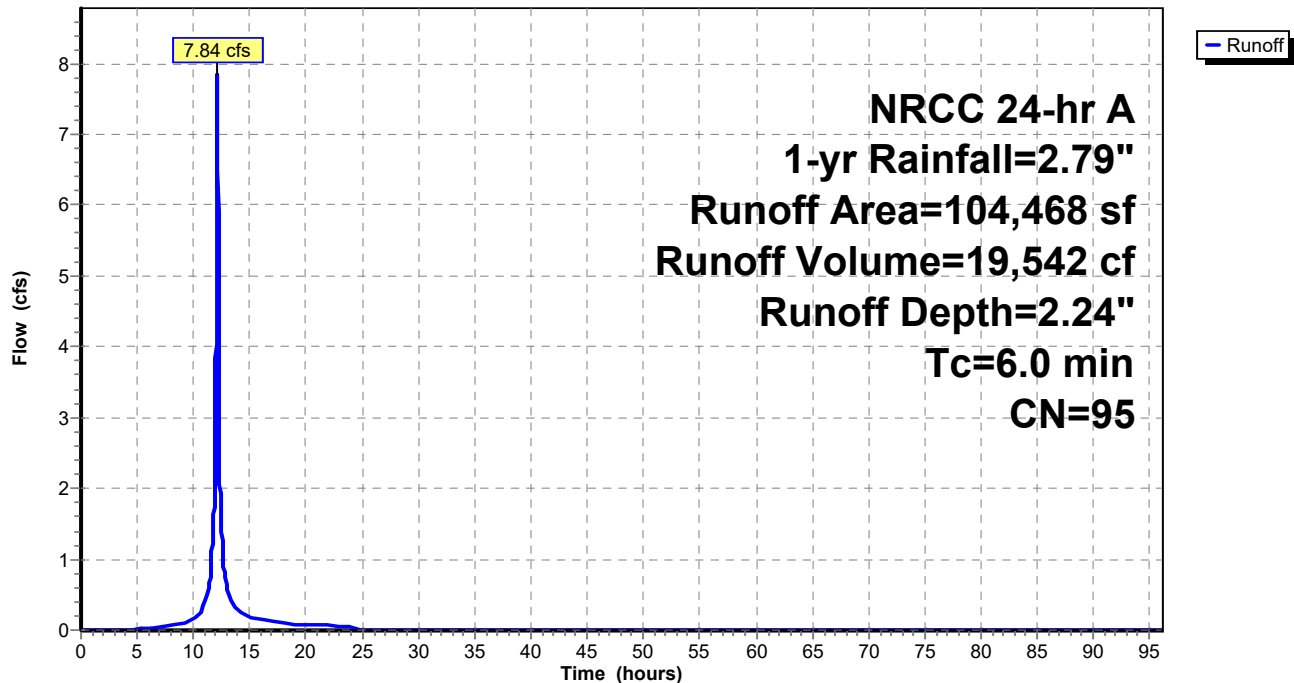
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
91,430	98	Paved parking, HSG C
7,435	74	>75% Grass cover, Good, HSG C
5,603	80	>75% Grass cover, Good, HSG D
104,468	95	Weighted Average
13,038		12.48% Pervious Area
91,430		87.52% Impervious Area

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

Subcatchment 28: A10

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Pond 29: Infiltration Basin (SWP-2)

Inflow Area = 147,528 sf, 61.97% Impervious, Inflow Depth = 1.82" for 1-yr event
 Inflow = 8.99 cfs @ 12.13 hrs, Volume= 22,333 cf
 Outflow = 1.82 cfs @ 12.45 hrs, Volume= 22,333 cf, Atten= 80%, Lag= 19.3 min
 Discarded = 1.82 cfs @ 12.45 hrs, Volume= 22,333 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 317.34' @ 12.45 hrs Surf.Area= 5,238 sf Storage= 6,180 cf

Plug-Flow detention time= 24.2 min calculated for 22,333 cf (100% of inflow)
 Center-of-Mass det. time= 24.2 min (814.3 - 790.1)

Volume	Invert	Avail.Storage	Storage Description
#1	316.00'	41,962 cf	Custom Stage Data (Irregular) Listed below (Recalc)

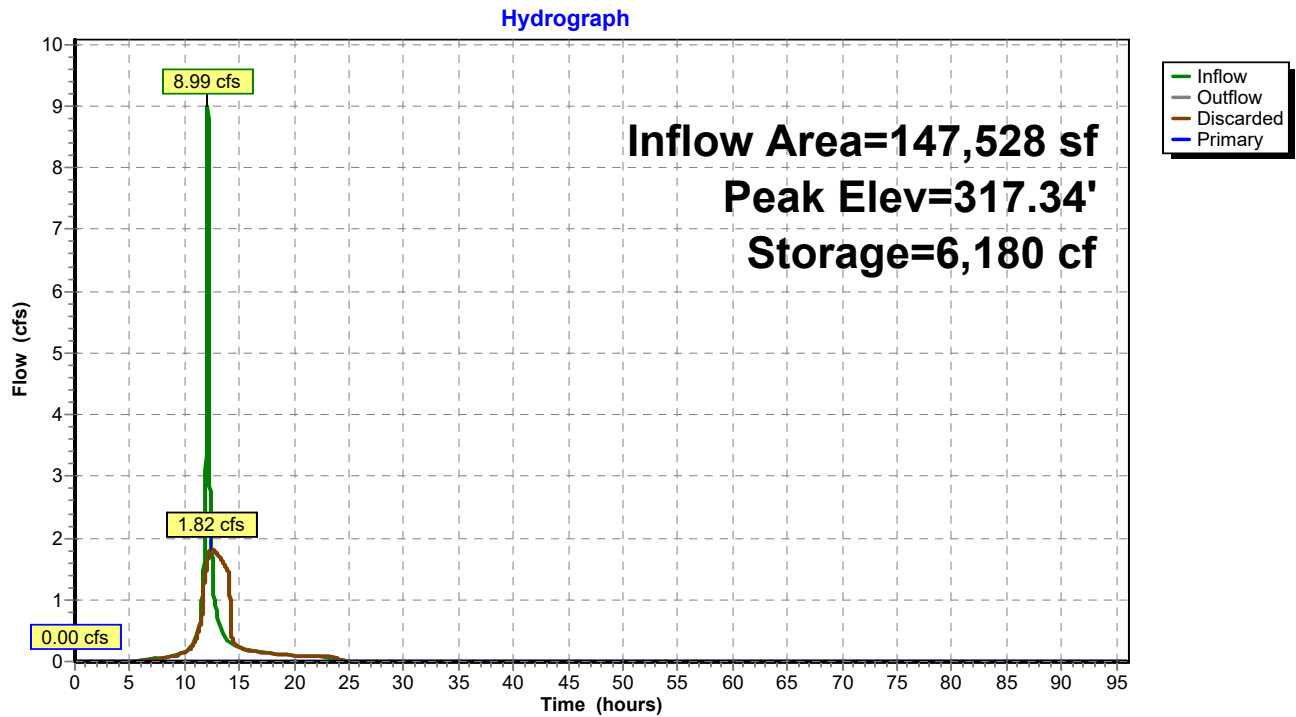
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
316.00	4,026	293.0	0	0	4,026
318.00	5,897	330.7	9,864	9,864	5,998
320.00	7,994	368.3	13,838	23,702	8,204
322.00	10,316	406.0	18,261	41,962	10,652

Device	Routing	Invert	Outlet Devices
#1	Primary	310.00'	15.0" Round Culvert L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 310.00' / 304.00' S= 0.1000 ' S= 0.1000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	318.25'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	320.50'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	321.00'	3.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#5	Discarded	316.00'	15.000 in/hr Exfiltration over Surface area Phase-In= 0.10'

Discarded OutFlow Max=1.82 cfs @ 12.45 hrs HW=317.34' (Free Discharge)
 ↳ **5=Exfiltration** (Exfiltration Controls 1.82 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=316.00' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Passes 0.00 cfs of 13.70 cfs potential flow)
 ↳ **2=Orifice/Grate** (Controls 0.00 cfs)
 ↳ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 29: Infiltration Basin (SWP-2)



N60 P1 Post-A 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 30: Post A2

Runoff = 4.93 cfs @ 12.29 hrs, Volume= 17,922 cf, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
43,743	98	Paved parking, HSG C
107,245	74	>75% Grass cover, Good, HSG C
2,876	61	>75% Grass cover, Good, HSG B
39,583	70	Woods, Good, HSG C
4,283	98	Water Surface, HSG C
33,976	65	Brush, Good, HSG C
231,706	77	Weighted Average
183,680		79.27% Pervious Area
48,026		20.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	215	0.0260	2.60		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	125	0.1000	6.42		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.4	377	0.0750	14.42	17.69	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
17.7	817	Total			

N60 P1 Post-A 3-17-20

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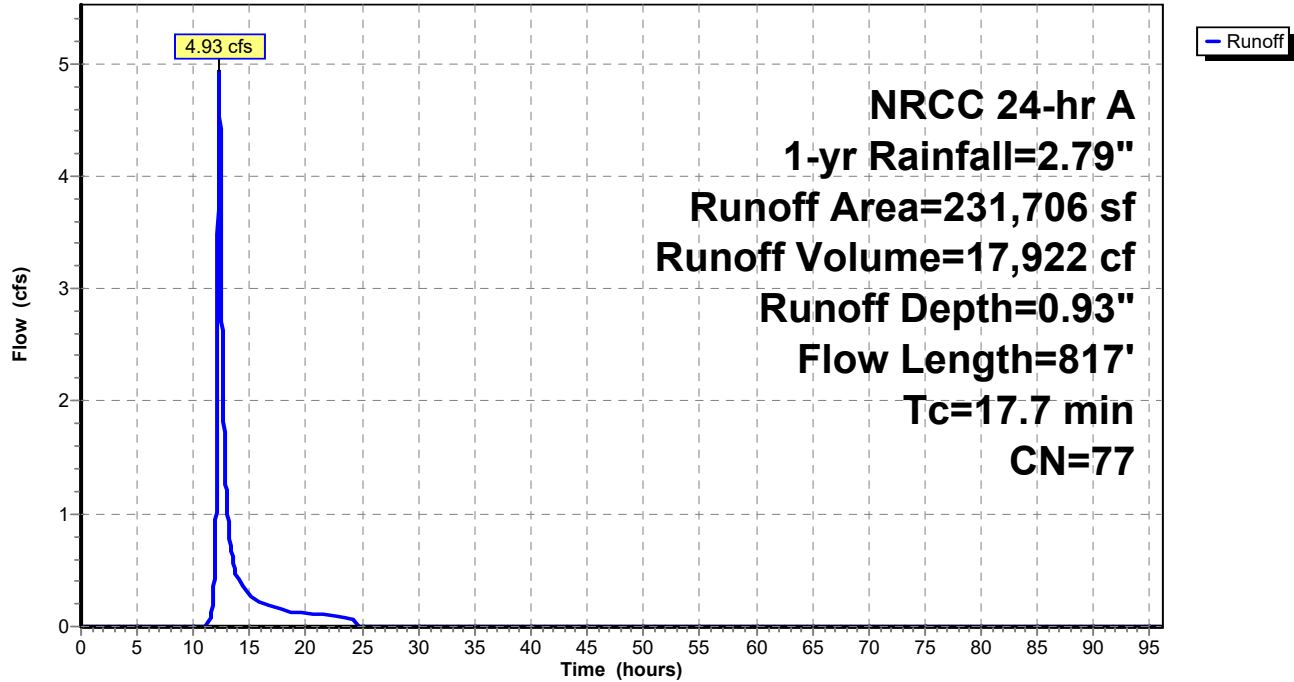
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NRCC 24-hr A 1-yr Rainfall=2.79"

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Subcatchment 30: Post A2

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Pond 31: Pocket Wetland (SWP-1)

Inflow Area = 231,706 sf, 20.73% Impervious, Inflow Depth = 0.93" for 1-yr event
 Inflow = 4.93 cfs @ 12.29 hrs, Volume= 17,922 cf
 Outflow = 0.04 cfs @ 24.27 hrs, Volume= 10,030 cf, Atten= 99%, Lag= 719.1 min
 Primary = 0.04 cfs @ 24.27 hrs, Volume= 10,030 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Starting Elev= 234.50' Surf.Area= 12,504 sf Storage= 7,835 cf
 Peak Elev= 236.00' @ 24.27 hrs Surf.Area= 15,031 sf Storage= 24,186 cf (16,351 cf above start)

Plug-Flow detention time= 4,390.0 min calculated for 2,195 cf (12% of inflow)
 Center-of-Mass det. time= 2,260.3 min (3,115.9 - 855.6)

Volume	Invert	Avail.Storage	Storage Description
#1	230.00'	1,811 cf	Forebay (Irregular) Listed below (Recalc)
#2	230.00'	1,976 cf	Micropool (Irregular) Listed below (Recalc)
#3	233.90'	65,123 cf	Marsh & Storage (Irregular) Listed below (Recalc)
		68,911 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	86	34.2	0	0	86
231.00	217	53.2	147	147	225
232.00	406	72.3	307	453	426
233.00	651	91.4	524	977	688
233.90	1,233	129.1	834	1,811	1,357

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	86	34.2	0	0	86
231.00	217	53.2	147	147	225
232.00	406	72.3	307	453	426
233.00	651	91.4	524	977	688
233.90	1,646	155.1	1,000	1,976	1,942

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
233.90	4,232	530.5	0	0	4,232
234.50	9,625	400.9	4,048	4,048	13,842
235.00	10,440	413.5	5,015	9,063	14,683
236.00	12,144	438.8	11,281	20,344	16,451
237.00	13,950	464.0	13,037	33,381	18,317
238.00	15,856	489.2	14,893	48,273	20,287
239.00	17,864	514.5	16,850	65,123	22,369

Device	Routing	Invert	Outlet Devices
#1	Primary	232.00'	21.0" Round Culvert L= 74.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 232.00' / 231.00' S= 0.0135 ' / ' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 2.41 sf

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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#2	Device 1	234.50'	1.1" Vert. Orifice/Grate	C= 0.600
#3	Device 1	237.50'	36.0" x 48.0" Horiz. Orifice/Grate	C= 0.600

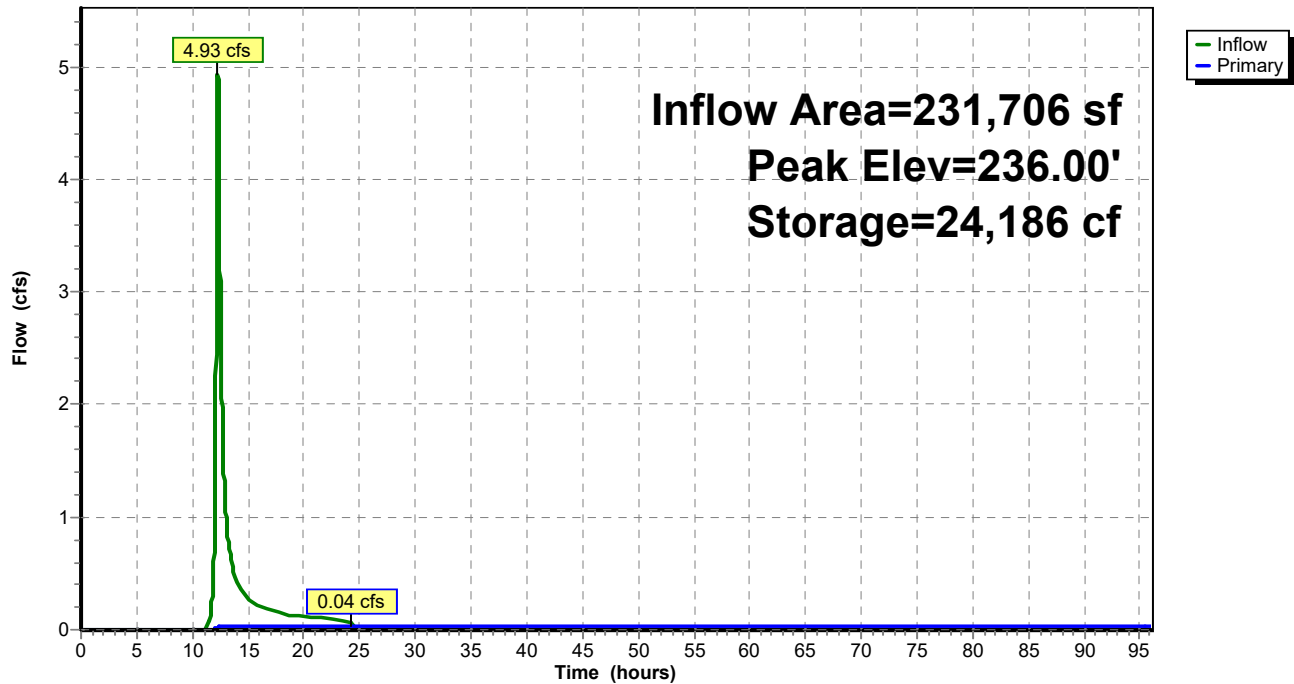
Limited to weir flow at low heads

Primary OutFlow Max=0.04 cfs @ 24.27 hrs HW=236.00' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 0.04 cfs of 14.75 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.04 cfs @ 5.82 fps)
3=Orifice/Grate (Controls 0.00 cfs)

Pond 31: Pocket Wetland (SWP-1)

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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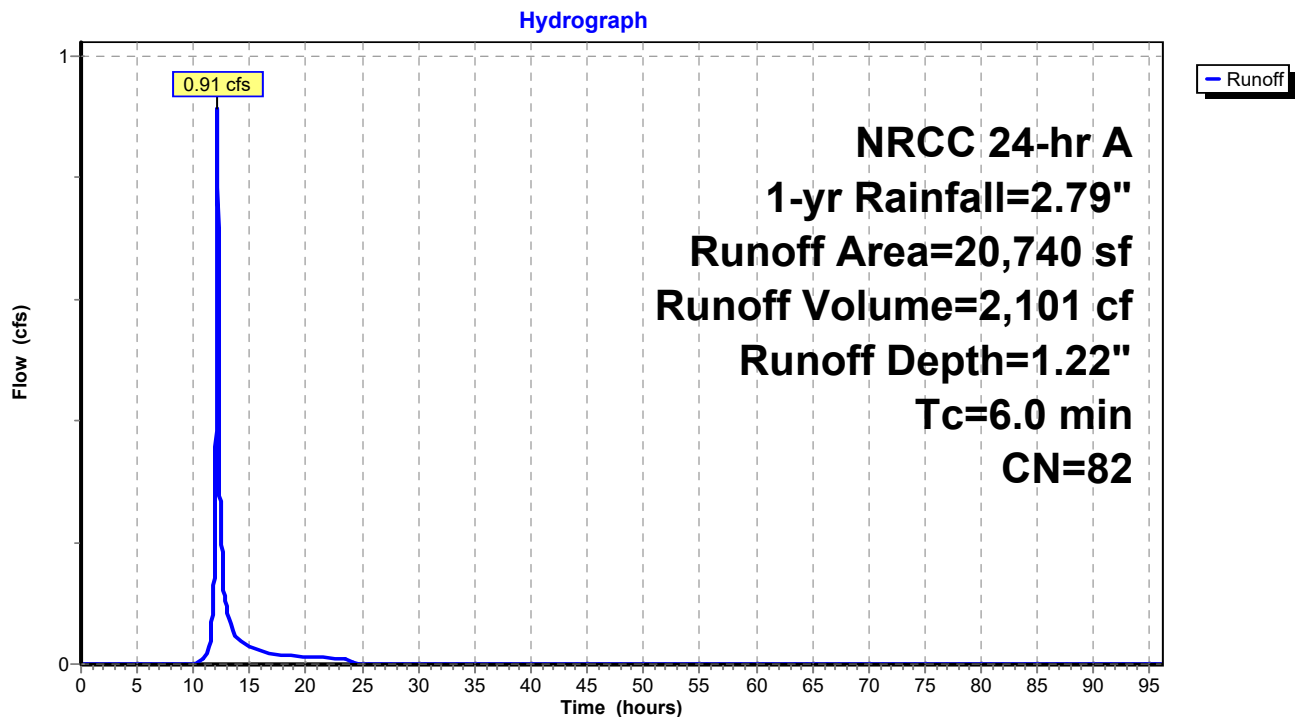
Summary for Subcatchment 32: Post A1

Runoff = 0.91 cfs @ 12.14 hrs, Volume= 2,101 cf, Depth= 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
7,304	98	Paved parking, HSG C
10,356	74	>75% Grass cover, Good, HSG C
3,080	70	Woods, Good, HSG C
20,740	82	Weighted Average
13,436		64.78% Pervious Area
7,304		35.22% Impervious Area

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

Subcatchment 32: Post A1

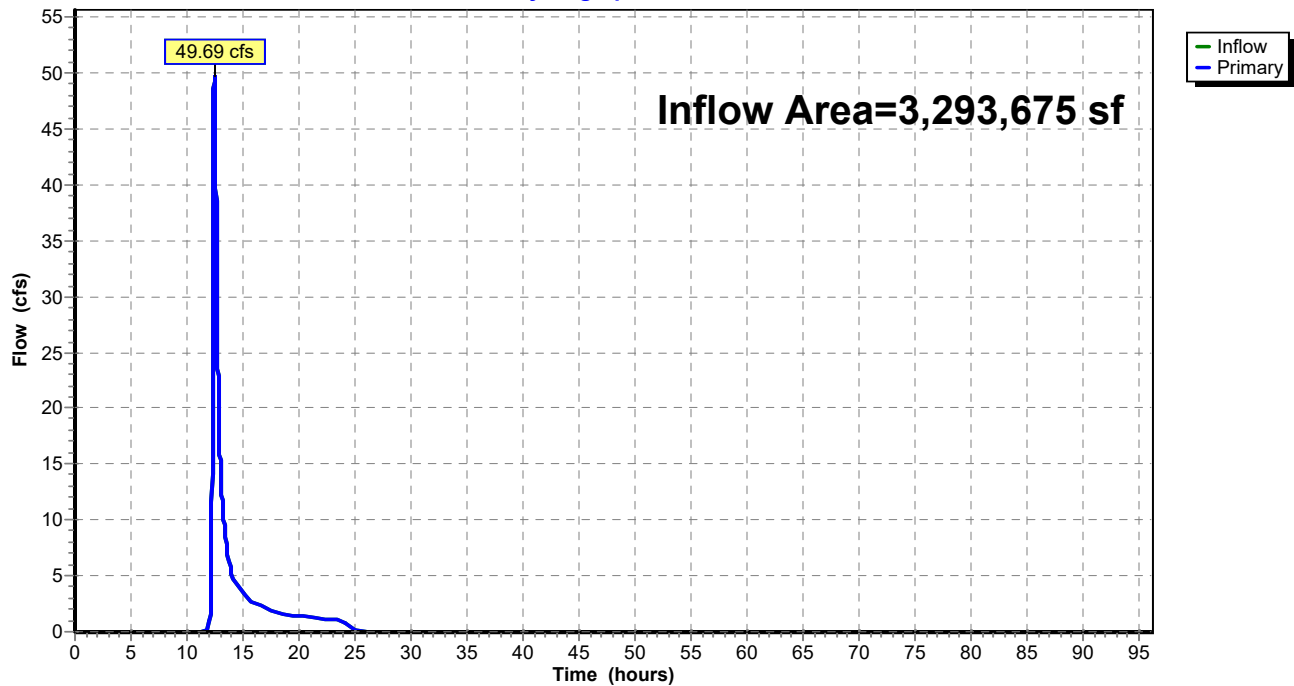
Summary for Link 33: Design Point A

Inflow Area = 3,293,675 sf, 35.25% Impervious, Inflow Depth > 0.73" for 1-yr event
 Inflow = 49.69 cfs @ 12.43 hrs, Volume= 200,988 cf
 Primary = 49.69 cfs @ 12.43 hrs, Volume= 200,988 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 33: Design Point A

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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 8: Post A0 OffsiteRunoff Area=1,115,060 sf 57.87% Impervious Runoff Depth=2.37"
Flow Length=1,018' Tc=12.5 min CN=90 Runoff=72.43 cfs 220,520 cf**Pond 9: Offsite Pond A**Peak Elev=361.29' Storage=78,351 cf Inflow=72.43 cfs 220,520 cf
Outflow=41.23 cfs 169,325 cf**Subcatchment 10: Post A4**Runoff Area=164,583 sf 10.25% Impervious Runoff Depth=1.31"
Flow Length=340' Tc=20.5 min CN=76 Runoff=4.68 cfs 17,934 cf**Reach 11: 24" Culvert Pipe**Avg. Flow Depth=0.48' Max Vel=8.07 fps Inflow=4.68 cfs 17,934 cf
24.0" Round Pipe n=0.013 L=112.0' S=0.0268 ' Capacity=37.02 cfs Outflow=4.68 cfs 17,934 cf**Subcatchment 12: Post A8**Runoff Area=403,480 sf 2.55% Impervious Runoff Depth=1.13"
Flow Length=320' Tc=21.4 min CN=73 Runoff=9.44 cfs 37,866 cf**Pond 12A: Existing Wetland A**Peak Elev=324.78' Storage=10,726 cf Inflow=55.29 cfs 225,125 cf
36.0" Round Culvert n=0.013 L=168.0' S=0.0655 ' Outflow=51.40 cfs 225,125 cf**Subcatchment 12B: Post A11**Runoff Area=722,164 sf 1.29% Impervious Runoff Depth=0.96"
Flow Length=475' Tc=19.8 min CN=70 Runoff=14.49 cfs 57,717 cf**Reach 13: Existing Stream A**Avg. Flow Depth=1.17' Max Vel=8.60 fps Inflow=63.87 cfs 282,842 cf
n=0.040 L=1,360.0' S=0.0721 ' Capacity=291.69 cfs Outflow=63.52 cfs 282,842 cf**Subcatchment 14: Post A3**Runoff Area=106,378 sf 85.91% Impervious Runoff Depth=2.86"
Tc=6.0 min CN=95 Runoff=10.01 cfs 25,358 cf**Pond 15: DIV-1**Peak Elev=327.34' Inflow=10.01 cfs 25,358 cf
Primary=5.57 cfs 23,430 cf Secondary=4.64 cfs 1,929 cf Outflow=10.01 cfs 25,358 cf**Pond 16: INF-1**Peak Elev=326.29' Storage=6,835 cf Inflow=5.57 cfs 23,430 cf
Outflow=1.18 cfs 23,430 cf**Subcatchment 17: Post A5**Runoff Area=92,926 sf 100.00% Impervious Runoff Depth=3.19"
Tc=6.0 min CN=98 Runoff=9.17 cfs 24,677 cf**Pond 18: DIV-2**Peak Elev=368.28' Inflow=9.17 cfs 24,677 cf
Primary=6.04 cfs 23,552 cf Secondary=3.33 cfs 1,125 cf Outflow=9.17 cfs 24,677 cf**Pond 19: INF-2**Peak Elev=366.90' Storage=7,388 cf Inflow=6.04 cfs 23,552 cf
Outflow=0.99 cfs 23,552 cf**Reach 20: 36" HDPE Pipe**Avg. Flow Depth=0.25' Max Vel=11.55 fps Inflow=3.33 cfs 1,125 cf
36.0" Round Pipe n=0.013 L=805.0' S=0.1205 ' Capacity=231.53 cfs Outflow=3.17 cfs 1,125 cf**Subcatchment 21: A6**Runoff Area=384,686 sf 86.44% Impervious Runoff Depth=2.97"
Tc=6.0 min CN=96 Runoff=36.90 cfs 95,090 cf

N60 P1 Post-A 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Subcatchment22: A7Runoff Area=103,728 sf 0.00% Impervious Runoff Depth=0.86"
Tc=6.0 min CN=68 Runoff=3.02 cfs 7,393 cf**Pond 23: Infiltration Basin (SWP-3)**Peak Elev=259.19' Storage=38,391 cf Inflow=42.88 cfs 103,608 cf
Discarded=5.12 cfs 103,608 cf Primary=0.00 cfs 0 cf Outflow=5.12 cfs 103,608 cf**Subcatchment24: A9**Runoff Area=33,825 sf 87.77% Impervious Runoff Depth=2.86"
Tc=6.0 min CN=95 Runoff=3.18 cfs 8,063 cf**Pond 25: DIV-4**Peak Elev=350.95' Inflow=3.18 cfs 8,063 cf
Primary=3.18 cfs 8,063 cf Secondary=0.00 cfs 0 cf Outflow=3.18 cfs 8,063 cf**Pond 26: INF-4**Peak Elev=350.48' Storage=2,285 cf Inflow=3.18 cfs 8,063 cf
Outflow=0.52 cfs 8,063 cf**Subcatchment27: A10**Runoff Area=43,060 sf 0.00% Impervious Runoff Depth=1.19"
Tc=6.0 min CN=74 Runoff=1.82 cfs 4,252 cf**Subcatchment28: A10**Runoff Area=104,468 sf 87.52% Impervious Runoff Depth=2.86"
Tc=6.0 min CN=95 Runoff=9.83 cfs 24,903 cf**Pond 29: Infiltration Basin (SWP-2)**Peak Elev=317.87' Storage=9,093 cf Inflow=11.65 cfs 29,155 cf
Discarded=2.00 cfs 29,155 cf Primary=0.00 cfs 0 cf Outflow=2.00 cfs 29,155 cf**Subcatchment30: Post A2**Runoff Area=231,706 sf 20.73% Impervious Runoff Depth=1.37"
Flow Length=817' Tc=17.7 min CN=77 Runoff=7.46 cfs 26,479 cf**Pond 31: Pocket Wetland (SWP-1)**Peak Elev=236.65' Storage=32,401 cf Inflow=7.46 cfs 26,479 cf
Outflow=0.05 cfs 12,483 cf**Subcatchment32: Post A1**Runoff Area=20,740 sf 35.22% Impervious Runoff Depth=1.72"
Tc=6.0 min CN=82 Runoff=1.29 cfs 2,967 cf**Link 33: Design Point A**Inflow=63.84 cfs 300,220 cf
Primary=63.84 cfs 300,220 cf**Total Runoff Area = 3,526,804 sf Runoff Volume = 553,220 cf Average Runoff Depth = 1.88"**
61.01% Pervious = 2,151,703 sf 38.99% Impervious = 1,375,101 sf

N60 P1 Post-A 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 8: Post A0 Offsite

Runoff = 72.43 cfs @ 12.20 hrs, Volume= 220,520 cf, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
645,334	98	Paved parking, HSG C
443,611	80	>75% Grass cover, Good, HSG D
23,572	74	>75% Grass cover, Good, HSG C
2,543	61	>75% Grass cover, Good, HSG B
1,115,060	90	Weighted Average
469,726		42.13% Pervious Area
645,334		57.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.0150	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	148	0.0574	3.86		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	740	0.0270	10.25	32.22	Pipe Channel, 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.015 Concrete sewer w/manholes & inlets
12.5	1,018	Total			

N60 P1 Post-A 3-17-20

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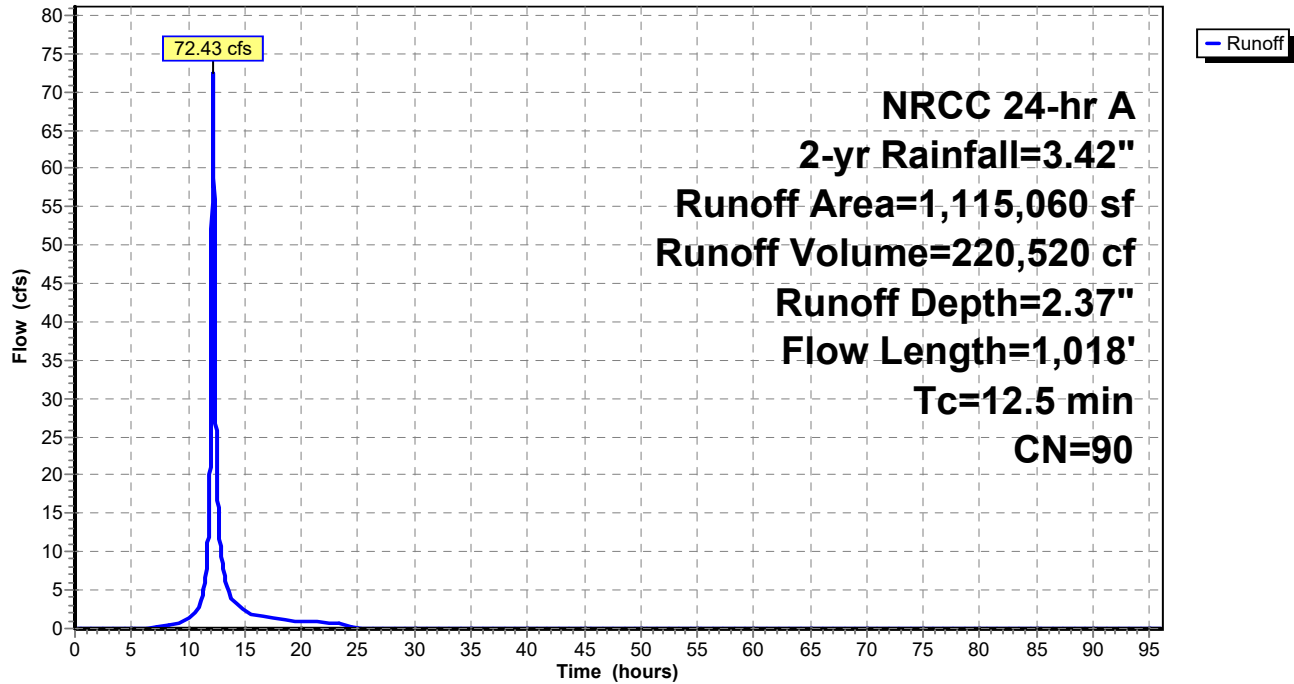
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NRCC 24-hr A 2-yr Rainfall=3.42"

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Subcatchment 8: Post A0 Offsite

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 9: Offsite Pond A

Inflow Area = 1,115,060 sf, 57.87% Impervious, Inflow Depth = 2.37" for 2-yr event
 Inflow = 72.43 cfs @ 12.20 hrs, Volume= 220,520 cf
 Outflow = 41.23 cfs @ 12.35 hrs, Volume= 169,325 cf, Atten= 43%, Lag= 9.1 min
 Primary = 41.23 cfs @ 12.35 hrs, Volume= 169,325 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 361.29' @ 12.35 hrs Surf.Area= 22,611 sf Storage= 78,351 cf

Plug-Flow detention time= 123.4 min calculated for 169,325 cf (77% of inflow)
 Center-of-Mass det. time= 48.0 min (851.3 - 803.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	357.00'	221,816 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
357.00	14,633	679.0	0	0	14,633
358.00	16,652	698.0	15,632	15,632	16,826
359.00	17,534	715.0	17,091	32,723	18,864
360.00	19,427	745.0	18,472	51,195	22,425
362.00	24,453	804.0	43,784	94,979	29,861
364.00	28,701	854.0	53,097	148,076	36,663
365.00	36,602	901.0	32,572	180,648	43,285
366.00	45,910	1,262.0	41,168	221,816	105,432

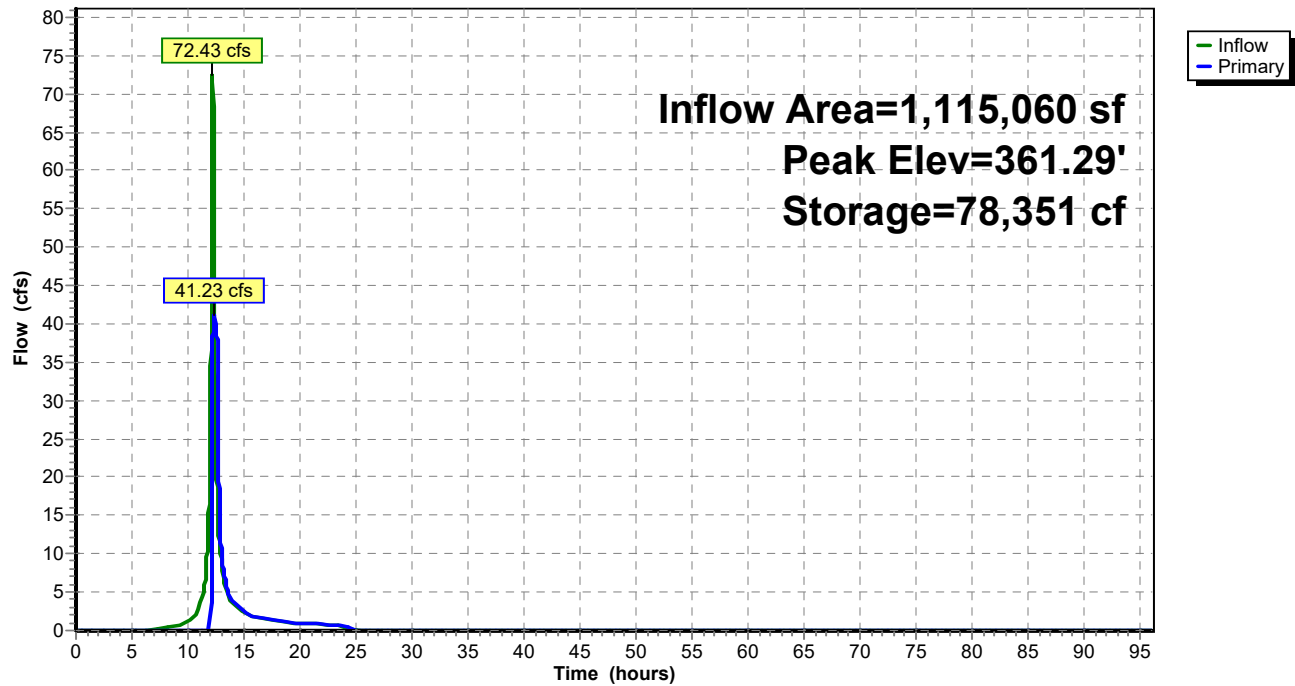
Device	Routing	Invert	Outlet Devices
#1	Primary	357.00'	30.0" Round Culvert L= 125.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 357.00' / 351.00' S= 0.0480 ' S= 0.0480 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#2	Device 1	360.00'	36.0" x 48.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#3	Primary	364.75'	150.0' long x 36.0' 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=41.23 cfs @ 12.35 hrs HW=361.29' TW=324.61' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 41.23 cfs @ 8.40 fps)
 2=Orifice/Grate (Passes 41.23 cfs of 131.40 cfs potential flow)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 9: Offsite Pond A

Hydrograph



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NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 10: Post A4

Runoff = 4.68 cfs @ 12.32 hrs, Volume= 17,934 cf, Depth= 1.31"

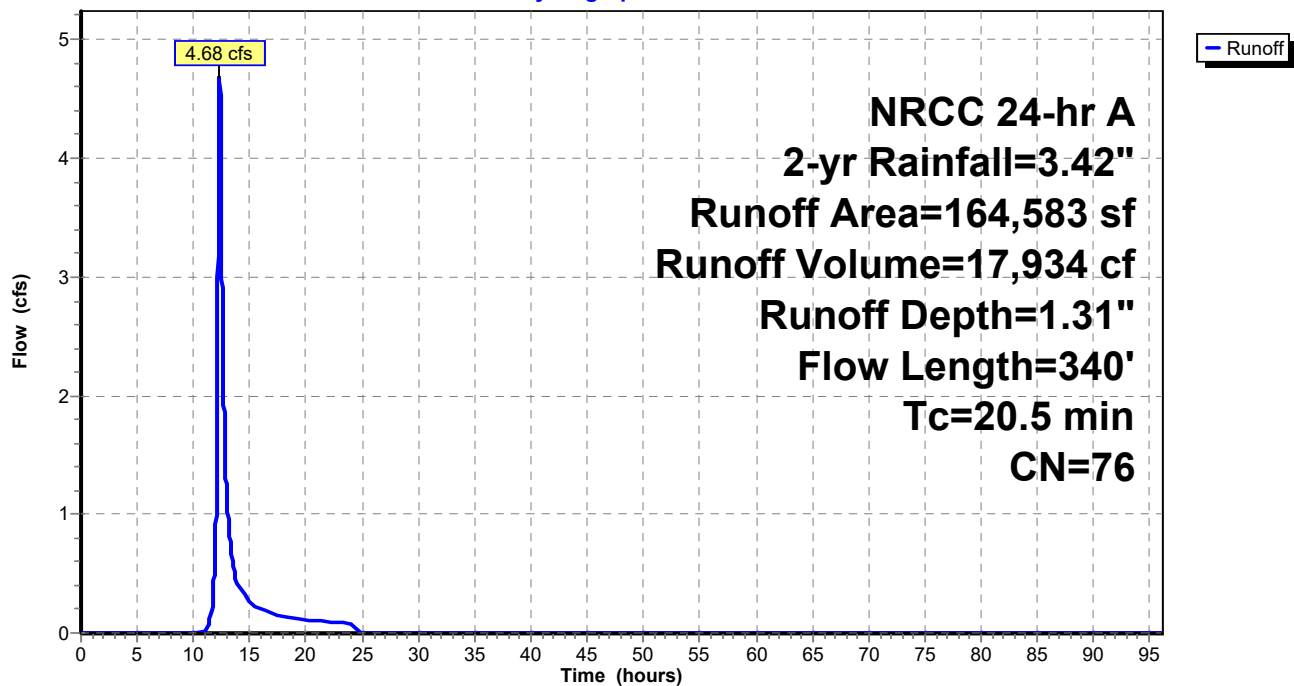
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
15,990	74	>75% Grass cover, Good, HSG C
65,271	70	Woods, Good, HSG C
66,457	77	Woods, Good, HSG D
16,865	98	Water Surface, HSG D
164,583	76	Weighted Average
147,718		89.75% Pervious Area
16,865		10.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.7	240	0.0208	2.32		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
20.5	340	Total			

Subcatchment 10: Post A4

Hydrograph



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NRCC 24-hr A 2-yr Rainfall=3.42"

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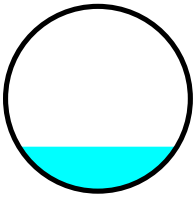
Summary for Reach 11: 24" Culvert Pipe

Inflow Area = 164,583 sf, 10.25% Impervious, Inflow Depth = 1.31" for 2-yr event
Inflow = 4.68 cfs @ 12.32 hrs, Volume= 17,934 cf
Outflow = 4.68 cfs @ 12.32 hrs, Volume= 17,934 cf, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.07 fps, Min. Travel Time= 0.2 min
Avg. Velocity= 3.08 fps, Avg. Travel Time= 0.6 min

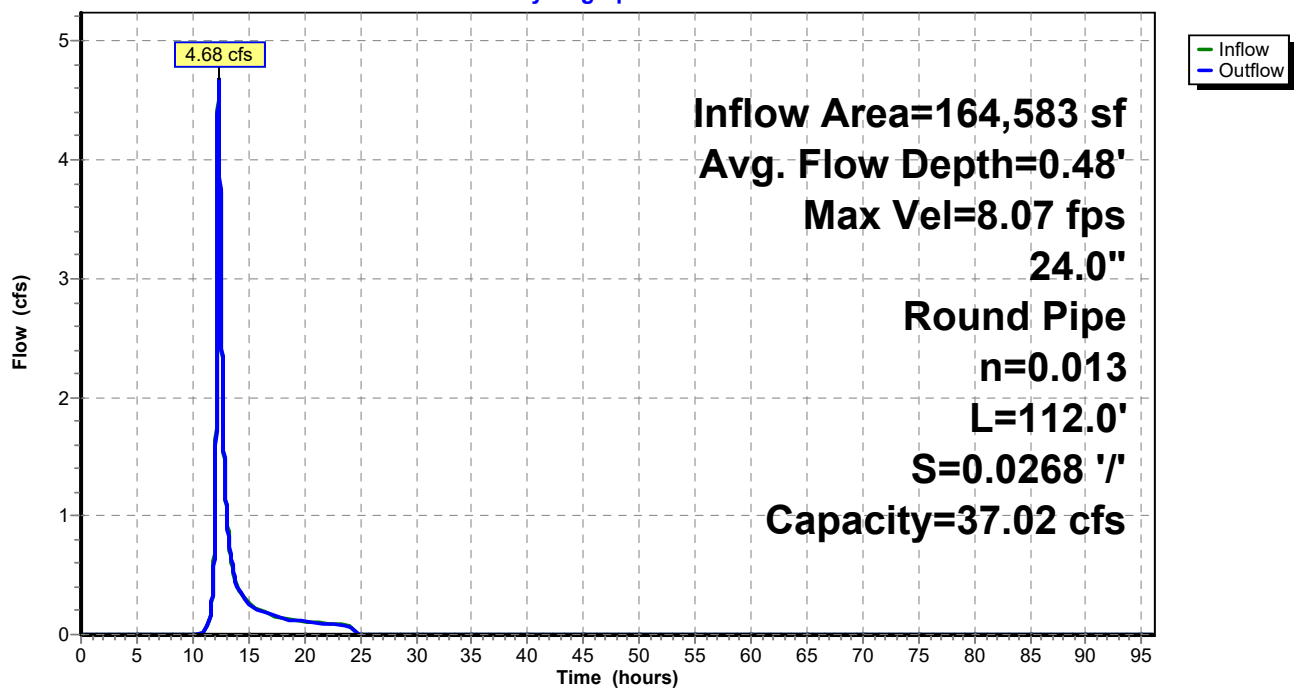
Peak Storage= 65 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 37.02 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 112.0' Slope= 0.0268 '/
Inlet Invert= 349.00', Outlet Invert= 346.00'



Reach 11: 24" Culvert Pipe

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 12: Post A8

Runoff = 9.44 cfs @ 12.34 hrs, Volume= 37,866 cf, Depth= 1.13"

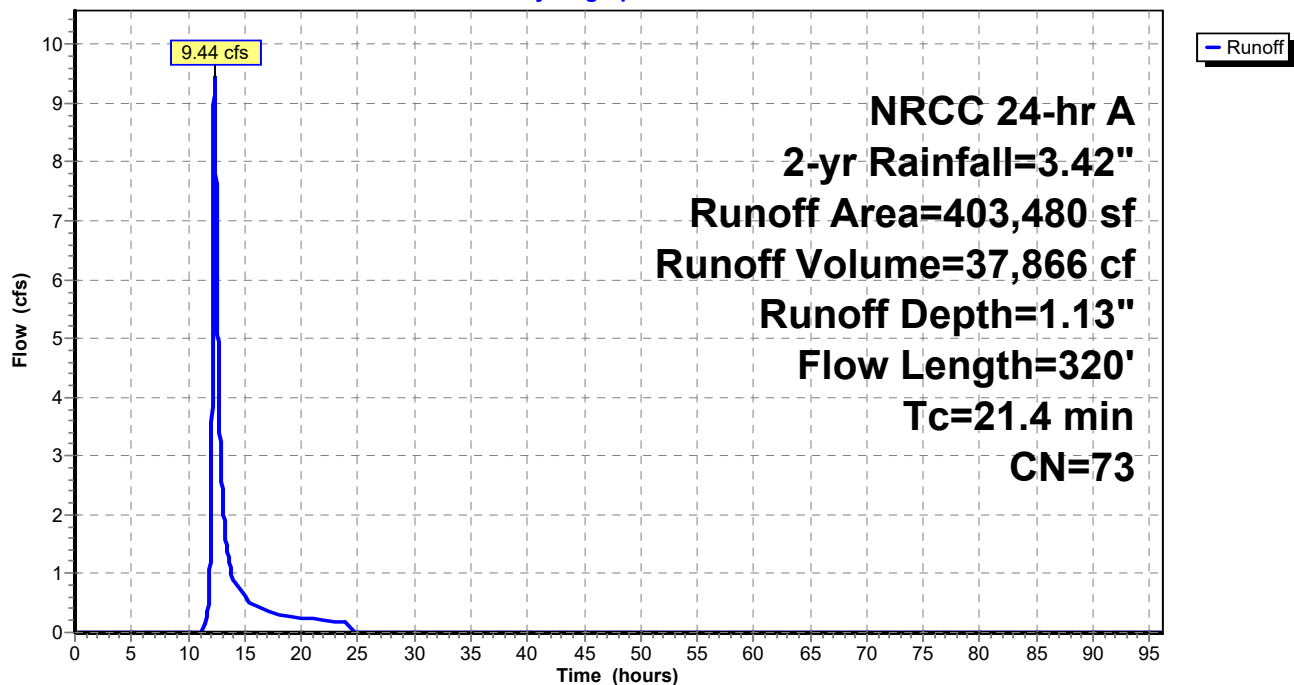
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
278,057	70	Woods, Good, HSG C
108,143	77	Woods, Good, HSG D
10,280	98	Paved parking, HSG D
6,532	74	>75% Grass cover, Good, HSG C
468	80	>75% Grass cover, Good, HSG D
403,480	73	Weighted Average
393,200		97.45% Pervious Area
10,280		2.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.9	220	0.0636	4.06		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
21.4	320	Total			

Subcatchment 12: Post A8

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 12A: Existing Wetland A

Inflow Area = 1,683,123 sf, 39.95% Impervious, Inflow Depth = 1.61" for 2-yr event
 Inflow = 55.29 cfs @ 12.34 hrs, Volume= 225,125 cf
 Outflow = 51.40 cfs @ 12.47 hrs, Volume= 225,125 cf, Atten= 7%, Lag= 7.9 min
 Primary = 51.40 cfs @ 12.47 hrs, Volume= 225,125 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 324.78' @ 12.47 hrs Surf.Area= 7,104 sf Storage= 10,726 cf

Plug-Flow detention time= 2.1 min calculated for 225,102 cf (100% of inflow)
 Center-of-Mass det. time= 2.1 min (854.8 - 852.6)

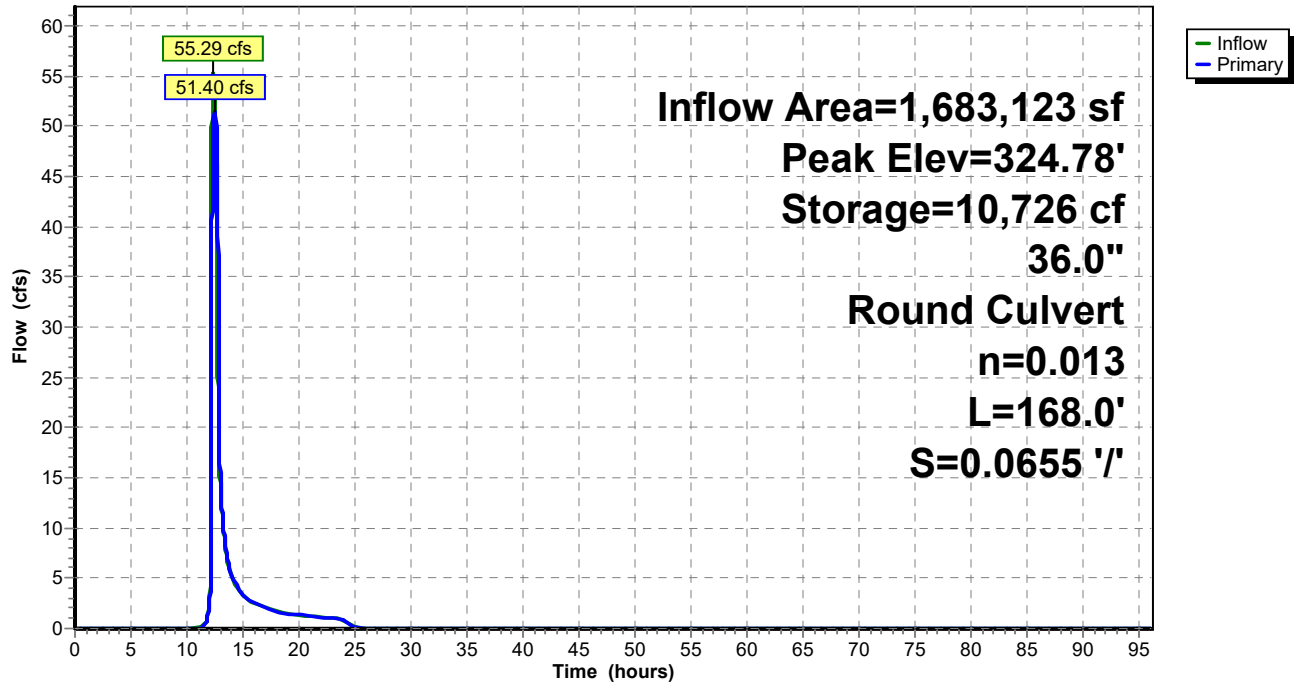
Volume	Invert	Avail.Storage	Storage Description		
#1	321.00'	190,307 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
321.00	124	53.2	0	0	124
322.00	1,084	175.8	525	525	2,361
324.00	4,913	341.5	5,536	6,061	9,202
326.00	11,332	638.2	15,804	21,866	32,354
328.00	20,583	804.3	31,458	53,324	51,475
330.00	34,086	1,075.5	54,104	107,428	92,087
332.00	49,257	1,268.5	82,879	190,307	128,164

Device	Routing	Invert	Outlet Devices
#1	Primary	321.00'	36.0" Round Culvert L= 168.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 321.00' / 310.00' S= 0.0655 ' S= 0.0655 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=51.40 cfs @ 12.47 hrs HW=324.78' TW=313.16' (Dynamic Tailwater)
 1=Culvert (Inlet Controls 51.40 cfs @ 7.27 fps)

Pond 12A: Existing Wetland A

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 12B: Post A11

Runoff = 14.49 cfs @ 12.32 hrs, Volume= 57,717 cf, Depth= 0.96"

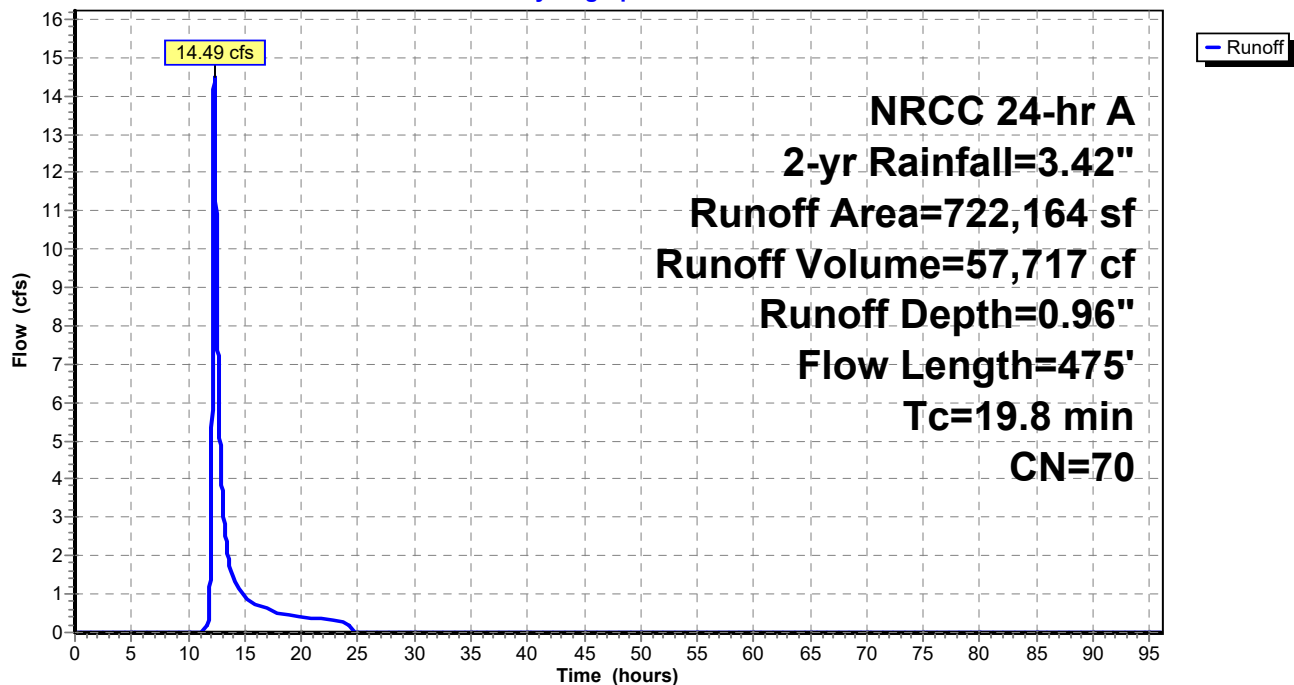
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
17,361	55	Woods, Good, HSG B
681,082	70	Woods, Good, HSG C
11,683	77	Woods, Good, HSG D
9,345	98	Paved parking, HSG C
2,693	74	>75% Grass cover, Good, HSG C
722,164	70	Weighted Average
712,819		98.71% Pervious Area
9,345		1.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.0	375	0.1400	6.02		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
19.8	475	Total			

Subcatchment 12B: Post A11

Hydrograph



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NRCC 24-hr A 2-yr Rainfall=3.42"

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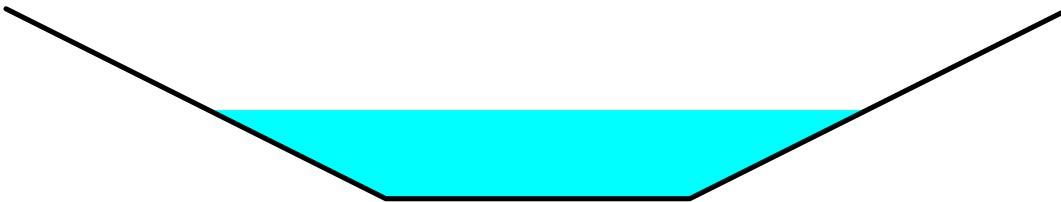
Summary for Reach 13: Existing Stream A

Inflow Area = 2,405,287 sf, 28.35% Impervious, Inflow Depth = 1.41" for 2-yr event
Inflow = 63.87 cfs @ 12.39 hrs, Volume= 282,842 cf
Outflow = 63.52 cfs @ 12.42 hrs, Volume= 282,842 cf, Atten= 1%, Lag= 2.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.60 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 2.15 fps, Avg. Travel Time= 10.5 min

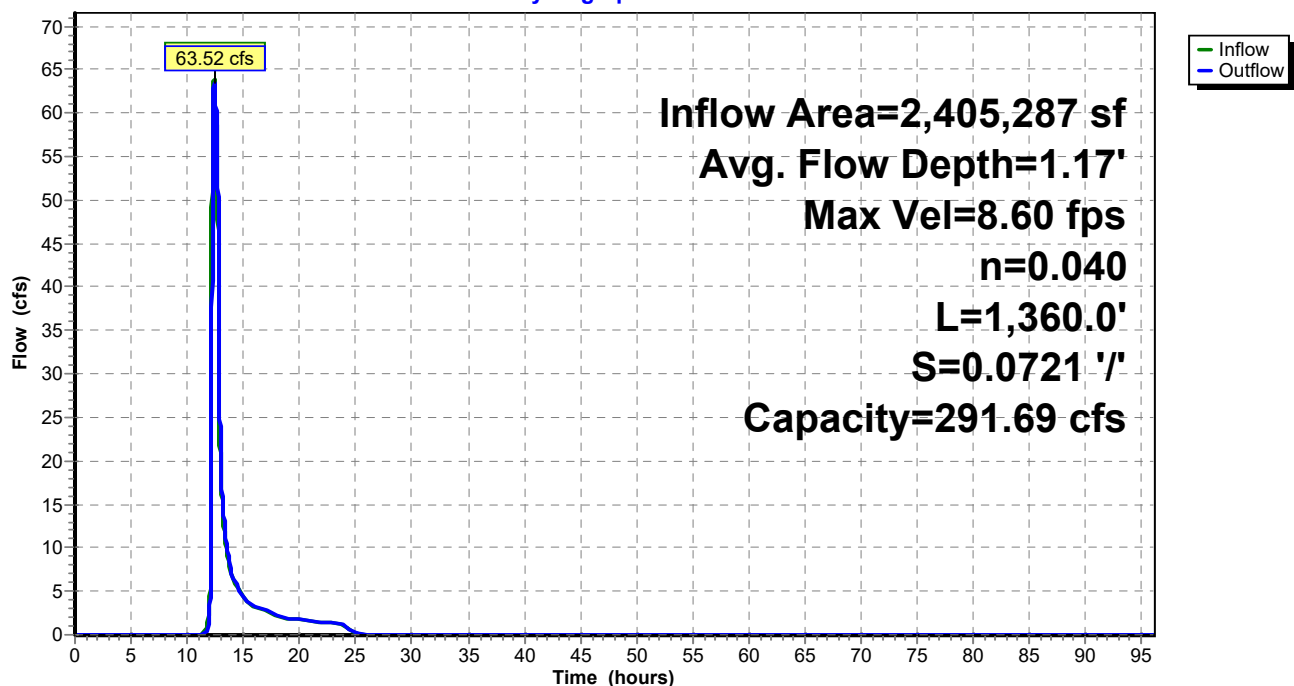
Peak Storage= 10,041 cf @ 12.42 hrs
Average Depth at Peak Storage= 1.17'
Bank-Full Depth= 2.50' Flow Area= 22.5 sf, Capacity= 291.69 cfs

4.00' x 2.50' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 ' ' Top Width= 14.00'
Length= 1,360.0' Slope= 0.0721 ' '
Inlet Invert= 312.00', Outlet Invert= 214.00'



Reach 13: Existing Stream A

Hydrograph



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NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 14: Post A3

Runoff = 10.01 cfs @ 12.13 hrs, Volume= 25,358 cf, Depth= 2.86"

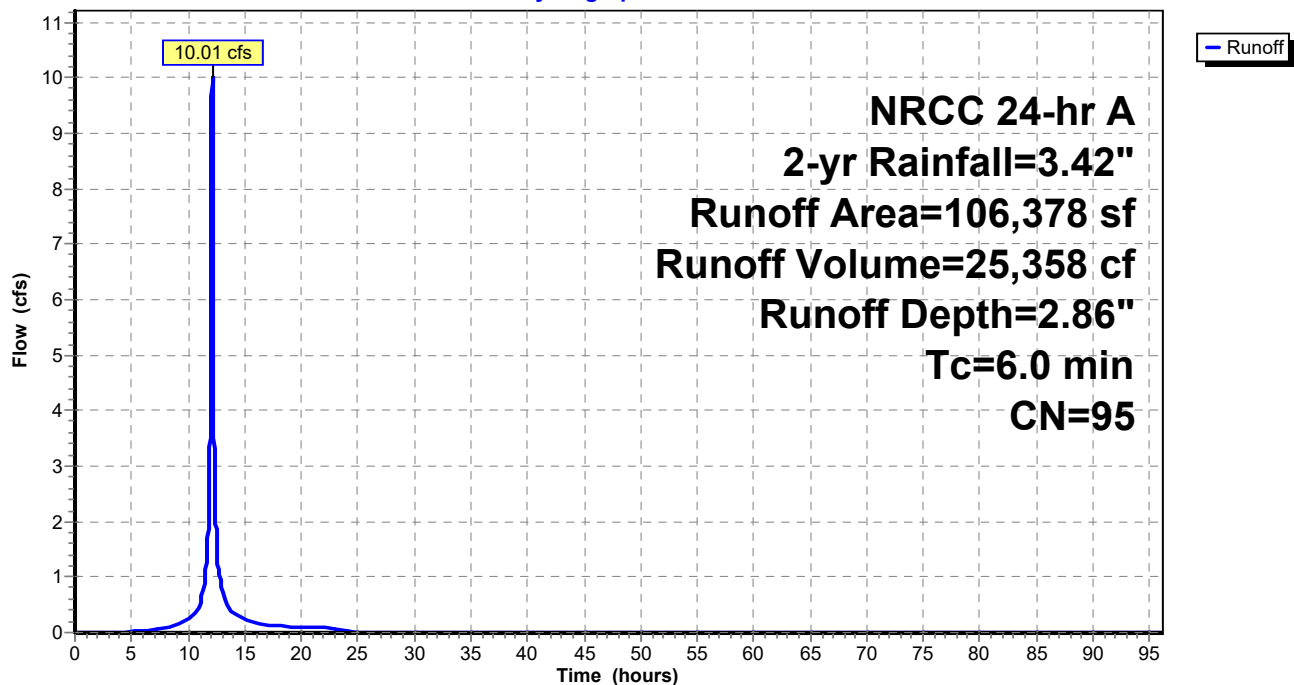
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
91,392	98	Paved parking, HSG C
14,986	74	>75% Grass cover, Good, HSG C
106,378	95	Weighted Average
14,986		14.09% Pervious Area
91,392		85.91% Impervious Area

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

Subcatchment 14: Post A3

Hydrograph



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NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 15: DIV-1

Inflow Area = 106,378 sf, 85.91% Impervious, Inflow Depth = 2.86" for 2-yr event
 Inflow = 10.01 cfs @ 12.13 hrs, Volume= 25,358 cf
 Outflow = 10.01 cfs @ 12.13 hrs, Volume= 25,358 cf, Atten= 0%, Lag= 0.0 min
 Primary = 5.57 cfs @ 12.06 hrs, Volume= 23,430 cf
 Secondary = 4.64 cfs @ 12.13 hrs, Volume= 1,929 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 327.34' @ 12.13 hrs

Flood Elev= 330.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 324.50' / 324.50' S= 0.0000 ' S= 0.0000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	324.50'	24.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 324.50' / 320.00' S= 0.0900 ' S= 0.0900 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	327.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.51 cfs @ 12.06 hrs HW=327.18' TW=325.06' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 5.51 cfs @ 7.02 fps)**Secondary OutFlow** Max=4.62 cfs @ 12.13 hrs HW=327.34' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 4.62 cfs of 20.53 cfs potential flow)↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 4.62 cfs @ 1.69 fps)

N60 P1 Post-A 3-17-20

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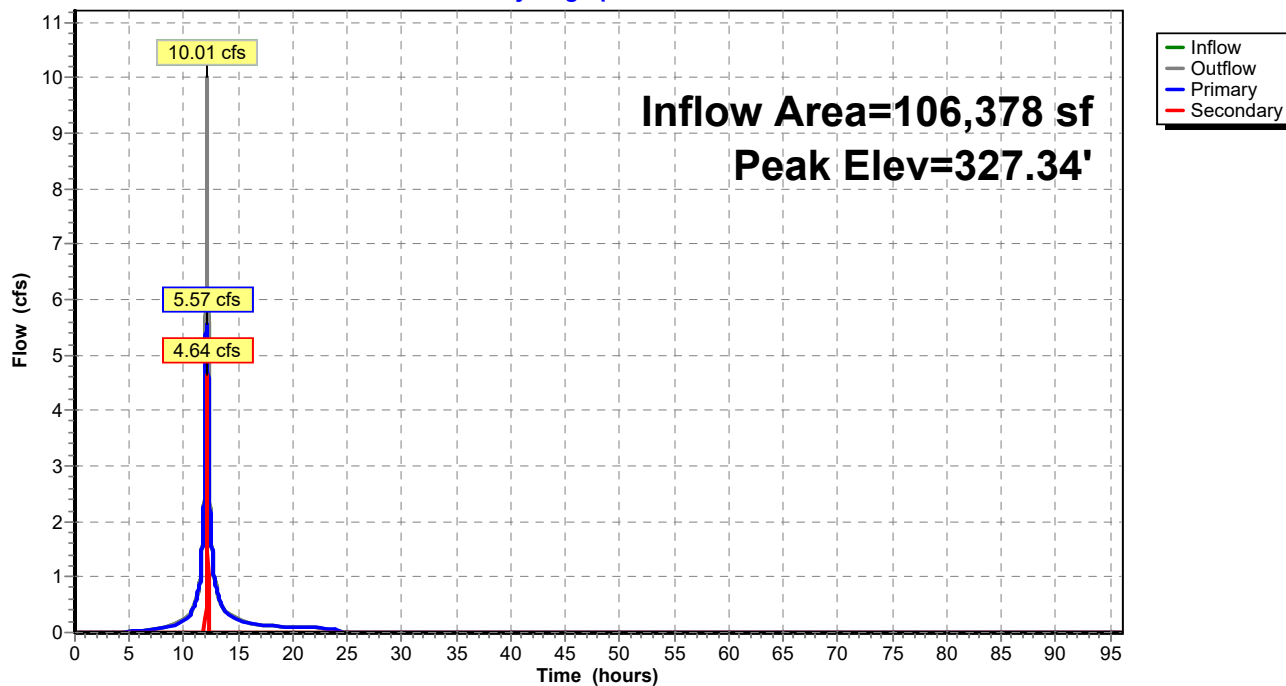
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Pond 15: DIV-1

Hydrograph



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NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 16: INF-1

Inflow Area = 106,378 sf, 85.91% Impervious, Inflow Depth = 2.64" for 2-yr event
 Inflow = 5.57 cfs @ 12.06 hrs, Volume= 23,430 cf
 Outflow = 1.18 cfs @ 11.65 hrs, Volume= 23,430 cf, Atten= 79%, Lag= 0.0 min
 Discarded = 1.18 cfs @ 11.65 hrs, Volume= 23,430 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 326.29' @ 12.65 hrs Surf.Area= 4,245 sf Storage= 6,835 cf

Plug-Flow detention time= 36.3 min calculated for 23,427 cf (100% of inflow)
 Center-of-Mass det. time= 36.3 min (815.6 - 779.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	324.00'	4,688 cf	36.75'W x 115.50'L x 4.33'H Field A 18,393 cf Overall - 6,674 cf Embedded = 11,720 cf x 40.0% Voids
#2A	324.50'	6,674 cf	Cultec R-360HD x 180 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 180 Chambers in 6 Rows Cap Storage= +6.5 cf x 2 x 6 rows = 77.5 cf
		11,361 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	324.00'	12.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=1.18 cfs @ 11.65 hrs HW=324.04' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 1.18 cfs)

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 2-yr Rainfall=3.42"

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Pond 16: INF-1 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 6 rows = 77.5 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

30 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 112.50' Row Length +18.0" End Stone x 2 = 115.50' Base Length

6 Rows x 60.0" Wide + 9.0" Spacing x 5 + 18.0" Side Stone x 2 = 36.75' Base Width

6.0" Base + 36.0" Chamber Height + 10.0" Cover = 4.33' Field Height

180 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 6 Rows = 6,673.6 cf Chamber Storage

18,393.4 cf Field - 6,673.6 cf Chambers = 11,719.8 cf Stone x 40.0% Voids = 4,687.9 cf Stone Storage

Chamber Storage + Stone Storage = 11,361.5 cf = 0.261 af

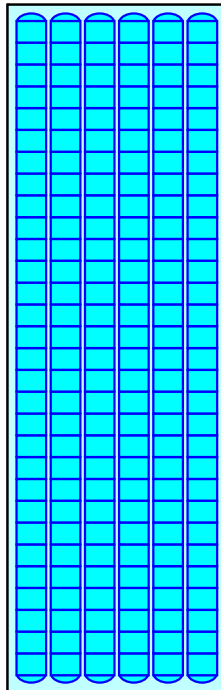
Overall Storage Efficiency = 61.8%

Overall System Size = 115.50' x 36.75' x 4.33'

180 Chambers

681.2 cy Field

434.1 cy Stone



N60 P1 Post-A 3-17-20

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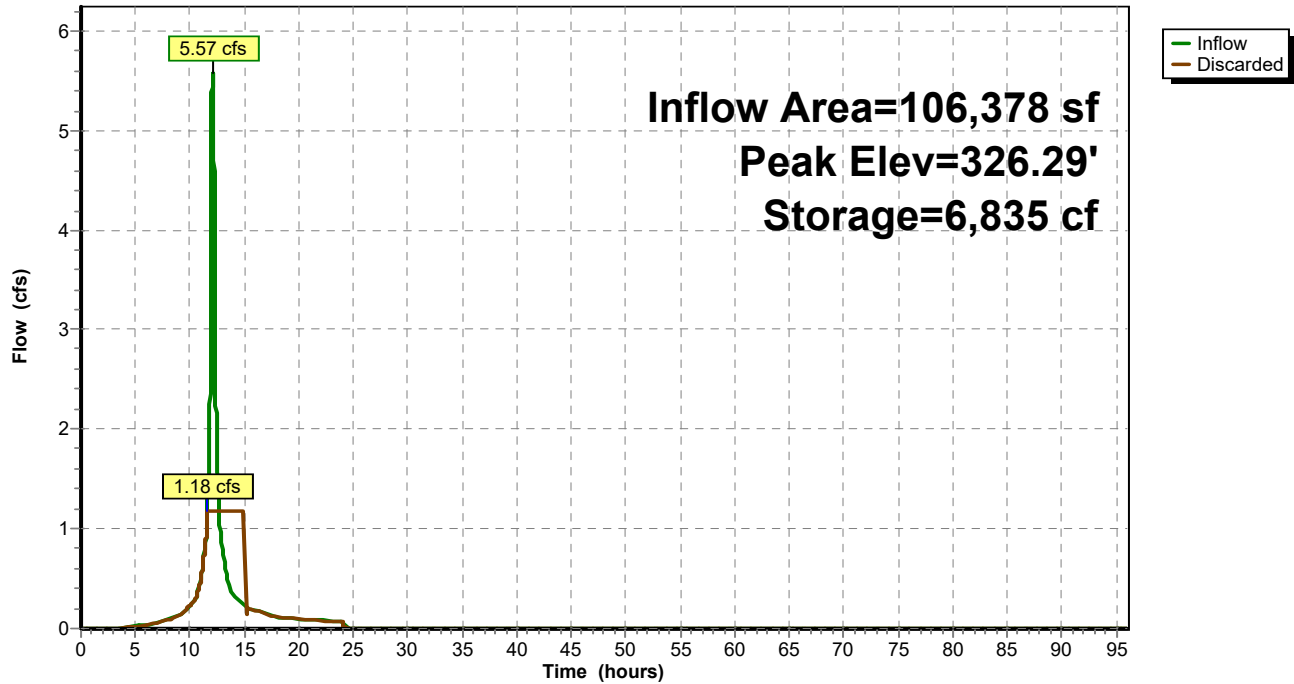
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NRCC 24-hr A 2-yr Rainfall=3.42"

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Pond 16: INF-1

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 17: Post A5

Runoff = 9.17 cfs @ 12.13 hrs, Volume= 24,677 cf, Depth= 3.19"

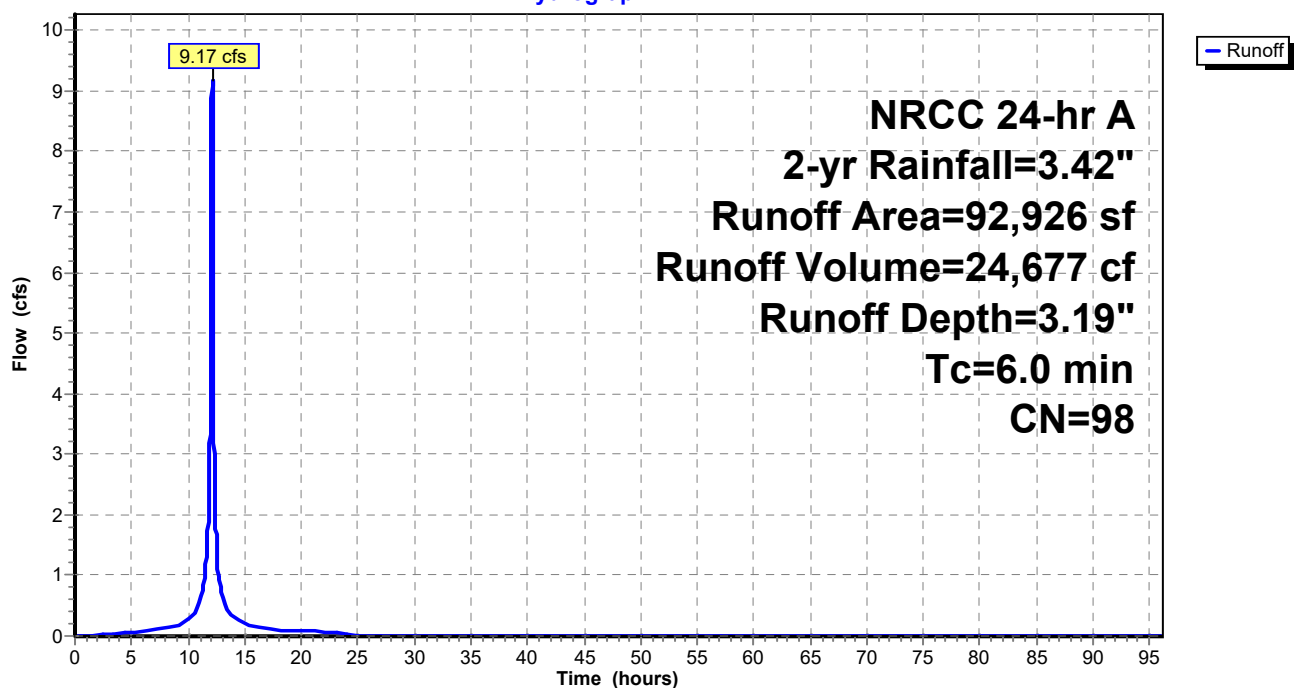
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
92,926	98	Roofs, HSG C
92,926		100.00% Impervious Area

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

Subcatchment 17: Post A5

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 18: DIV-2

Inflow Area = 92,926 sf, 100.00% Impervious, Inflow Depth = 3.19" for 2-yr event
 Inflow = 9.17 cfs @ 12.13 hrs, Volume= 24,677 cf
 Outflow = 9.17 cfs @ 12.13 hrs, Volume= 24,677 cf, Atten= 0%, Lag= 0.0 min
 Primary = 6.04 cfs @ 12.06 hrs, Volume= 23,552 cf
 Secondary = 3.33 cfs @ 12.13 hrs, Volume= 1,125 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 368.28' @ 12.13 hrs

Flood Elev= 371.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	365.00'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 365.00' / 365.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	366.50'	24.0" Round Culvert L= 550.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 366.50' / 355.00' S= 0.0209 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	368.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.98 cfs @ 12.06 hrs HW=368.10' TW=365.60' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 5.98 cfs @ 7.61 fps)**Secondary OutFlow** Max=3.31 cfs @ 12.13 hrs HW=368.28' TW=355.24' (Dynamic Tailwater)↑ **2=Culvert** (Passes 3.31 cfs of 13.38 cfs potential flow)↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 3.31 cfs @ 1.50 fps)

N60 P1 Post-A 3-17-20

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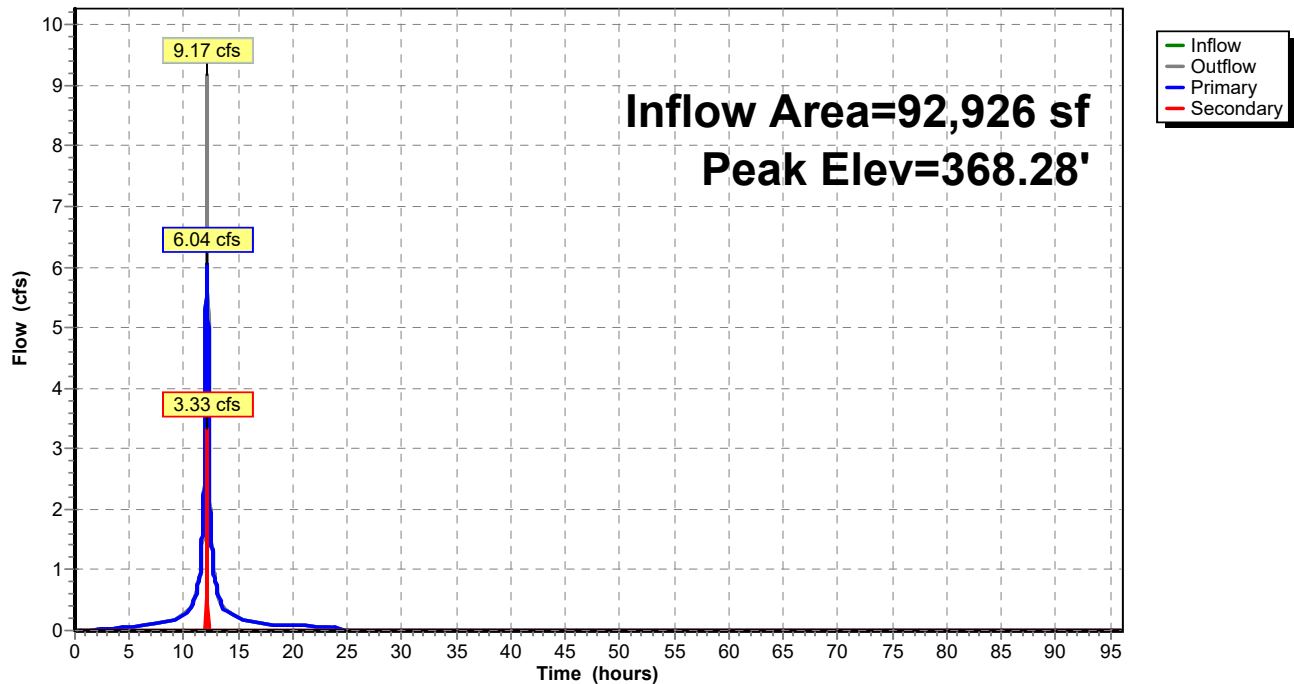
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NRCC 24-hr A 2-yr Rainfall=3.42"

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Pond 18: DIV-2

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 19: INF-2

Inflow Area = 92,926 sf, 100.00% Impervious, Inflow Depth = 3.04" for 2-yr event
 Inflow = 6.04 cfs @ 12.06 hrs, Volume= 23,552 cf
 Outflow = 0.99 cfs @ 11.62 hrs, Volume= 23,552 cf, Atten= 84%, Lag= 0.0 min
 Discarded = 0.99 cfs @ 11.62 hrs, Volume= 23,552 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 366.90' @ 12.68 hrs Surf.Area= 4,295 sf Storage= 7,388 cf

Plug-Flow detention time= 46.0 min calculated for 23,550 cf (100% of inflow)
 Center-of-Mass det. time= 46.0 min (801.2 - 755.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	364.50'	4,639 cf	41.50'W x 103.50'L x 4.33'H Field A 18,613 cf Overall - 7,016 cf Embedded = 11,596 cf x 40.0% Voids
#2A	365.00'	7,016 cf	Cultec R-360HD x 189 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 189 Chambers in 7 Rows Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf
		11,655 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	364.50'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=0.99 cfs @ 11.62 hrs HW=364.55' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.99 cfs)

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 2-yr Rainfall=3.42"

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Pond 19: INF-2 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

27 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 101.50' Row Length +12.0" End Stone x 2 = 103.50' Base Length

7 Rows x 60.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 41.50' Base Width

6.0" Base + 36.0" Chamber Height + 10.0" Cover = 4.33' Field Height

189 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 7 Rows = 7,016.3 cf Chamber Storage

18,612.7 cf Field - 7,016.3 cf Chambers = 11,596.5 cf Stone x 40.0% Voids = 4,638.6 cf Stone Storage

Chamber Storage + Stone Storage = 11,654.9 cf = 0.268 af

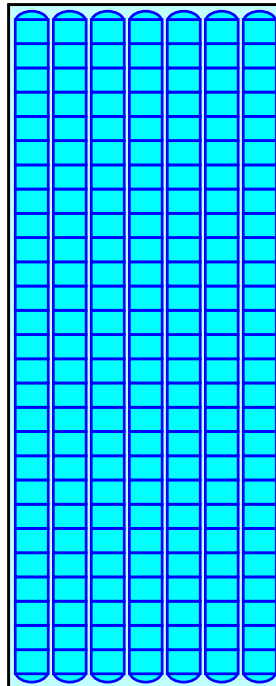
Overall Storage Efficiency = 62.6%

Overall System Size = 103.50' x 41.50' x 4.33'

189 Chambers

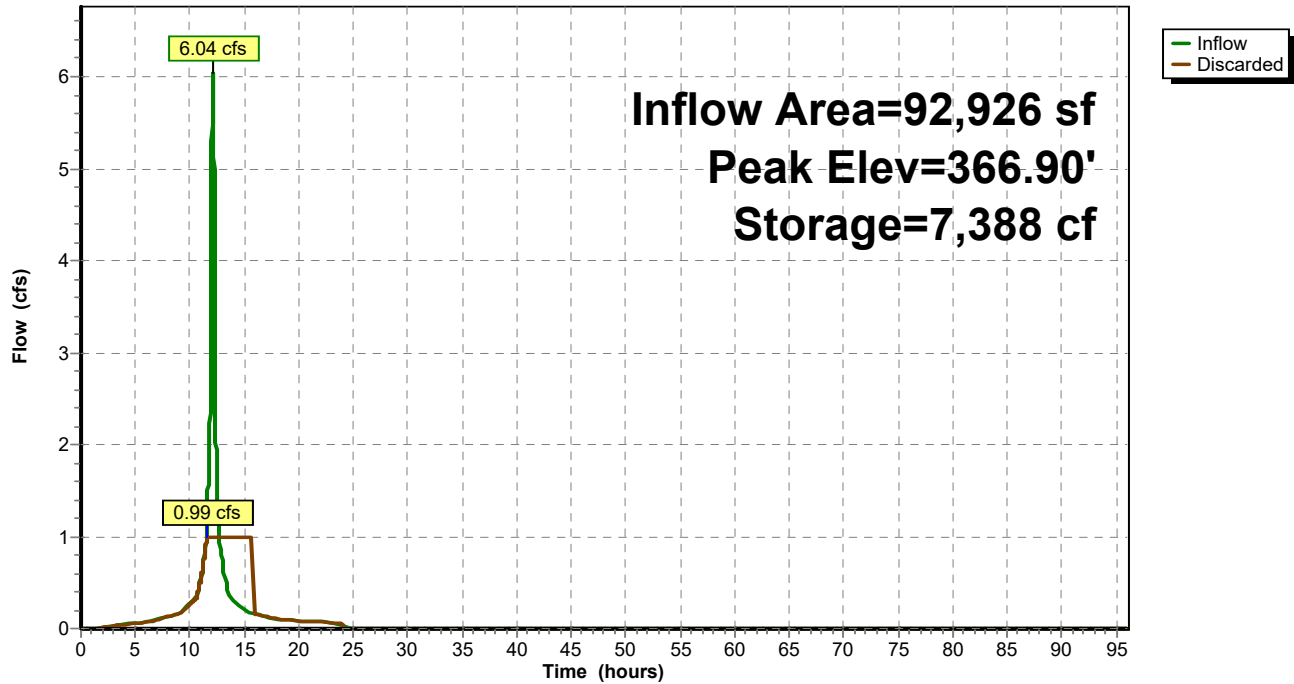
689.4 cy Field

429.5 cy Stone



Pond 19: INF-2

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 2-yr Rainfall=3.42"

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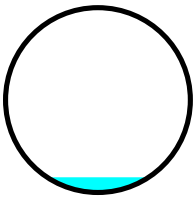
Summary for Reach 20: 36" HDPE Pipe

Inflow = 3.33 cfs @ 12.13 hrs, Volume= 1,125 cf
Outflow = 3.17 cfs @ 12.15 hrs, Volume= 1,125 cf, Atten= 5%, Lag= 0.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 11.55 fps, Min. Travel Time= 1.2 min
Avg. Velocity= 4.79 fps, Avg. Travel Time= 2.8 min

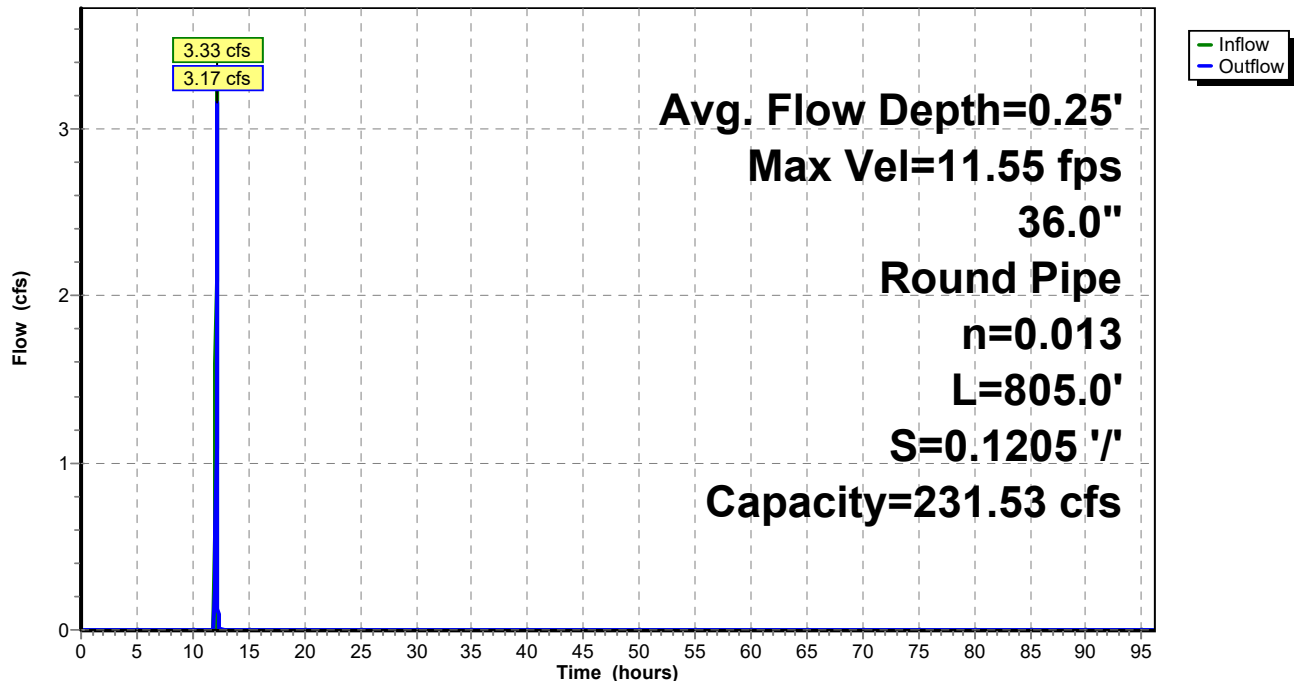
Peak Storage= 220 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 231.53 cfs

36.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 805.0' Slope= 0.1205 '/'
Inlet Invert= 355.00', Outlet Invert= 258.00'



Reach 20: 36" HDPE Pipe

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 21: A6

Runoff = 36.90 cfs @ 12.13 hrs, Volume= 95,090 cf, Depth= 2.97"

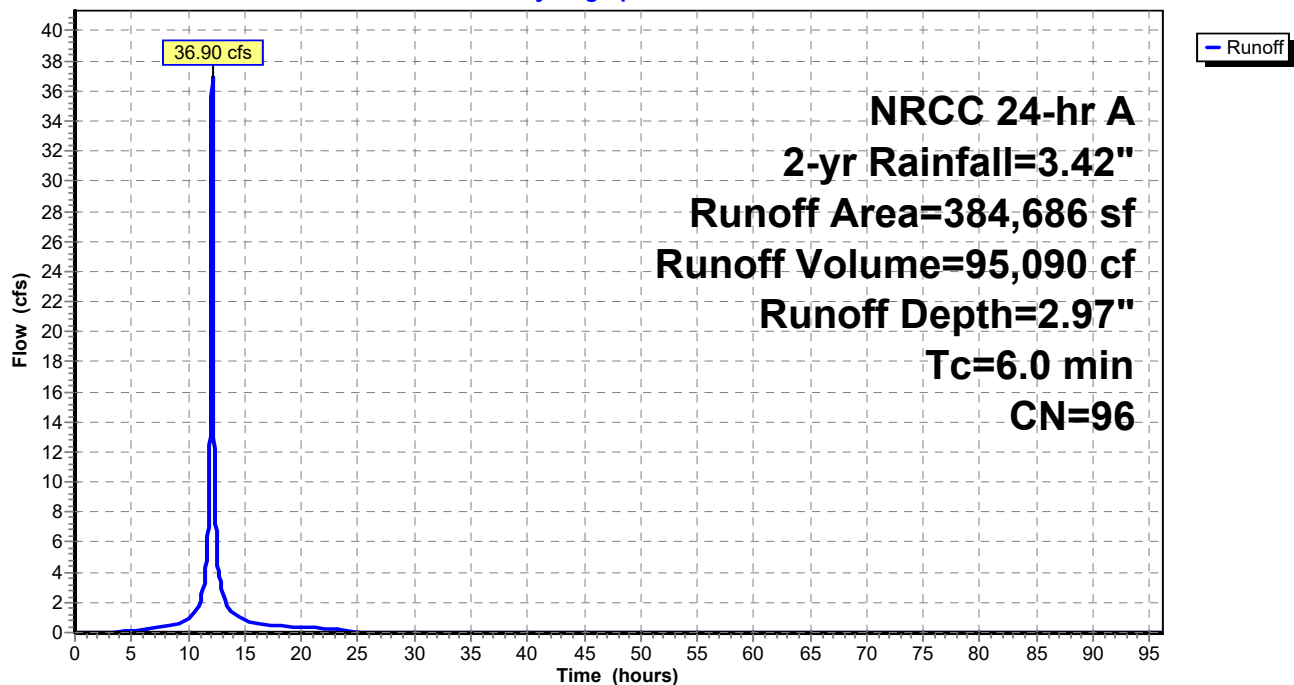
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
332,512	98	Paved parking, HSG C
52,174	86	<50% Grass cover, Poor, HSG C
384,686	96	Weighted Average
52,174		13.56% Pervious Area
332,512		86.44% Impervious Area

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

Subcatchment 21: A6

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 22: A7

Runoff = 3.02 cfs @ 12.14 hrs, Volume= 7,393 cf, Depth= 0.86"

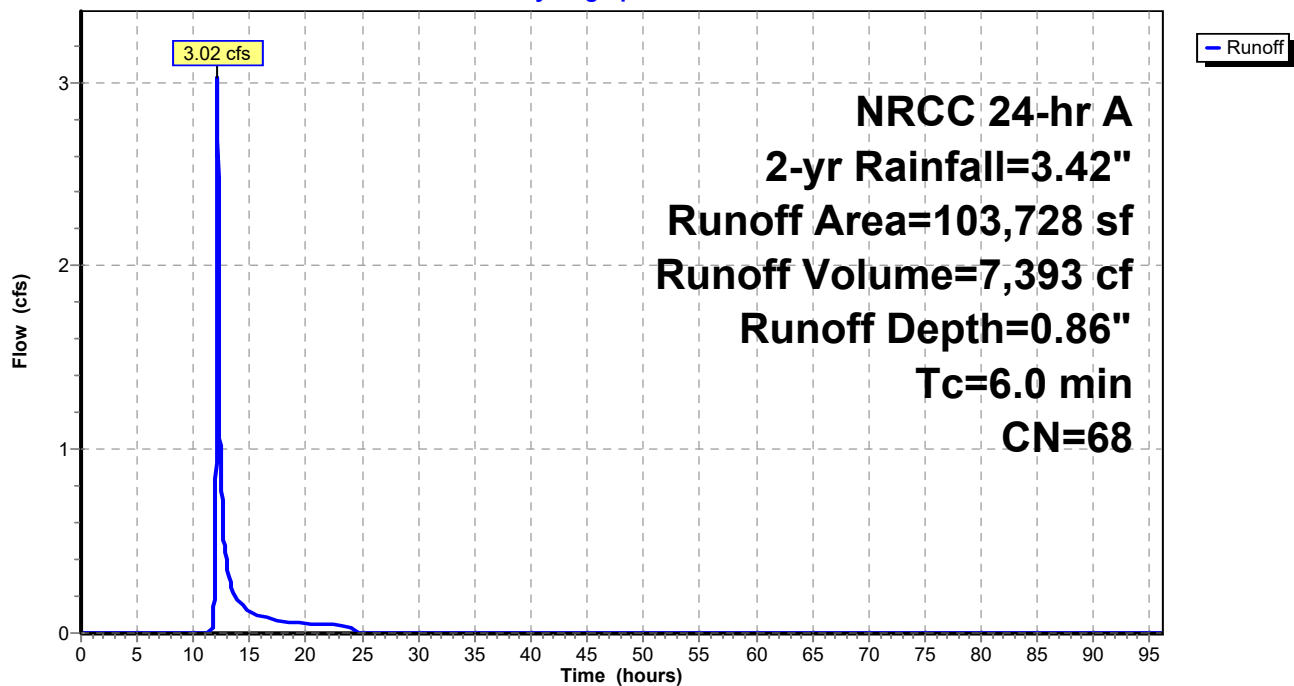
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
35,128	65	Brush, Good, HSG C
68,600	70	Woods, Good, HSG C
103,728	68	Weighted Average
103,728		100.00% Pervious Area

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

Subcatchment 22: A7

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 23: Infiltration Basin (SWP-3)

Inflow Area = 488,414 sf, 68.08% Impervious, Inflow Depth = 2.55" for 2-yr event
 Inflow = 42.88 cfs @ 12.13 hrs, Volume= 103,608 cf
 Outflow = 5.12 cfs @ 12.62 hrs, Volume= 103,608 cf, Atten= 88%, Lag= 29.4 min
 Discarded = 5.12 cfs @ 12.62 hrs, Volume= 103,608 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 259.19' @ 12.62 hrs Surf.Area= 14,760 sf Storage= 38,391 cf

Plug-Flow detention time= 58.7 min calculated for 103,597 cf (100% of inflow)
 Center-of-Mass det. time= 58.7 min (834.1 - 775.4)

Volume	Invert	Avail.Storage	Storage Description		
#1	256.00'	87,144 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
256.00	9,450	527.9	0	0	9,450
258.00	12,731	565.7	22,100	22,100	12,917
260.00	16,238	603.5	28,898	50,998	16,623
262.00	19,973	641.3	36,147	87,144	20,569

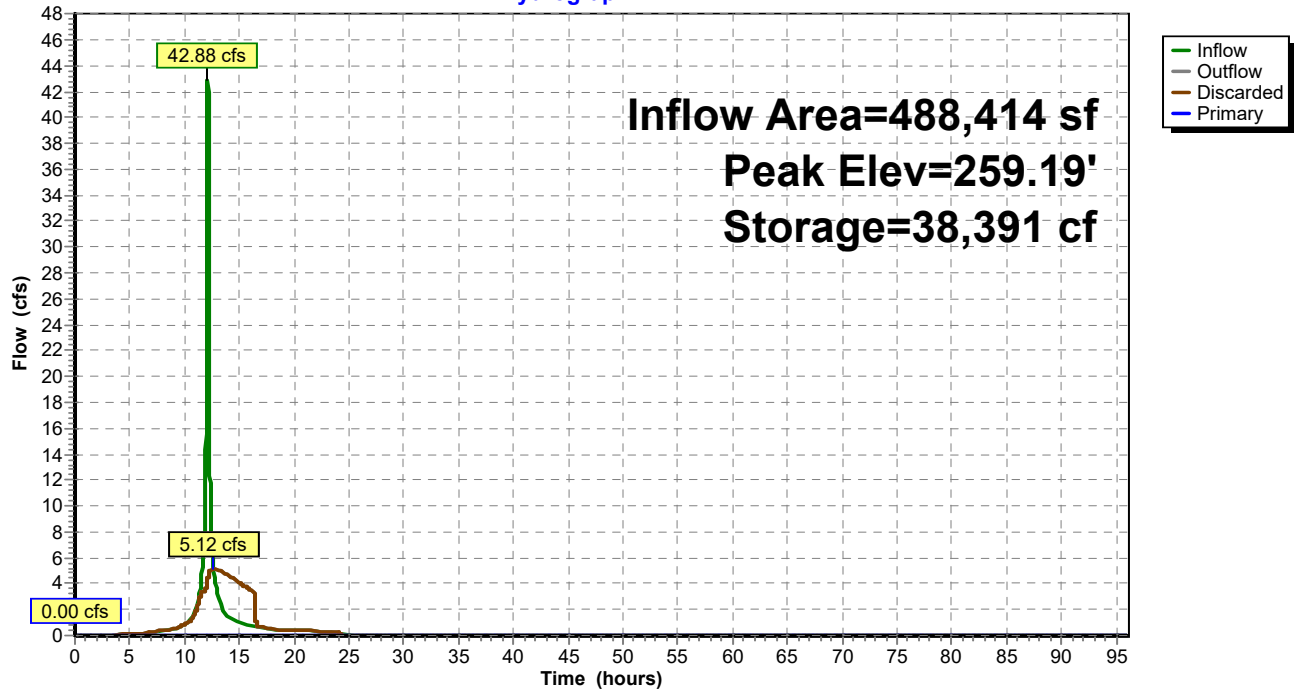
Device	Routing	Invert	Outlet Devices
#1	Primary	254.00'	36.0" Round Culvert X 2.00 L= 95.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 254.00' / 244.00' S= 0.1053 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	260.00'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	260.00'	3.0' long x 0.5' breadth Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	259.40'	6.0" Vert. Orifice/Grate C= 0.600
#5	Device 1	261.00'	36.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Discarded	256.00'	15.000 in/hr Exfiltration over Surface area Phase-In= 0.10'

Discarded OutFlow Max=5.12 cfs @ 12.62 hrs HW=259.19' (Free Discharge)
 ↳ **6=Exfiltration** (Exfiltration Controls 5.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=256.00' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Passes 0.00 cfs of 48.21 cfs potential flow)
 ↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **4=Orifice/Grate** (Controls 0.00 cfs)
 ↳ **5=Orifice/Grate** (Controls 0.00 cfs)

Pond 23: Infiltration Basin (SWP-3)

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 24: A9

Runoff = 3.18 cfs @ 12.13 hrs, Volume= 8,063 cf, Depth= 2.86"

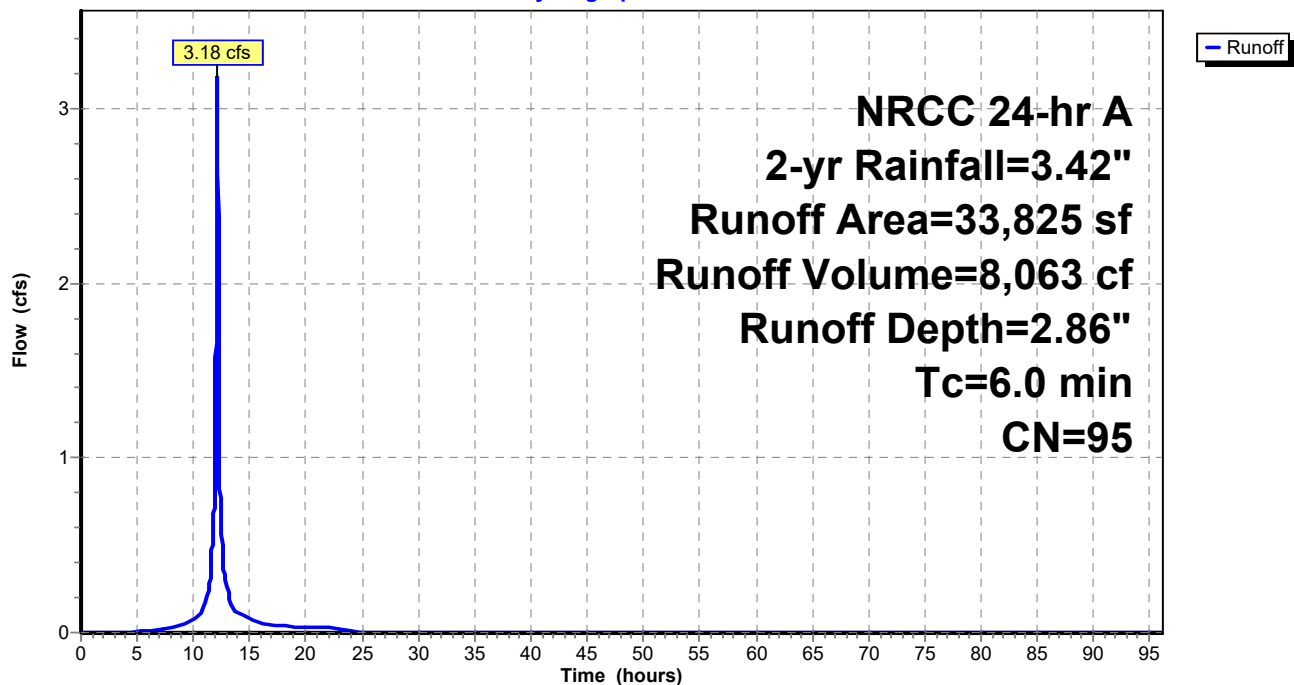
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
29,687	98	Paved parking, HSG C
4,138	74	>75% Grass cover, Good, HSG C
33,825	95	Weighted Average
4,138		12.23% Pervious Area
29,687		87.77% Impervious Area

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

Subcatchment 24: A9

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 25: DIV-4

Inflow Area = 33,825 sf, 87.77% Impervious, Inflow Depth = 2.86" for 2-yr event
 Inflow = 3.18 cfs @ 12.13 hrs, Volume= 8,063 cf
 Outflow = 3.18 cfs @ 12.13 hrs, Volume= 8,063 cf, Atten= 0%, Lag= 0.0 min
 Primary = 3.18 cfs @ 12.13 hrs, Volume= 8,063 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 350.95' @ 12.13 hrs

Flood Elev= 355.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	349.50'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 349.50' / 349.50' S= 0.0000 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	349.50'	18.0" Round Culvert L= 128.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 349.50' / 344.00' S= 0.0430 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	352.50'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=3.18 cfs @ 12.13 hrs HW=350.95' TW=349.93' (Dynamic Tailwater)↑ **1=Culvert** (Barrel Controls 3.18 cfs @ 4.05 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=349.50' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Controls 0.00 cfs)↑ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

N60 P1 Post-A 3-17-20

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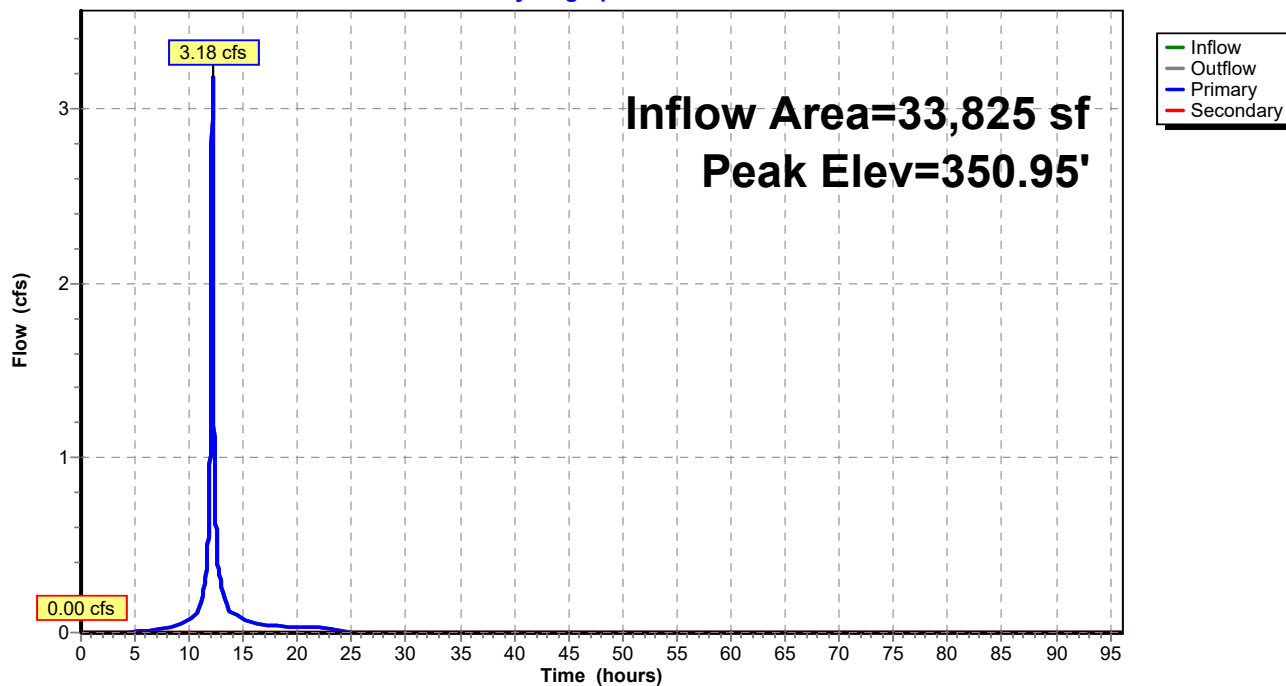
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NRCC 24-hr A 2-yr Rainfall=3.42"

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Pond 25: DIV-4

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 26: INF-4

Inflow Area = 33,825 sf, 87.77% Impervious, Inflow Depth = 2.86" for 2-yr event
 Inflow = 3.18 cfs @ 12.13 hrs, Volume= 8,063 cf
 Outflow = 0.52 cfs @ 11.82 hrs, Volume= 8,063 cf, Atten= 84%, Lag= 0.0 min
 Discarded = 0.52 cfs @ 11.82 hrs, Volume= 8,063 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 350.48' @ 12.56 hrs Surf.Area= 2,242 sf Storage= 2,285 cf

Plug-Flow detention time= 26.2 min calculated for 8,062 cf (100% of inflow)
 Center-of-Mass det. time= 26.2 min (801.6 - 775.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	349.00'	2,196 cf	30.50'W x 73.50'L x 3.88'H Field A 8,687 cf Overall - 3,196 cf Embedded = 5,490 cf x 40.0% Voids
#2A	349.50'	3,196 cf	Cultec R-330XLHD x 60 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
		5,393 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	349.00'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=0.52 cfs @ 11.82 hrs HW=349.05' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.52 cfs)

N60 P1 Post-A 3-17-20

Prepared by {enter your company name here}

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NRCC 24-hr A 2-yr Rainfall=3.42"

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Pond 26: INF-4 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

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

10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length

6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width

6.0" Base + 30.5" Chamber Height + 10.0" Cover = 3.88' Field Height

60 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 3,196.5 cf Chamber Storage

8,686.8 cf Field - 3,196.5 cf Chambers = 5,490.3 cf Stone x 40.0% Voids = 2,196.1 cf Stone Storage

Chamber Storage + Stone Storage = 5,392.6 cf = 0.124 af

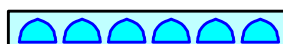
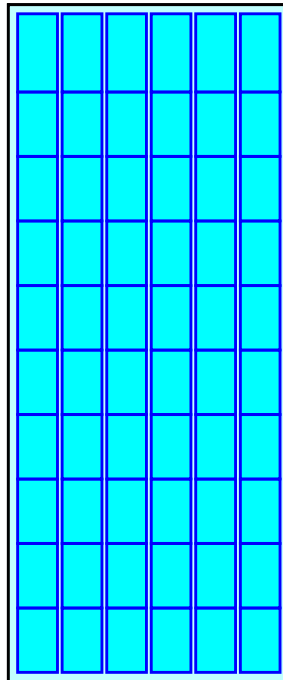
Overall Storage Efficiency = 62.1%

Overall System Size = 73.50' x 30.50' x 3.88'

60 Chambers

321.7 cy Field

203.3 cy Stone



N60 P1 Post-A 3-17-20

Prepared by {enter your company name here}

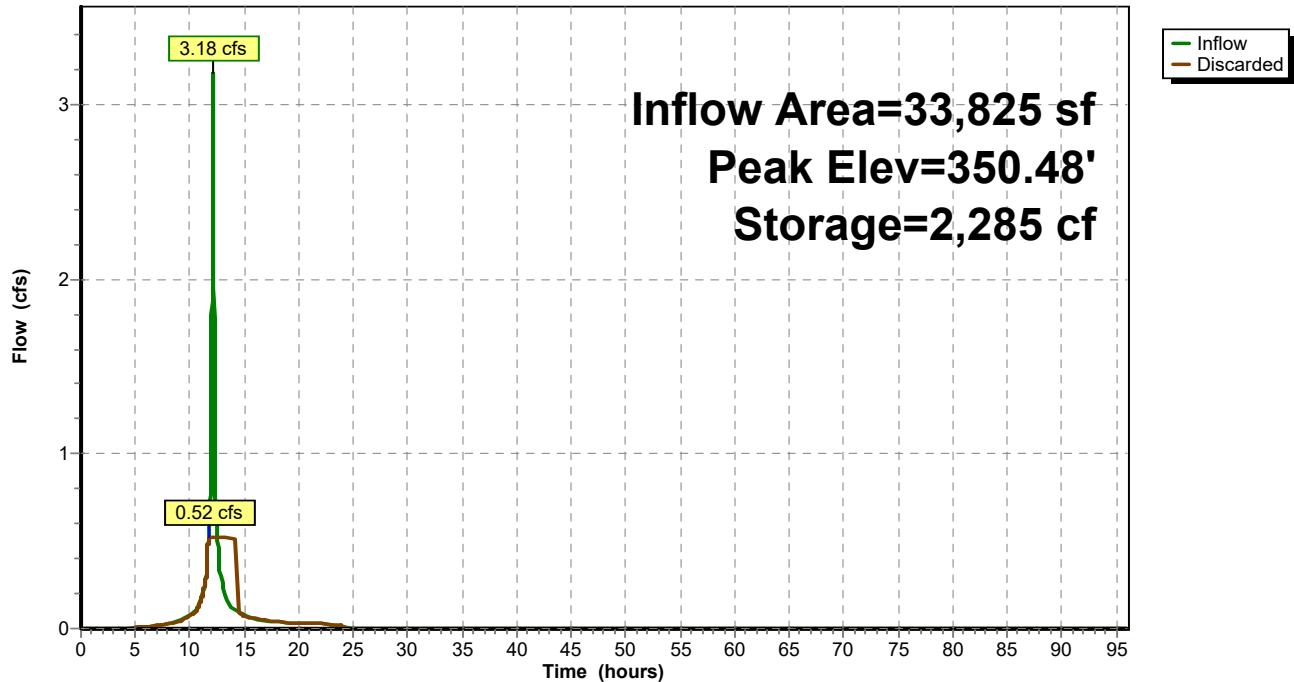
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NRCC 24-hr A 2-yr Rainfall=3.42"

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Pond 26: INF-4

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 2-yr Rainfall=3.42"

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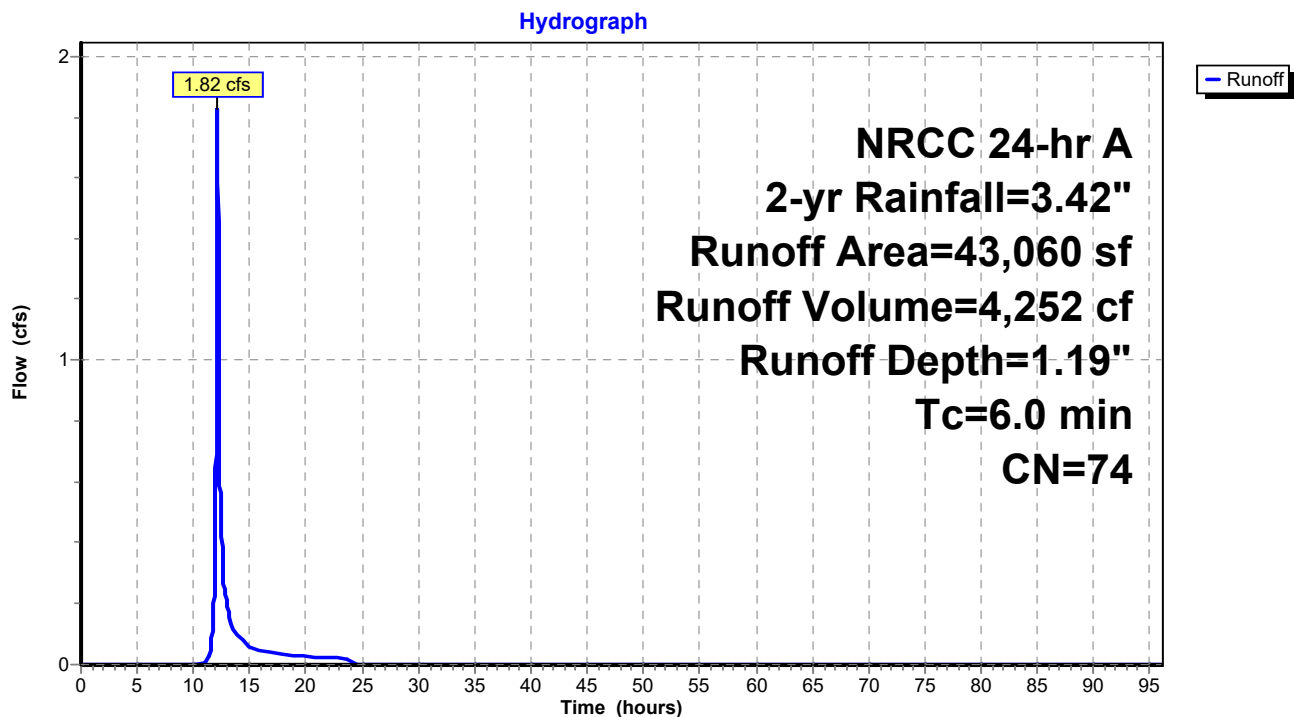
Summary for Subcatchment 27: A10

Runoff = 1.82 cfs @ 12.14 hrs, Volume= 4,252 cf, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
16,120	73	Brush, Good, HSG D
19,715	77	Brush, Poor, HSG C
7,225	70	Woods, Good, HSG C
43,060	74	Weighted Average
43,060		100.00% Pervious Area

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

Subcatchment 27: A10

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 2-yr Rainfall=3.42"

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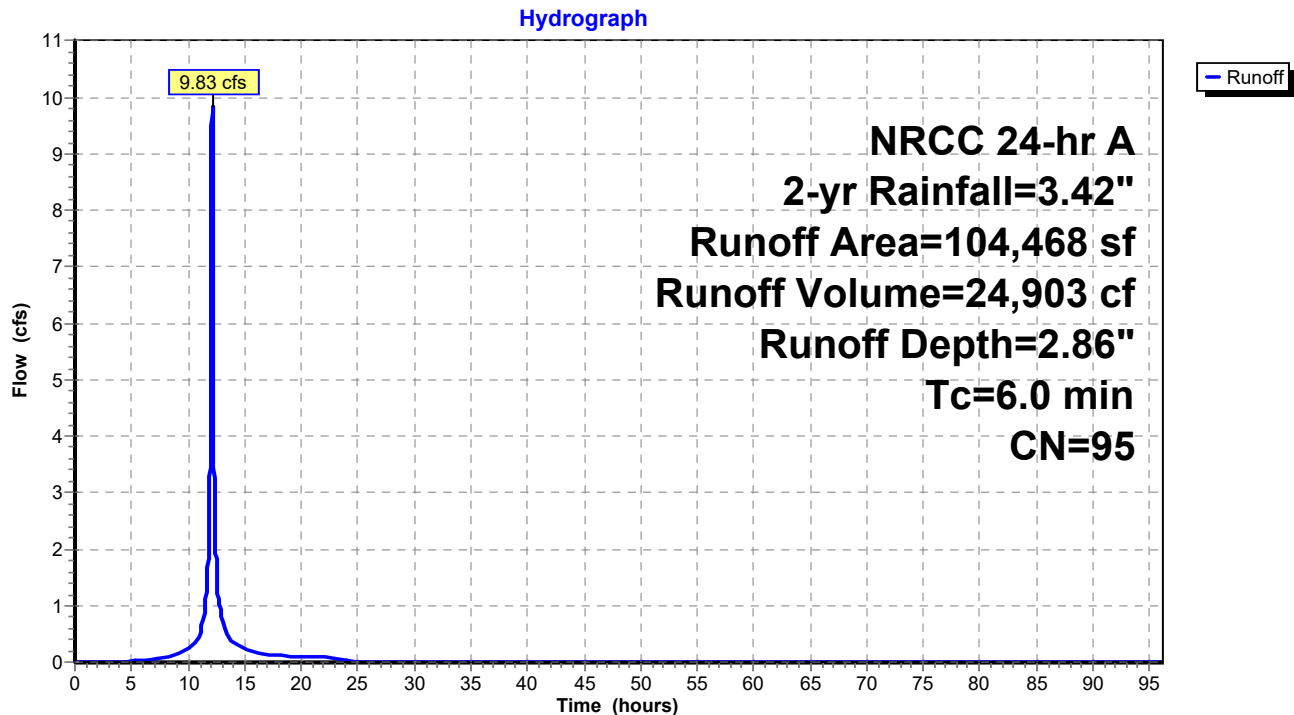
Summary for Subcatchment 28: A10

Runoff = 9.83 cfs @ 12.13 hrs, Volume= 24,903 cf, Depth= 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
91,430	98	Paved parking, HSG C
7,435	74	>75% Grass cover, Good, HSG C
5,603	80	>75% Grass cover, Good, HSG D
104,468	95	Weighted Average
13,038		12.48% Pervious Area
91,430		87.52% Impervious Area

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

Subcatchment 28: A10

N60 P1 Post-A 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 29: Infiltration Basin (SWP-2)

Inflow Area = 147,528 sf, 61.97% Impervious, Inflow Depth = 2.37" for 2-yr event
 Inflow = 11.65 cfs @ 12.13 hrs, Volume= 29,155 cf
 Outflow = 2.00 cfs @ 12.56 hrs, Volume= 29,155 cf, Atten= 83%, Lag= 25.6 min
 Discarded = 2.00 cfs @ 12.56 hrs, Volume= 29,155 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 317.87' @ 12.56 hrs Surf.Area= 5,762 sf Storage= 9,093 cf

Plug-Flow detention time= 33.7 min calculated for 29,152 cf (100% of inflow)
 Center-of-Mass det. time= 33.7 min (818.8 - 785.2)

Volume	Invert	Avail.Storage	Storage Description
#1	316.00'	41,962 cf	Custom Stage Data (Irregular) Listed below (Recalc)

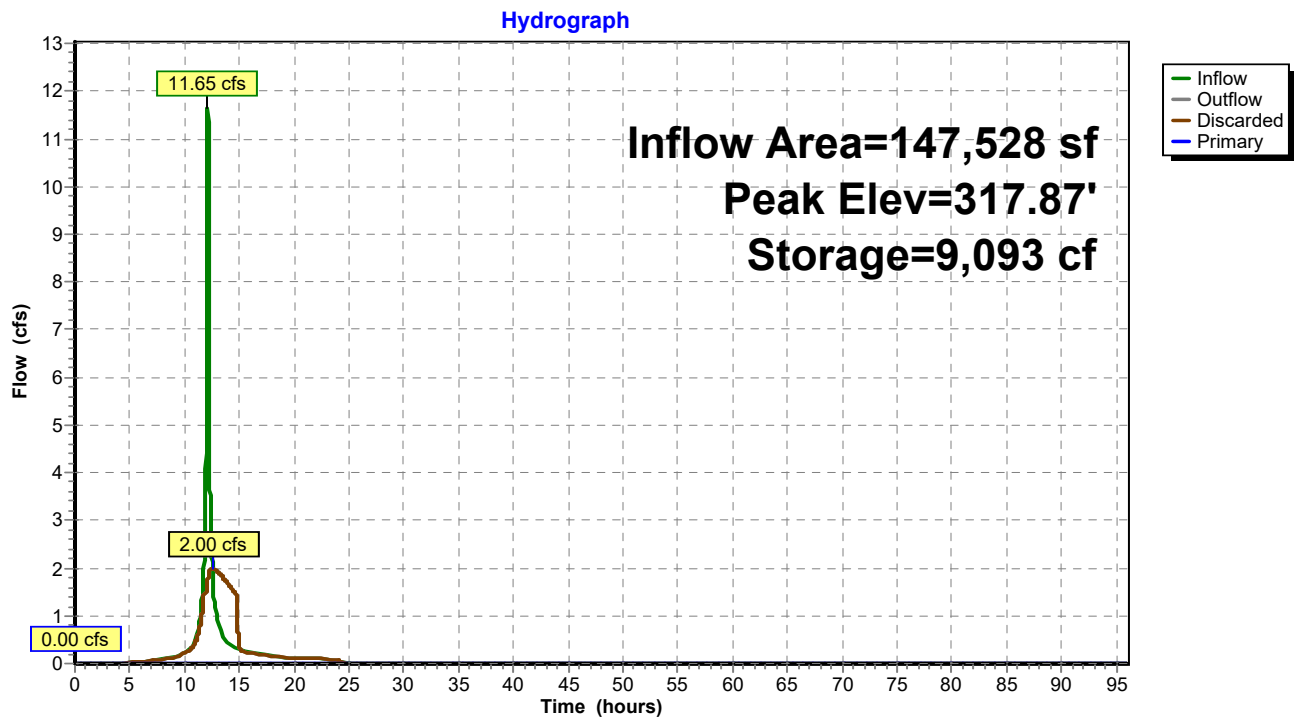
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
316.00	4,026	293.0	0	0	4,026
318.00	5,897	330.7	9,864	9,864	5,998
320.00	7,994	368.3	13,838	23,702	8,204
322.00	10,316	406.0	18,261	41,962	10,652

Device	Routing	Invert	Outlet Devices
#1	Primary	310.00'	15.0" Round Culvert L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 310.00' / 304.00' S= 0.1000 ' S= 0.1000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	318.25'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	320.50'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	321.00'	3.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#5	Discarded	316.00'	15.000 in/hr Exfiltration over Surface area Phase-In= 0.10'

Discarded OutFlow Max=2.00 cfs @ 12.56 hrs HW=317.87' (Free Discharge)
 ↳ **5=Exfiltration** (Exfiltration Controls 2.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=316.00' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Passes 0.00 cfs of 13.70 cfs potential flow)
 ↳ **2=Orifice/Grate** (Controls 0.00 cfs)
 ↳ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 29: Infiltration Basin (SWP-2)



N60 P1 Post-A 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 30: Post A2

Runoff = 7.46 cfs @ 12.28 hrs, Volume= 26,479 cf, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
43,743	98	Paved parking, HSG C
107,245	74	>75% Grass cover, Good, HSG C
2,876	61	>75% Grass cover, Good, HSG B
39,583	70	Woods, Good, HSG C
4,283	98	Water Surface, HSG C
33,976	65	Brush, Good, HSG C
231,706	77	Weighted Average
183,680		79.27% Pervious Area
48,026		20.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	215	0.0260	2.60		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	125	0.1000	6.42		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.4	377	0.0750	14.42	17.69	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
17.7	817	Total			

N60 P1 Post-A 3-17-20

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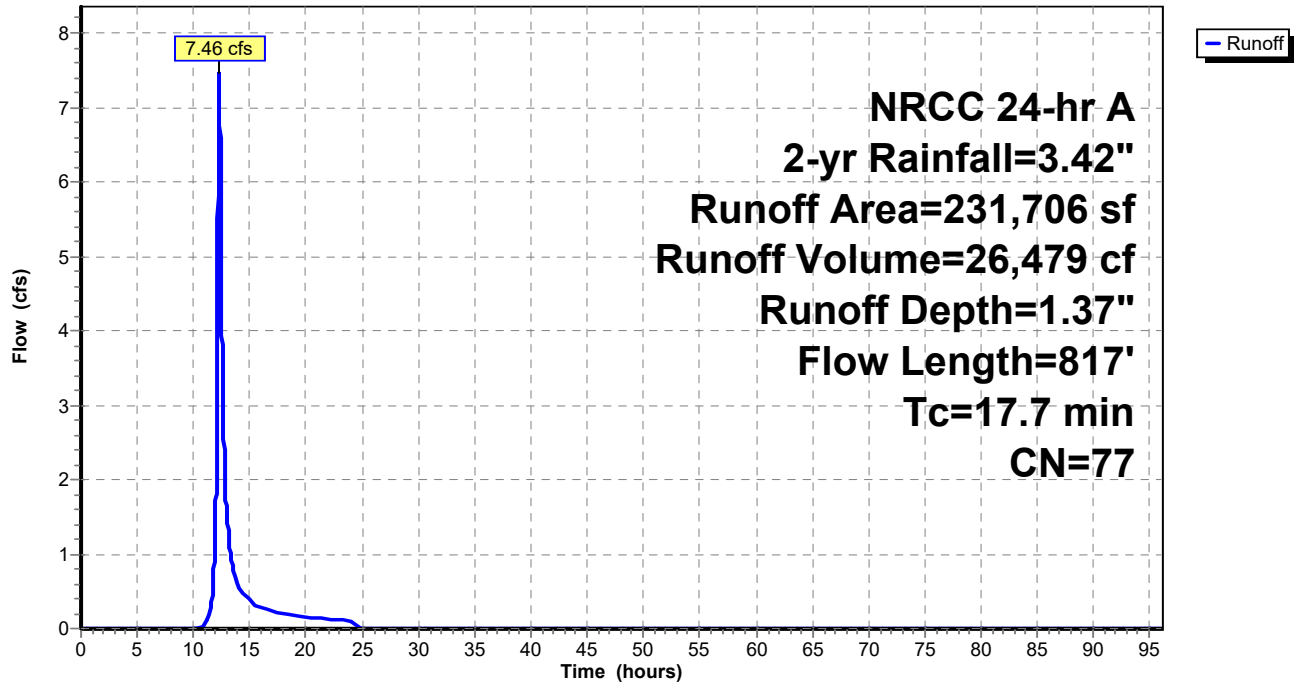
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NRCC 24-hr A 2-yr Rainfall=3.42"

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Subcatchment 30: Post A2

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 31: Pocket Wetland (SWP-1)

Inflow Area = 231,706 sf, 20.73% Impervious, Inflow Depth = 1.37" for 2-yr event
 Inflow = 7.46 cfs @ 12.28 hrs, Volume= 26,479 cf
 Outflow = 0.05 cfs @ 24.29 hrs, Volume= 12,483 cf, Atten= 99%, Lag= 720.5 min
 Primary = 0.05 cfs @ 24.29 hrs, Volume= 12,483 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Starting Elev= 234.50' Surf.Area= 12,504 sf Storage= 7,835 cf
 Peak Elev= 236.65' @ 24.29 hrs Surf.Area= 16,183 sf Storage= 32,401 cf (24,566 cf above start)

Plug-Flow detention time= 4,005.6 min calculated for 4,647 cf (18% of inflow)
 Center-of-Mass det. time= 2,306.1 min (3,151.5 - 845.4)

Volume	Invert	Avail.Storage	Storage Description
#1	230.00'	1,811 cf	Forebay (Irregular) Listed below (Recalc)
#2	230.00'	1,976 cf	Micropool (Irregular) Listed below (Recalc)
#3	233.90'	65,123 cf	Marsh & Storage (Irregular) Listed below (Recalc)
		68,911 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	86	34.2	0	0	86
231.00	217	53.2	147	147	225
232.00	406	72.3	307	453	426
233.00	651	91.4	524	977	688
233.90	1,233	129.1	834	1,811	1,357

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	86	34.2	0	0	86
231.00	217	53.2	147	147	225
232.00	406	72.3	307	453	426
233.00	651	91.4	524	977	688
233.90	1,646	155.1	1,000	1,976	1,942

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
233.90	4,232	530.5	0	0	4,232
234.50	9,625	400.9	4,048	4,048	13,842
235.00	10,440	413.5	5,015	9,063	14,683
236.00	12,144	438.8	11,281	20,344	16,451
237.00	13,950	464.0	13,037	33,381	18,317
238.00	15,856	489.2	14,893	48,273	20,287
239.00	17,864	514.5	16,850	65,123	22,369

Device	Routing	Invert	Outlet Devices
#1	Primary	232.00'	21.0" Round Culvert L= 74.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 232.00' / 231.00' S= 0.0135 ' / ' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 2.41 sf

N60 P1 Post-A 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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#2	Device 1	234.50'	1.1" Vert. Orifice/Grate	C= 0.600
#3	Device 1	237.50'	36.0" x 48.0" Horiz. Orifice/Grate	C= 0.600

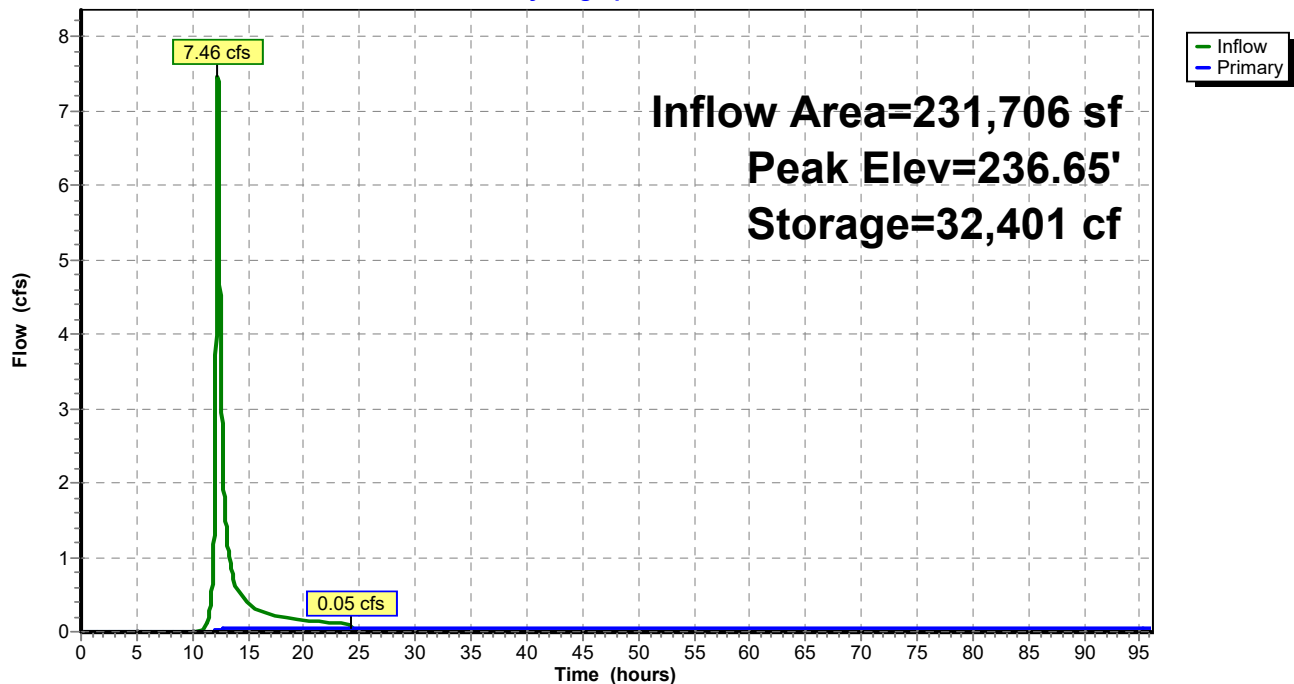
Limited to weir flow at low heads

Primary OutFlow Max=0.05 cfs @ 24.29 hrs HW=236.65' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 0.05 cfs of 16.14 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.05 cfs @ 6.98 fps)
3=Orifice/Grate (Controls 0.00 cfs)

Pond 31: Pocket Wetland (SWP-1)

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 32: Post A1

Runoff = 1.29 cfs @ 12.13 hrs, Volume= 2,967 cf, Depth= 1.72"

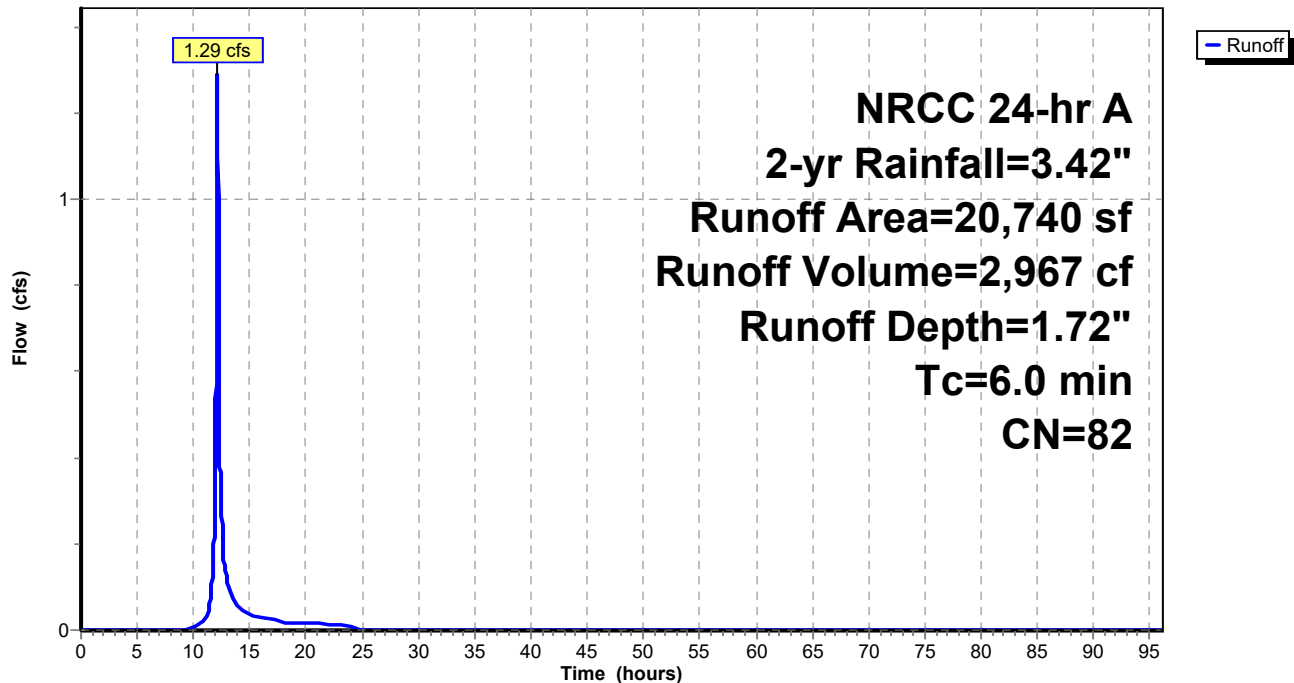
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
7,304	98	Paved parking, HSG C
10,356	74	>75% Grass cover, Good, HSG C
3,080	70	Woods, Good, HSG C
20,740	82	Weighted Average
13,436		64.78% Pervious Area
7,304		35.22% Impervious Area

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

Subcatchment 32: Post A1

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 2-yr Rainfall=3.42"

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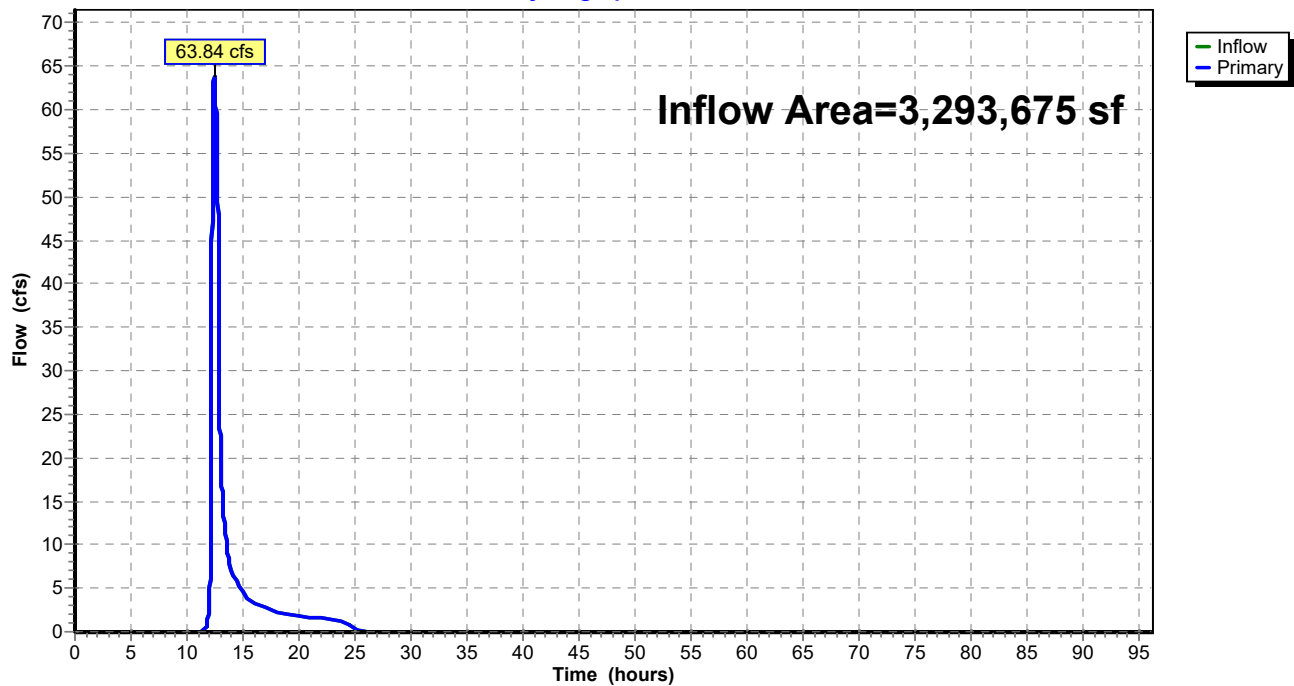
Summary for Link 33: Design Point A

Inflow Area = 3,293,675 sf, 35.25% Impervious, Inflow Depth > 1.09" for 2-yr event
Inflow = 63.84 cfs @ 12.42 hrs, Volume= 300,220 cf
Primary = 63.84 cfs @ 12.42 hrs, Volume= 300,220 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 33: Design Point A

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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 8: Post A0 OffsiteRunoff Area=1,115,060 sf 57.87% Impervious Runoff Depth=3.99"
Flow Length=1,018' Tc=12.5 min CN=90 Runoff=118.73 cfs 370,955 cf**Pond 9: Offsite Pond A**Peak Elev=363.03' Storage=121,390 cf Inflow=118.73 cfs 370,955 cf
Outflow=51.70 cfs 319,760 cf**Subcatchment 10: Post A4**Runoff Area=164,583 sf 10.25% Impervious Runoff Depth=2.63"
Flow Length=340' Tc=20.5 min CN=76 Runoff=9.63 cfs 36,136 cf**Reach 11: 24" Culvert Pipe**Avg. Flow Depth=0.70' Max Vel=9.90 fps Inflow=9.63 cfs 36,136 cf
24.0" Round Pipe n=0.013 L=112.0' S=0.0268 '/' Capacity=37.02 cfs Outflow=9.63 cfs 36,136 cf**Subcatchment 12: Post A8**Runoff Area=403,480 sf 2.55% Impervious Runoff Depth=2.37"
Flow Length=320' Tc=21.4 min CN=73 Runoff=20.71 cfs 79,853 cf**Pond 12A: Existing Wetland A**Peak Elev=326.51' Storage=28,195 cf Inflow=81.34 cfs 435,748 cf
36.0" Round Culvert n=0.013 L=168.0' S=0.0655 '/' Outflow=68.17 cfs 435,748 cf**Subcatchment 12B: Post A11**Runoff Area=722,164 sf 1.29% Impervious Runoff Depth=2.13"
Flow Length=475' Tc=19.8 min CN=70 Runoff=34.41 cfs 127,927 cf**Reach 13: Existing Stream A**Avg. Flow Depth=1.44' Max Vel=9.65 fps Inflow=96.54 cfs 563,676 cf
n=0.040 L=1,360.0' S=0.0721 '/' Capacity=291.69 cfs Outflow=96.02 cfs 563,676 cf**Subcatchment 14: Post A3**Runoff Area=106,378 sf 85.91% Impervious Runoff Depth=4.54"
Tc=6.0 min CN=95 Runoff=15.43 cfs 40,232 cf**Pond 15: DIV-1**Peak Elev=327.57' Inflow=15.43 cfs 40,232 cf
Primary=5.30 cfs 32,199 cf Secondary=10.53 cfs 8,033 cf Outflow=15.43 cfs 40,232 cf**Pond 16: INF-1**Peak Elev=326.96' Storage=8,756 cf Inflow=5.30 cfs 32,199 cf
Outflow=1.18 cfs 32,199 cf**Subcatchment 17: Post A5**Runoff Area=92,926 sf 100.00% Impervious Runoff Depth=4.88"
Tc=6.0 min CN=98 Runoff=13.81 cfs 37,813 cf**Pond 18: DIV-2**Peak Elev=368.50' Inflow=13.81 cfs 37,813 cf
Primary=5.81 cfs 32,380 cf Secondary=8.44 cfs 5,433 cf Outflow=13.81 cfs 37,813 cf**Pond 19: INF-2**Peak Elev=367.98' Storage=10,191 cf Inflow=5.81 cfs 32,380 cf
Outflow=0.99 cfs 32,380 cf**Reach 20: 36" HDPE Pipe**Avg. Flow Depth=0.39' Max Vel=15.46 fps Inflow=8.44 cfs 5,433 cf
36.0" Round Pipe n=0.013 L=805.0' S=0.1205 '/' Capacity=231.53 cfs Outflow=8.31 cfs 5,433 cf**Subcatchment 21: A6**Runoff Area=384,686 sf 86.44% Impervious Runoff Depth=4.65"
Tc=6.0 min CN=96 Runoff=56.35 cfs 149,125 cf

N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Subcatchment22: A7Runoff Area=103,728 sf 0.00% Impervious Runoff Depth=1.97"
Tc=6.0 min CN=68 Runoff=7.34 cfs 16,989 cf**Pond 23: Infiltration Basin (SWP-3)**Peak Elev=260.58' Storage=60,792 cf Inflow=71.83 cfs 171,547 cf
Discarded=6.00 cfs 147,546 cf Primary=14.62 cfs 24,002 cf Outflow=20.62 cfs 171,547 cf**Subcatchment24: A9**Runoff Area=33,825 sf 87.77% Impervious Runoff Depth=4.54"
Tc=6.0 min CN=95 Runoff=4.91 cfs 12,793 cf**Pond 25: DIV-4**Peak Elev=352.26' Inflow=4.91 cfs 12,793 cf
Primary=4.91 cfs 12,793 cf Secondary=0.00 cfs 0 cf Outflow=4.91 cfs 12,793 cf**Pond 26: INF-4**Peak Elev=351.97' Storage=4,576 cf Inflow=4.91 cfs 12,793 cf
Outflow=0.52 cfs 12,793 cf**Subcatchment27: A10**Runoff Area=43,060 sf 0.00% Impervious Runoff Depth=2.46"
Tc=6.0 min CN=74 Runoff=3.83 cfs 8,829 cf**Subcatchment28: A10**Runoff Area=104,468 sf 87.52% Impervious Runoff Depth=4.54"
Tc=6.0 min CN=95 Runoff=15.15 cfs 39,510 cf**Pond 29: Infiltration Basin (SWP-2)**Peak Elev=319.17' Storage=17,434 cf Inflow=18.97 cfs 48,338 cf
Discarded=2.46 cfs 46,751 cf Primary=0.36 cfs 1,588 cf Outflow=2.82 cfs 48,338 cf**Subcatchment30: Post A2**Runoff Area=231,706 sf 20.73% Impervious Runoff Depth=2.72"
Flow Length=817' Tc=17.7 min CN=77 Runoff=15.07 cfs 52,591 cf**Pond 31: Pocket Wetland (SWP-1)**Peak Elev=237.57' Storage=45,458 cf Inflow=15.07 cfs 52,591 cf
Outflow=0.95 cfs 28,822 cf**Subcatchment32: Post A1**Runoff Area=20,740 sf 35.22% Impervious Runoff Depth=3.19"
Tc=6.0 min CN=82 Runoff=2.35 cfs 5,508 cf**Link 33: Design Point A**Inflow=111.80 cfs 631,628 cf
Primary=111.80 cfs 631,628 cf**Total Runoff Area = 3,526,804 sf Runoff Volume = 978,260 cf Average Runoff Depth = 3.33"**
61.01% Pervious = 2,151,703 sf 38.99% Impervious = 1,375,101 sf

N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 8: Post A0 Offsite

Runoff = 118.73 cfs @ 12.20 hrs, Volume= 370,955 cf, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
645,334	98	Paved parking, HSG C
443,611	80	>75% Grass cover, Good, HSG D
23,572	74	>75% Grass cover, Good, HSG C
2,543	61	>75% Grass cover, Good, HSG B
1,115,060	90	Weighted Average
469,726		42.13% Pervious Area
645,334		57.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.0150	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	148	0.0574	3.86		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	740	0.0270	10.25	32.22	Pipe Channel, 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.015 Concrete sewer w/manholes & inlets
12.5	1,018	Total			

N60 P1 Post-A 3-17-20

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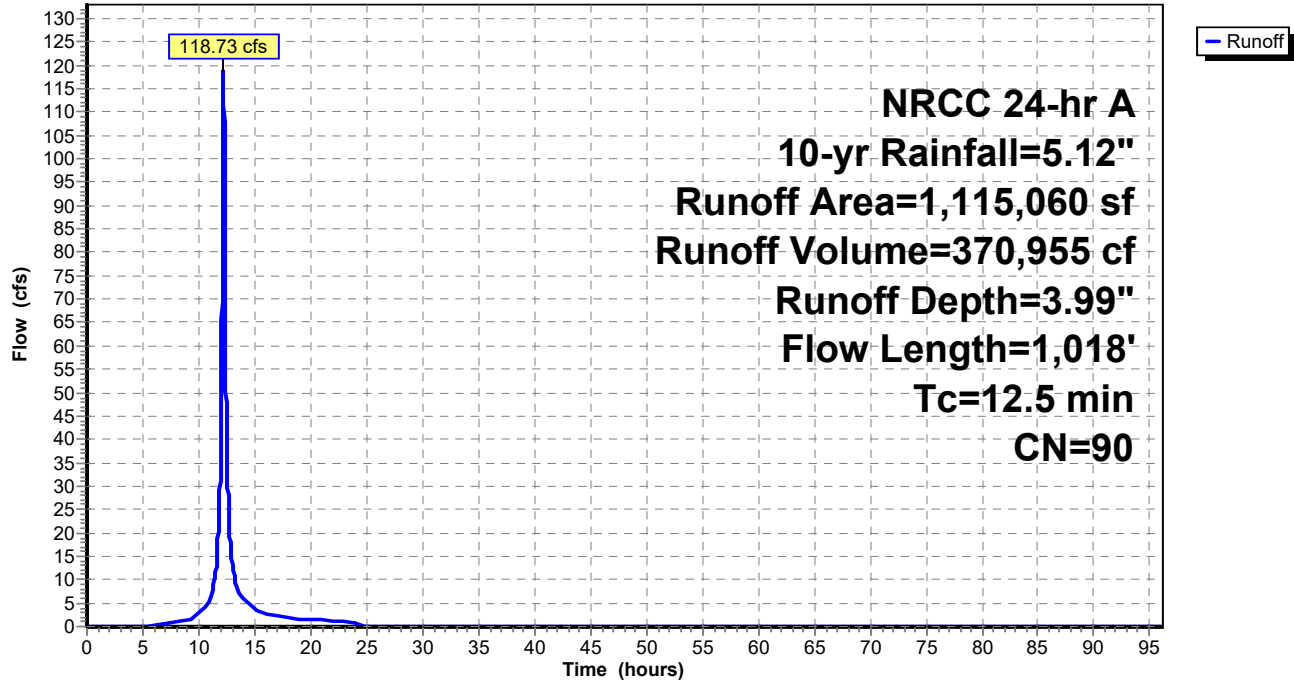
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Subcatchment 8: Post A0 Offsite

Hydrograph



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NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Pond 9: Offsite Pond A

Inflow Area = 1,115,060 sf, 57.87% Impervious, Inflow Depth = 3.99" for 10-yr event
 Inflow = 118.73 cfs @ 12.20 hrs, Volume= 370,955 cf
 Outflow = 51.70 cfs @ 12.41 hrs, Volume= 319,760 cf, Atten= 56%, Lag= 12.7 min
 Primary = 51.70 cfs @ 12.41 hrs, Volume= 319,760 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 363.03' @ 12.41 hrs Surf.Area= 26,608 sf Storage= 121,390 cf

Plug-Flow detention time= 99.2 min calculated for 319,726 cf (86% of inflow)
 Center-of-Mass det. time= 41.8 min (832.7 - 790.9)

Volume	Invert	Avail.Storage	Storage Description		
#1	357.00'	221,816 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
357.00	14,633	679.0	0	0	14,633
358.00	16,652	698.0	15,632	15,632	16,826
359.00	17,534	715.0	17,091	32,723	18,864
360.00	19,427	745.0	18,472	51,195	22,425
362.00	24,453	804.0	43,784	94,979	29,861
364.00	28,701	854.0	53,097	148,076	36,663
365.00	36,602	901.0	32,572	180,648	43,285
366.00	45,910	1,262.0	41,168	221,816	105,432

Device	Routing	Invert	Outlet Devices
#1	Primary	357.00'	30.0" Round Culvert L= 125.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 357.00' / 351.00' S= 0.0480 ' S= 0.0480 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#2	Device 1	360.00'	36.0" x 48.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#3	Primary	364.75'	150.0' long x 36.0' 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=51.70 cfs @ 12.41 hrs HW=363.03' TW=326.27' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 51.70 cfs @ 10.53 fps)
 2=Orifice/Grate (Passes 51.70 cfs of 201.30 cfs potential flow)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

N60 P1 Post-A 3-17-20

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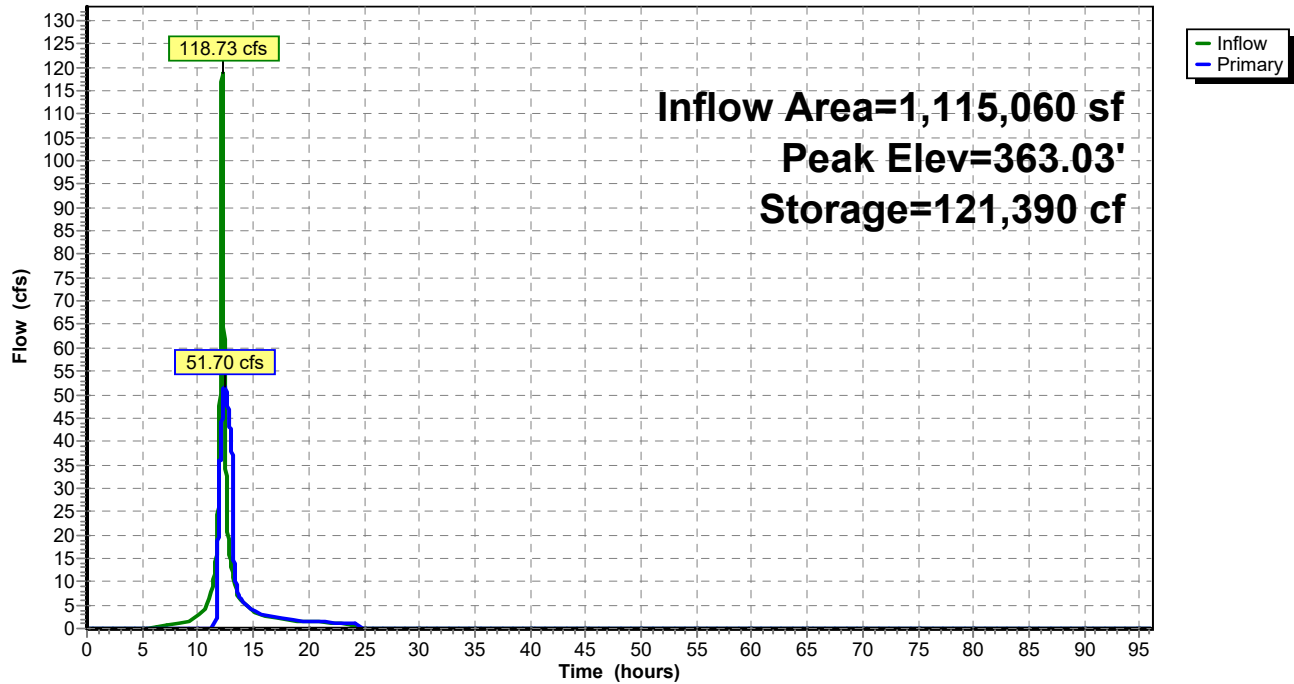
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NRCC 24-hr A 10-yr Rainfall=5.12"

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Pond 9: Offsite Pond A

Hydrograph



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NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 10: Post A4

Runoff = 9.63 cfs @ 12.30 hrs, Volume= 36,136 cf, Depth= 2.63"

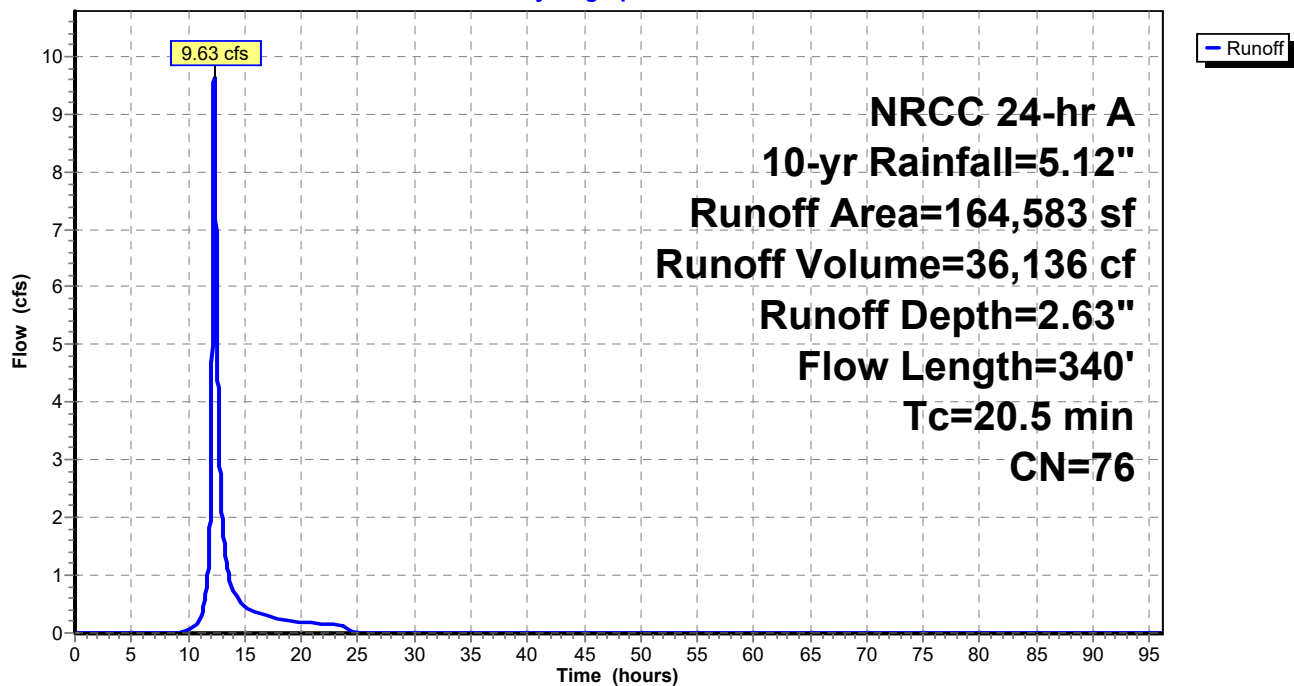
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
15,990	74	>75% Grass cover, Good, HSG C
65,271	70	Woods, Good, HSG C
66,457	77	Woods, Good, HSG D
16,865	98	Water Surface, HSG D
164,583	76	Weighted Average
147,718		89.75% Pervious Area
16,865		10.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.7	240	0.0208	2.32		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
20.5	340	Total			

Subcatchment 10: Post A4

Hydrograph



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NRCC 24-hr A 10-yr Rainfall=5.12"

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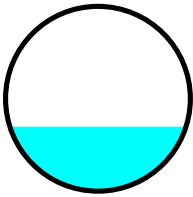
Summary for Reach 11: 24" Culvert Pipe

Inflow Area = 164,583 sf, 10.25% Impervious, Inflow Depth = 2.63" for 10-yr event
Inflow = 9.63 cfs @ 12.30 hrs, Volume= 36,136 cf
Outflow = 9.63 cfs @ 12.31 hrs, Volume= 36,136 cf, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.90 fps, Min. Travel Time= 0.2 min
Avg. Velocity= 3.58 fps, Avg. Travel Time= 0.5 min

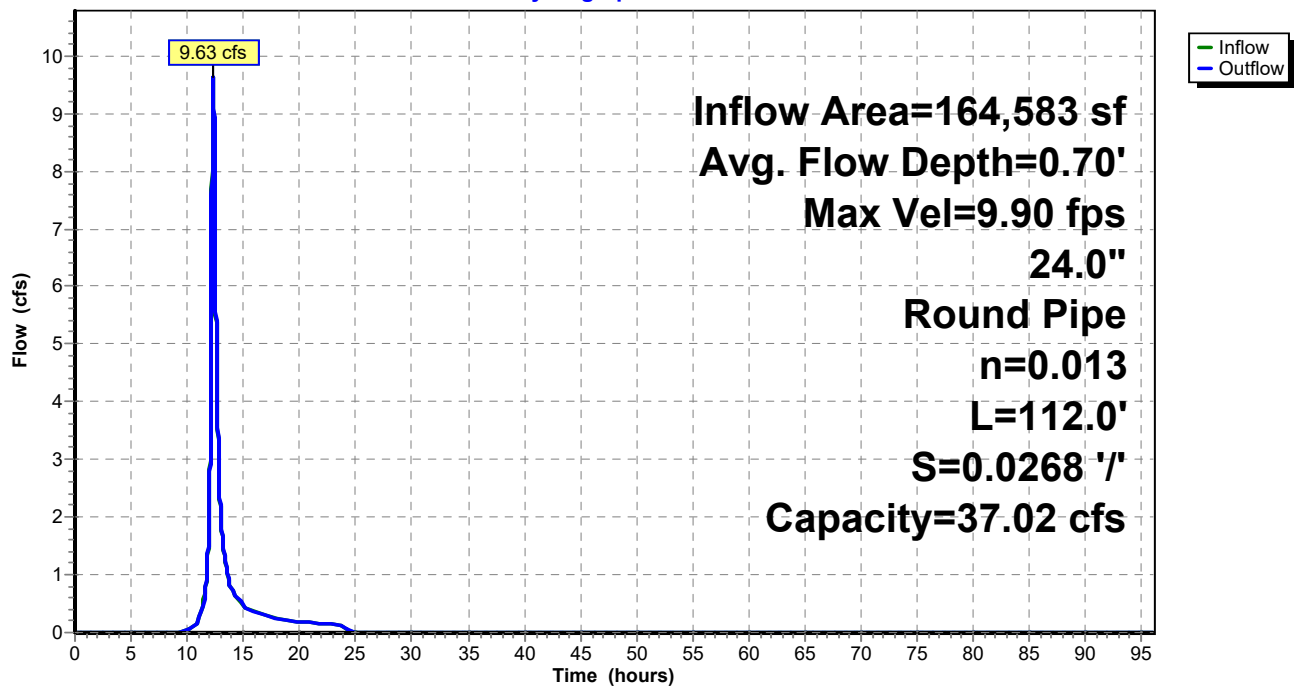
Peak Storage= 109 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.70'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 37.02 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 112.0' Slope= 0.0268 '/
Inlet Invert= 349.00', Outlet Invert= 346.00'



Reach 11: 24" Culvert Pipe

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 12: Post A8

Runoff = 20.71 cfs @ 12.32 hrs, Volume= 79,853 cf, Depth= 2.37"

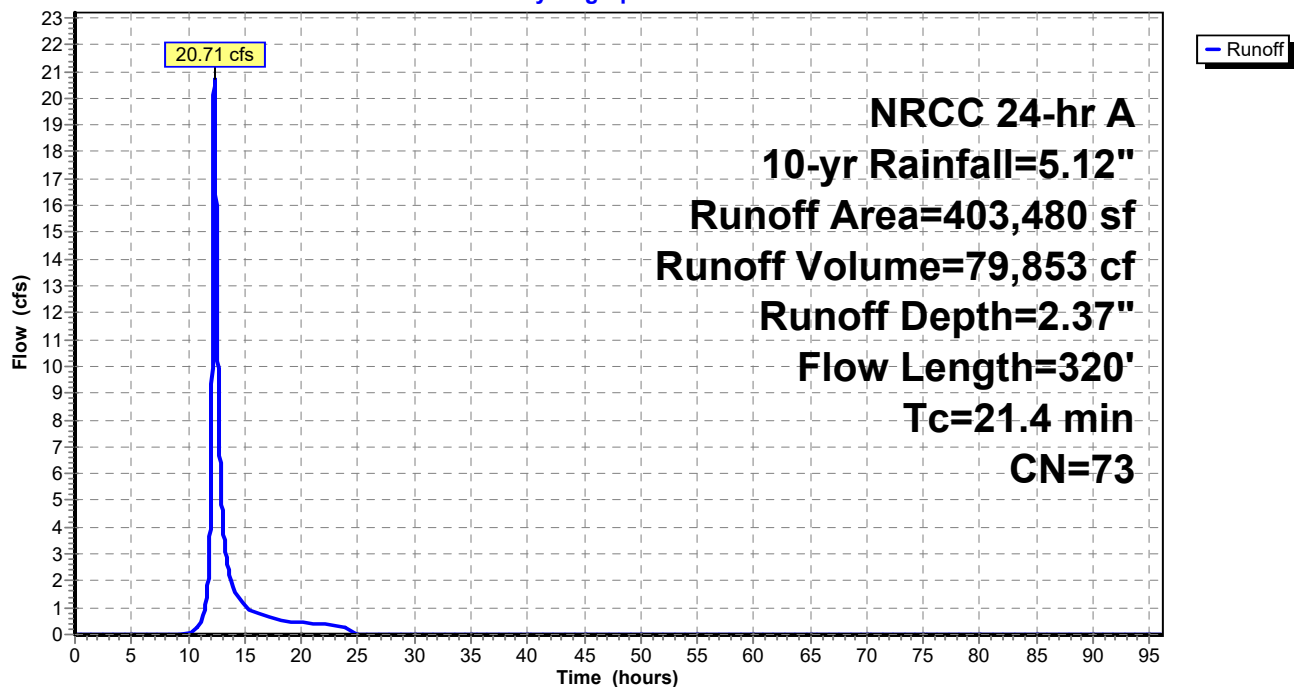
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
278,057	70	Woods, Good, HSG C
108,143	77	Woods, Good, HSG D
10,280	98	Paved parking, HSG D
6,532	74	>75% Grass cover, Good, HSG C
468	80	>75% Grass cover, Good, HSG D
403,480	73	Weighted Average
393,200		97.45% Pervious Area
10,280		2.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.9	220	0.0636	4.06		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
21.4	320	Total			

Subcatchment 12: Post A8

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Pond 12A: Existing Wetland A

Inflow Area = 1,683,123 sf, 39.95% Impervious, Inflow Depth = 3.11" for 10-yr event
 Inflow = 81.34 cfs @ 12.34 hrs, Volume= 435,748 cf
 Outflow = 68.17 cfs @ 12.56 hrs, Volume= 435,748 cf, Atten= 16%, Lag= 13.6 min
 Primary = 68.17 cfs @ 12.56 hrs, Volume= 435,748 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 326.51' @ 12.56 hrs Surf.Area= 13,438 sf Storage= 28,195 cf

Plug-Flow detention time= 3.8 min calculated for 435,748 cf (100% of inflow)
 Center-of-Mass det. time= 3.6 min (837.8 - 834.2)

Volume	Invert	Avail.Storage	Storage Description
#1	321.00'	190,307 cf	Custom Stage Data (Irregular) Listed below (Recalc)

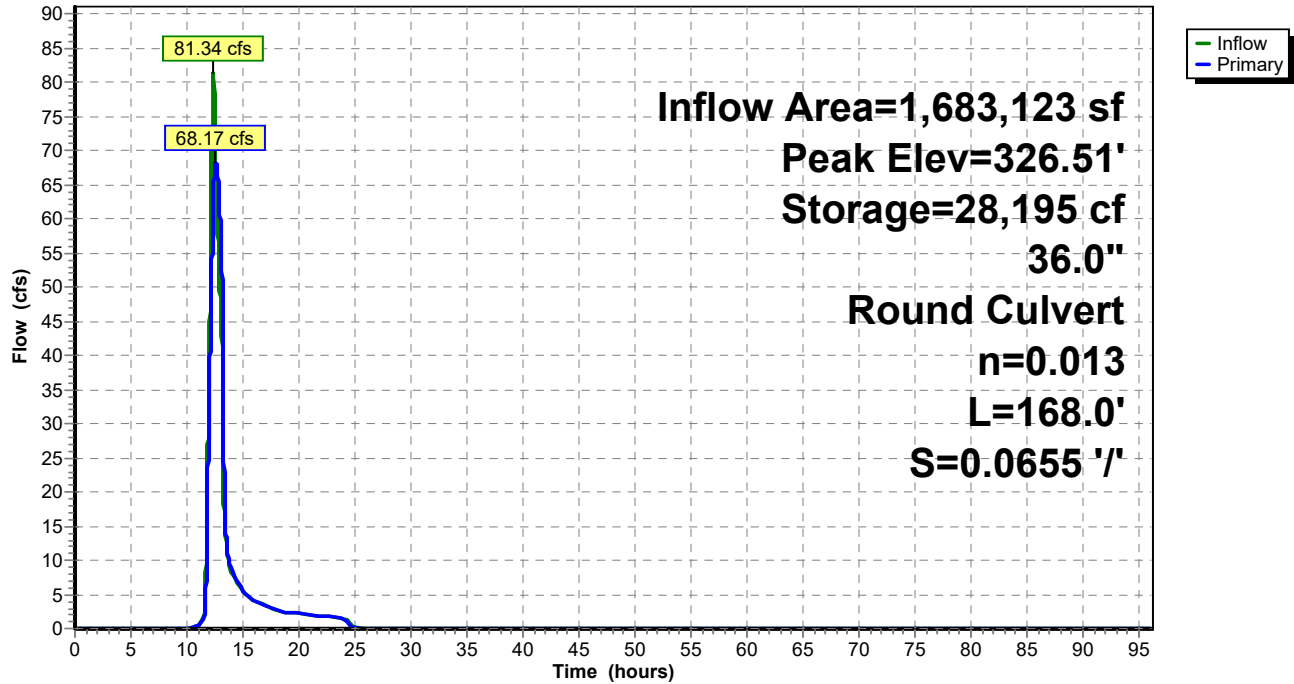
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
321.00	124	53.2	0	0	124
322.00	1,084	175.8	525	525	2,361
324.00	4,913	341.5	5,536	6,061	9,202
326.00	11,332	638.2	15,804	21,866	32,354
328.00	20,583	804.3	31,458	53,324	51,475
330.00	34,086	1,075.5	54,104	107,428	92,087
332.00	49,257	1,268.5	82,879	190,307	128,164

Device	Routing	Invert	Outlet Devices
#1	Primary	321.00'	36.0" Round Culvert L= 168.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 321.00' / 310.00' S= 0.0655 ' S Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=68.17 cfs @ 12.56 hrs HW=326.51' TW=313.38' (Dynamic Tailwater)
 ↑**1=Culvert** (Inlet Controls 68.17 cfs @ 9.64 fps)

Pond 12A: Existing Wetland A

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 12B: Post A11

Runoff = 34.41 cfs @ 12.30 hrs, Volume= 127,927 cf, Depth= 2.13"

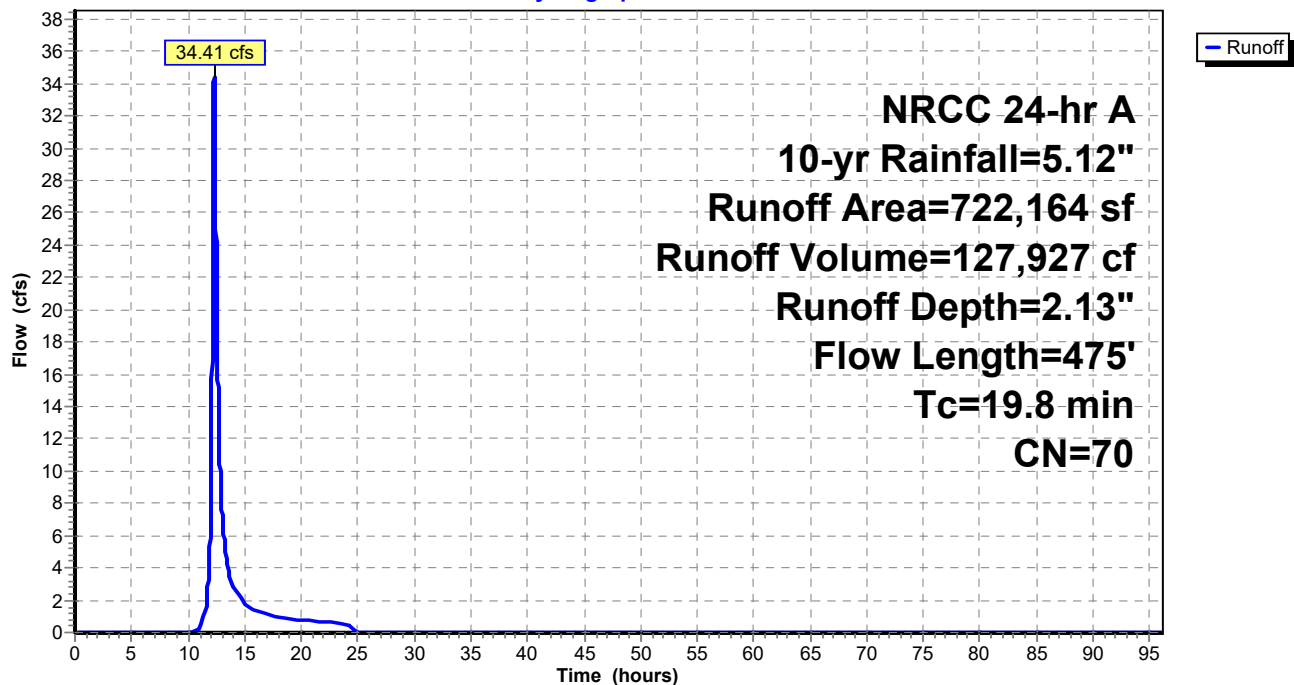
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
17,361	55	Woods, Good, HSG B
681,082	70	Woods, Good, HSG C
11,683	77	Woods, Good, HSG D
9,345	98	Paved parking, HSG C
2,693	74	>75% Grass cover, Good, HSG C
722,164	70	Weighted Average
712,819		98.71% Pervious Area
9,345		1.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.0	375	0.1400	6.02		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
19.8	475	Total			

Subcatchment 12B: Post A11

Hydrograph



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NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Reach 13: Existing Stream A

Inflow Area = 2,405,287 sf, 28.35% Impervious, Inflow Depth = 2.81" for 10-yr event
Inflow = 96.54 cfs @ 12.35 hrs, Volume= 563,676 cf
Outflow = 96.02 cfs @ 12.38 hrs, Volume= 563,676 cf, Atten= 1%, Lag= 2.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.65 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 2.53 fps, Avg. Travel Time= 9.0 min

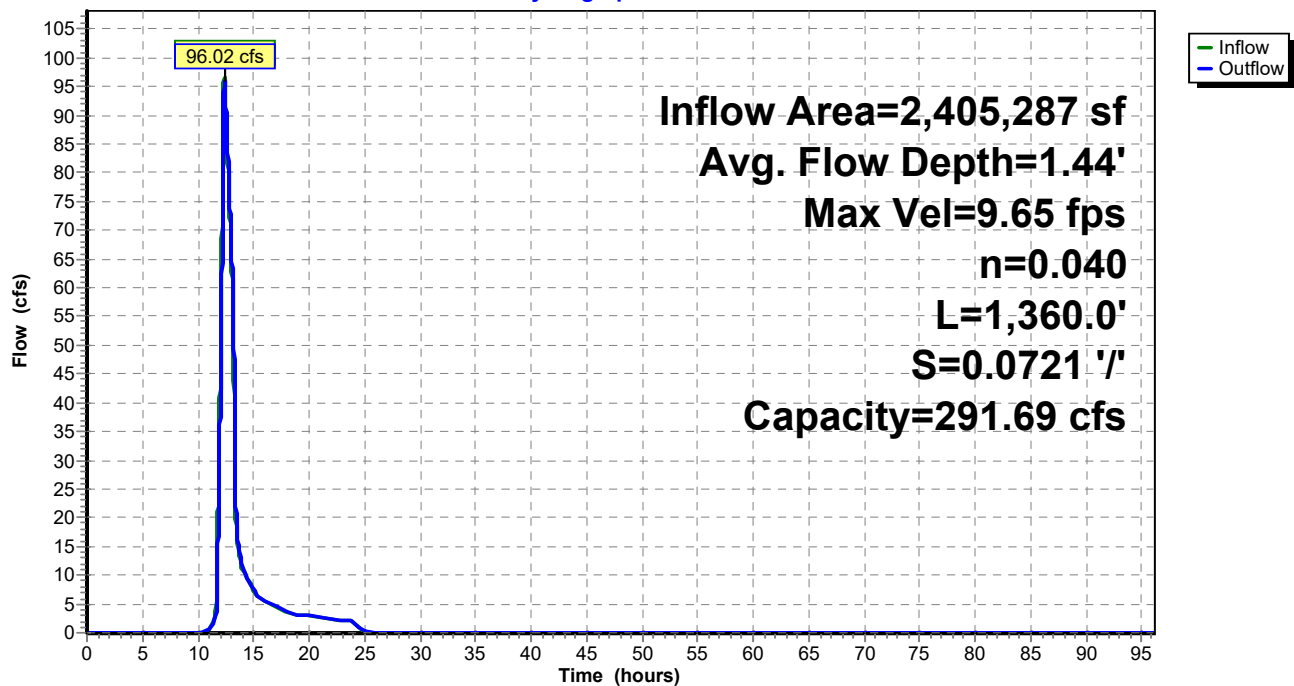
Peak Storage= 13,536 cf @ 12.38 hrs
Average Depth at Peak Storage= 1.44'
Bank-Full Depth= 2.50' Flow Area= 22.5 sf, Capacity= 291.69 cfs

4.00' x 2.50' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 1,360.0' Slope= 0.0721 '/'
Inlet Invert= 312.00', Outlet Invert= 214.00'



Reach 13: Existing Stream A

Hydrograph



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NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 14: Post A3

Runoff = 15.43 cfs @ 12.13 hrs, Volume= 40,232 cf, Depth= 4.54"

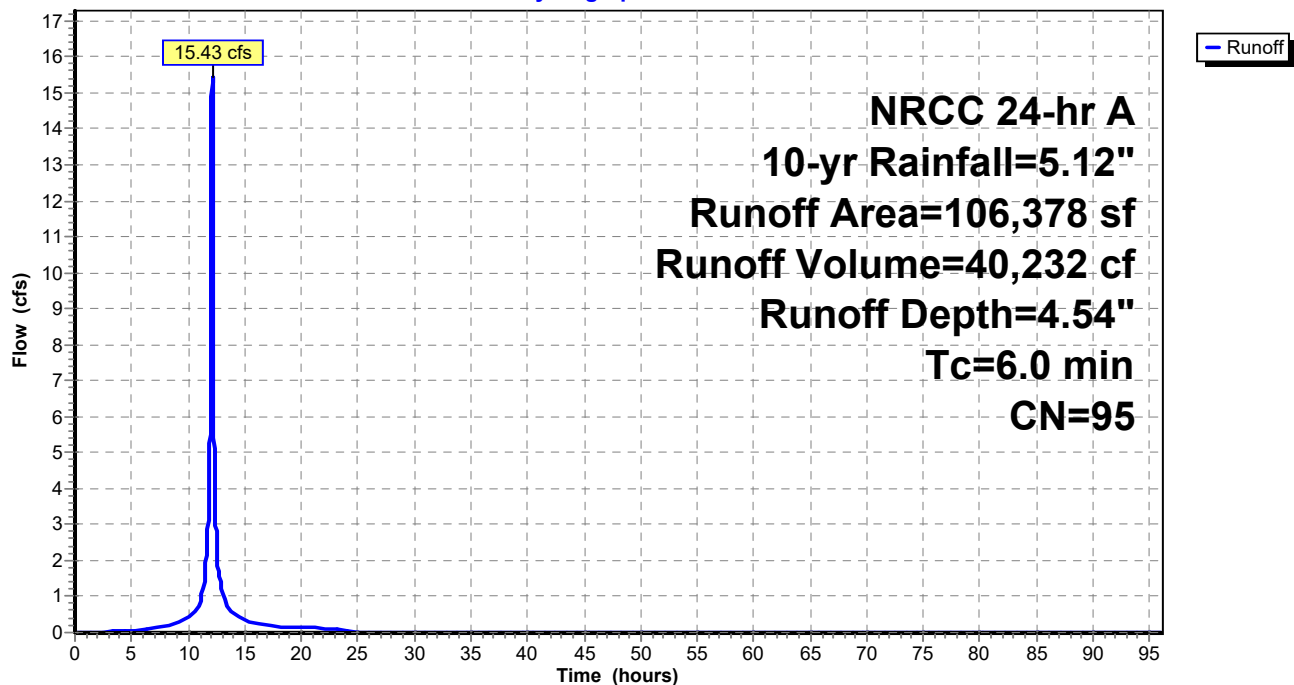
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
91,392	98	Paved parking, HSG C
14,986	74	>75% Grass cover, Good, HSG C
106,378	95	Weighted Average
14,986		14.09% Pervious Area
91,392		85.91% Impervious Area

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

Subcatchment 14: Post A3

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Pond 15: DIV-1

Inflow Area = 106,378 sf, 85.91% Impervious, Inflow Depth = 4.54" for 10-yr event
 Inflow = 15.43 cfs @ 12.13 hrs, Volume= 40,232 cf
 Outflow = 15.43 cfs @ 12.13 hrs, Volume= 40,232 cf, Atten= 0%, Lag= 0.0 min
 Primary = 5.30 cfs @ 11.94 hrs, Volume= 32,199 cf
 Secondary = 10.53 cfs @ 12.13 hrs, Volume= 8,033 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 327.57' @ 12.13 hrs

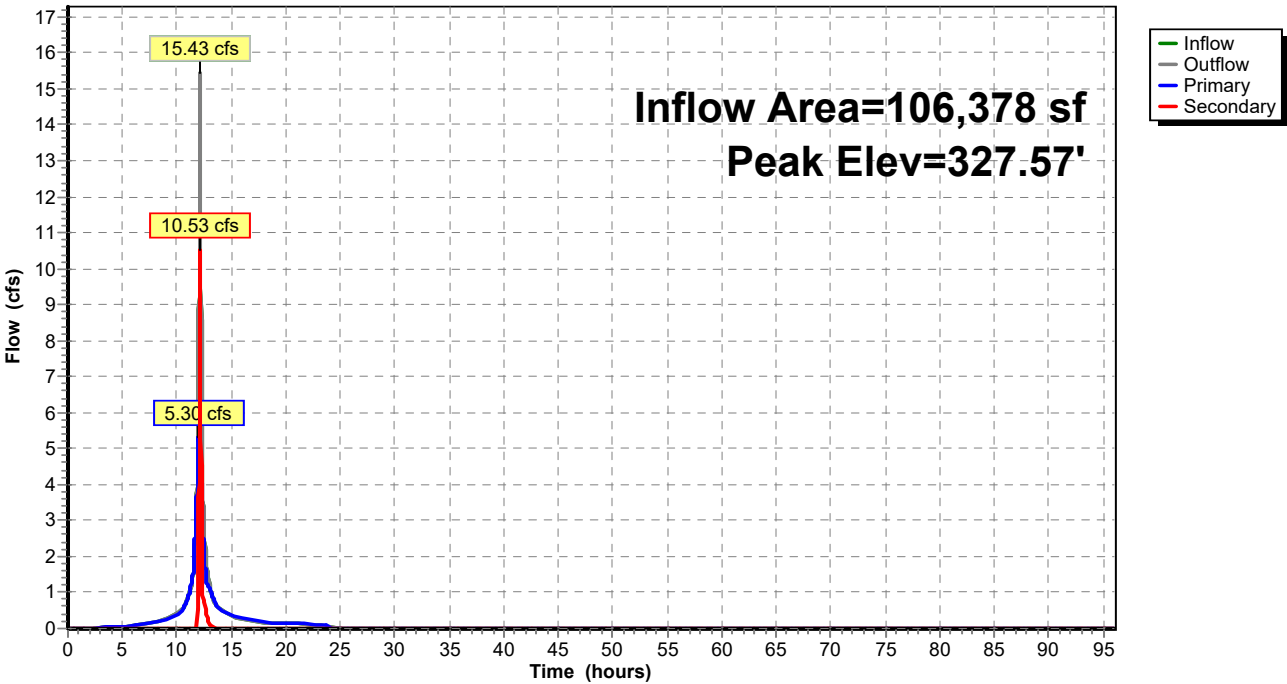
Flood Elev= 330.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 324.50' / 324.50' S= 0.0000 ' S= 0.0000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	324.50'	24.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 324.50' / 320.00' S= 0.0900 ' S= 0.0900 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	327.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.24 cfs @ 11.94 hrs HW=327.04' TW=325.12' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 5.24 cfs @ 6.68 fps)**Secondary OutFlow** Max=10.52 cfs @ 12.13 hrs HW=327.57' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 10.52 cfs of 21.76 cfs potential flow)↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 10.52 cfs @ 2.31 fps)

Pond 15: DIV-1

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Pond 16: INF-1

Inflow Area = 106,378 sf, 85.91% Impervious, Inflow Depth = 3.63" for 10-yr event
 Inflow = 5.30 cfs @ 11.94 hrs, Volume= 32,199 cf
 Outflow = 1.18 cfs @ 11.41 hrs, Volume= 32,199 cf, Atten= 78%, Lag= 0.0 min
 Discarded = 1.18 cfs @ 11.41 hrs, Volume= 32,199 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 326.96' @ 12.83 hrs Surf.Area= 4,245 sf Storage= 8,756 cf

Plug-Flow detention time= 47.8 min calculated for 32,196 cf (100% of inflow)
 Center-of-Mass det. time= 47.8 min (821.4 - 773.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	324.00'	4,688 cf	36.75'W x 115.50'L x 4.33'H Field A 18,393 cf Overall - 6,674 cf Embedded = 11,720 cf x 40.0% Voids
#2A	324.50'	6,674 cf	Cultec R-360HD x 180 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 180 Chambers in 6 Rows Cap Storage= +6.5 cf x 2 x 6 rows = 77.5 cf
		11,361 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	324.00'	12.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=1.18 cfs @ 11.41 hrs HW=324.05' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 1.18 cfs)

N60 P1 Post-A 3-17-20

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Pond 16: INF-1 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 6 rows = 77.5 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

30 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 112.50' Row Length +18.0" End Stone x 2 = 115.50' Base Length

6 Rows x 60.0" Wide + 9.0" Spacing x 5 + 18.0" Side Stone x 2 = 36.75' Base Width

6.0" Base + 36.0" Chamber Height + 10.0" Cover = 4.33' Field Height

180 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 6 Rows = 6,673.6 cf Chamber Storage

18,393.4 cf Field - 6,673.6 cf Chambers = 11,719.8 cf Stone x 40.0% Voids = 4,687.9 cf Stone Storage

Chamber Storage + Stone Storage = 11,361.5 cf = 0.261 af

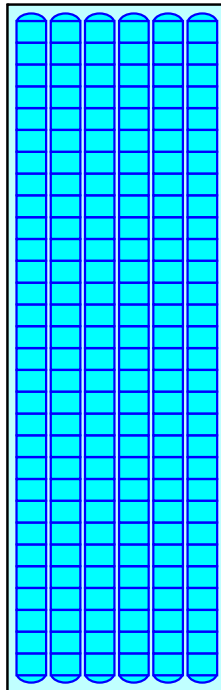
Overall Storage Efficiency = 61.8%

Overall System Size = 115.50' x 36.75' x 4.33'

180 Chambers

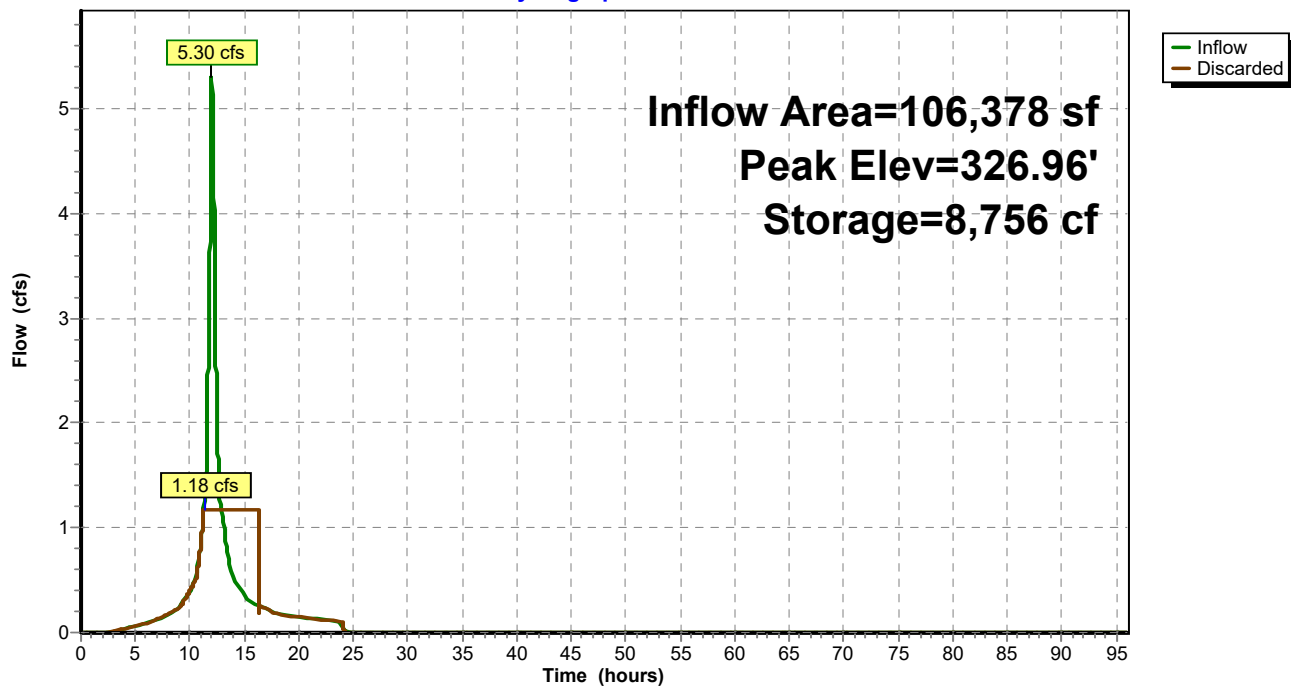
681.2 cy Field

434.1 cy Stone



Pond 16: INF-1

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 17: Post A5

Runoff = 13.81 cfs @ 12.13 hrs, Volume= 37,813 cf, Depth= 4.88"

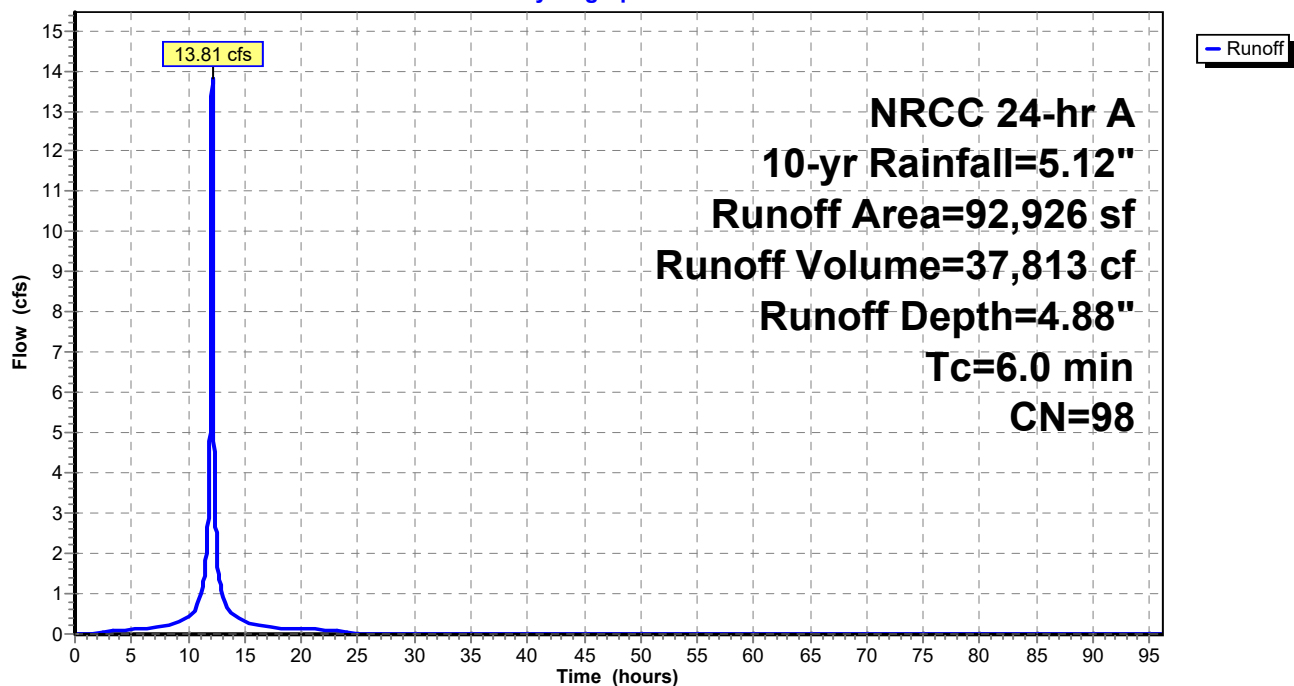
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
92,926	98	Roofs, HSG C
92,926		100.00% Impervious Area

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

Subcatchment 17: Post A5

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Pond 18: DIV-2

Inflow Area = 92,926 sf, 100.00% Impervious, Inflow Depth = 4.88" for 10-yr event
 Inflow = 13.81 cfs @ 12.13 hrs, Volume= 37,813 cf
 Outflow = 13.81 cfs @ 12.13 hrs, Volume= 37,813 cf, Atten= 0%, Lag= 0.0 min
 Primary = 5.81 cfs @ 11.97 hrs, Volume= 32,380 cf
 Secondary = 8.44 cfs @ 12.13 hrs, Volume= 5,433 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 368.50' @ 12.13 hrs

Flood Elev= 371.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	365.00'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 365.00' / 365.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	366.50'	24.0" Round Culvert L= 550.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 366.50' / 355.00' S= 0.0209 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	368.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.75 cfs @ 11.97 hrs HW=368.06' TW=365.75' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 5.75 cfs @ 7.31 fps)**Secondary OutFlow** Max=8.43 cfs @ 12.13 hrs HW=368.50' TW=355.39' (Dynamic Tailwater)↑ **2=Culvert** (Passes 8.43 cfs of 15.12 cfs potential flow)↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 8.43 cfs @ 2.12 fps)

N60 P1 Post-A 3-17-20

Prepared by {enter your company name here}

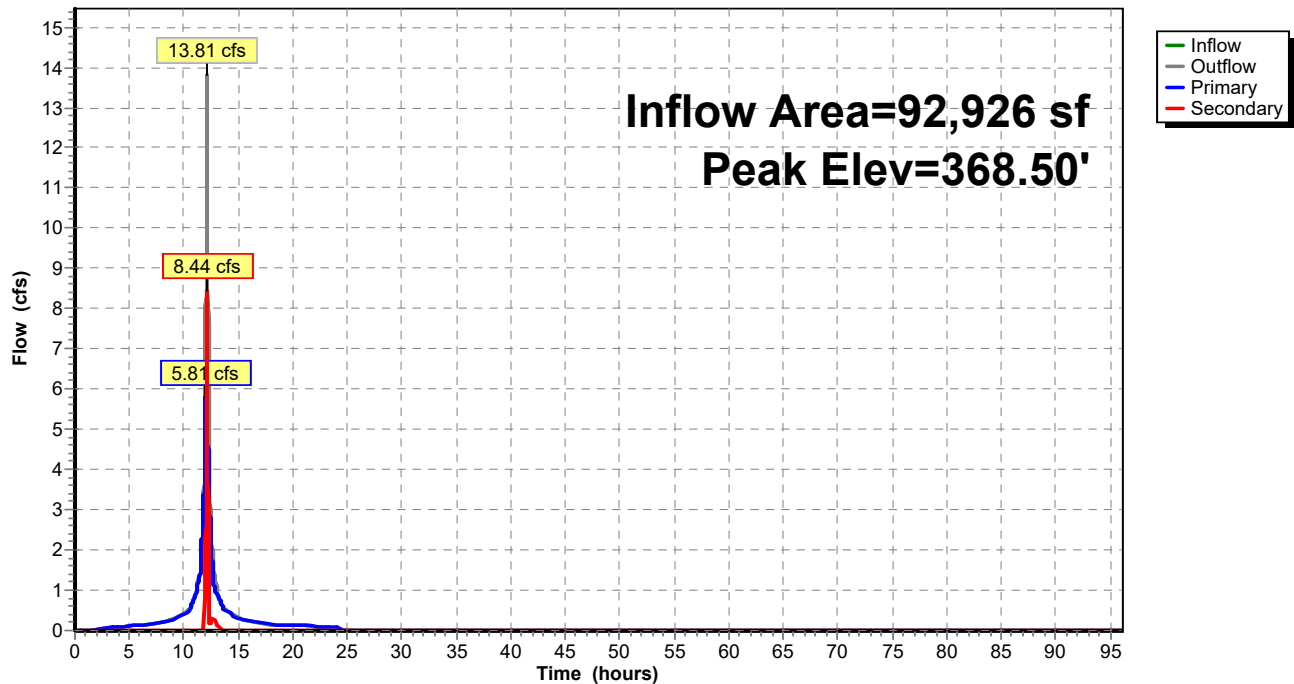
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NRCC 24-hr A 10-yr Rainfall=5.12"

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Pond 18: DIV-2

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Pond 19: INF-2

Inflow Area = 92,926 sf, 100.00% Impervious, Inflow Depth = 4.18" for 10-yr event
 Inflow = 5.81 cfs @ 11.97 hrs, Volume= 32,380 cf
 Outflow = 0.99 cfs @ 11.32 hrs, Volume= 32,380 cf, Atten= 83%, Lag= 0.0 min
 Discarded = 0.99 cfs @ 11.32 hrs, Volume= 32,380 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 367.98' @ 12.86 hrs Surf.Area= 4,295 sf Storage= 10,191 cf

Plug-Flow detention time= 66.2 min calculated for 32,376 cf (100% of inflow)
 Center-of-Mass det. time= 66.2 min (815.8 - 749.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	364.50'	4,639 cf	41.50'W x 103.50'L x 4.33'H Field A 18,613 cf Overall - 7,016 cf Embedded = 11,596 cf x 40.0% Voids
#2A	365.00'	7,016 cf	Cultec R-360HD x 189 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 189 Chambers in 7 Rows Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf
		11,655 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	364.50'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=0.99 cfs @ 11.32 hrs HW=364.55' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.99 cfs)

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 10-yr Rainfall=5.12"

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Pond 19: INF-2 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

27 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 101.50' Row Length +12.0" End Stone x 2 = 103.50' Base Length

7 Rows x 60.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 41.50' Base Width

6.0" Base + 36.0" Chamber Height + 10.0" Cover = 4.33' Field Height

189 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 7 Rows = 7,016.3 cf Chamber Storage

18,612.7 cf Field - 7,016.3 cf Chambers = 11,596.5 cf Stone x 40.0% Voids = 4,638.6 cf Stone Storage

Chamber Storage + Stone Storage = 11,654.9 cf = 0.268 af

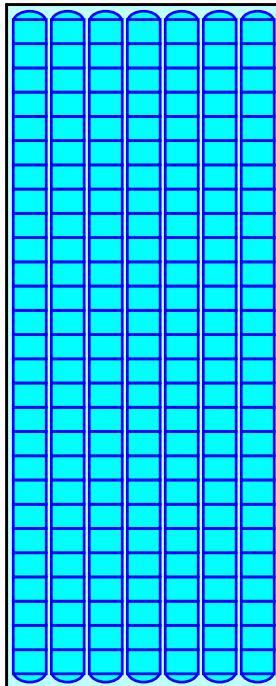
Overall Storage Efficiency = 62.6%

Overall System Size = 103.50' x 41.50' x 4.33'

189 Chambers

689.4 cy Field

429.5 cy Stone



N60 P1 Post-A 3-17-20

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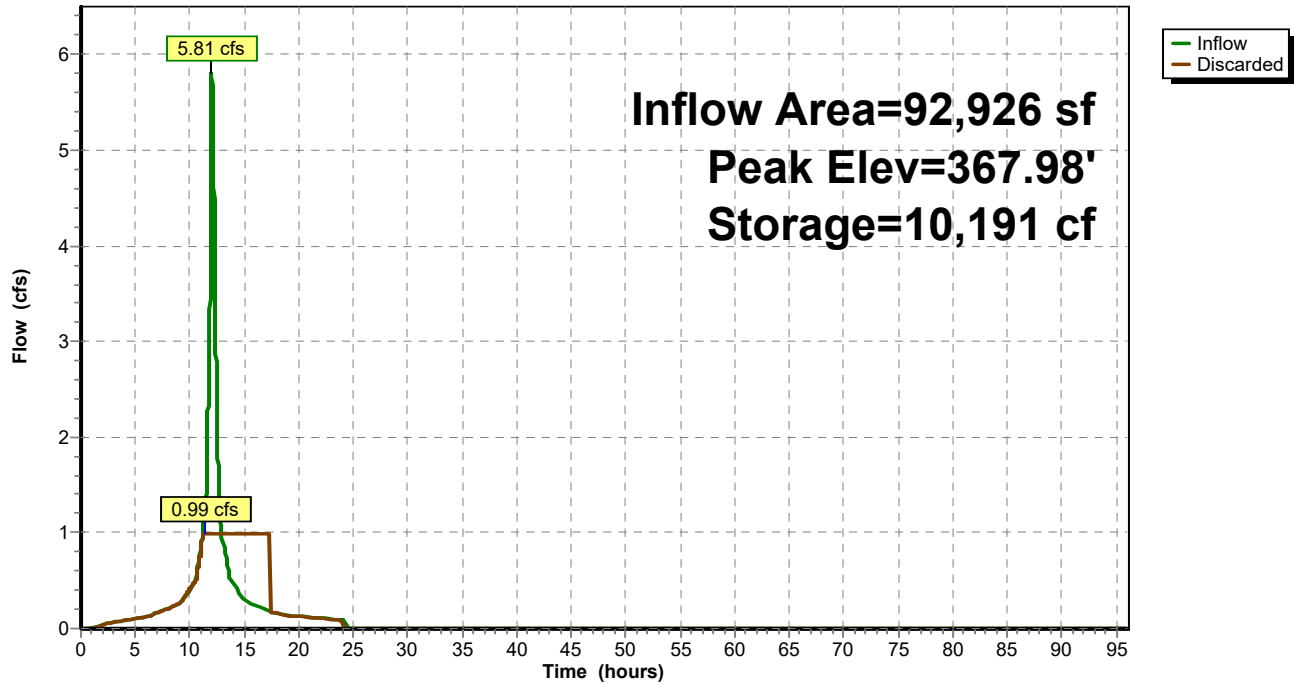
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NRCC 24-hr A 10-yr Rainfall=5.12"

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Pond 19: INF-2

Hydrograph



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NRCC 24-hr A 10-yr Rainfall=5.12"

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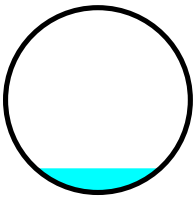
Summary for Reach 20: 36" HDPE Pipe

Inflow = 8.44 cfs @ 12.13 hrs, Volume= 5,433 cf
Outflow = 8.31 cfs @ 12.14 hrs, Volume= 5,433 cf, Atten= 2%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 15.46 fps, Min. Travel Time= 0.9 min
Avg. Velocity= 6.06 fps, Avg. Travel Time= 2.2 min

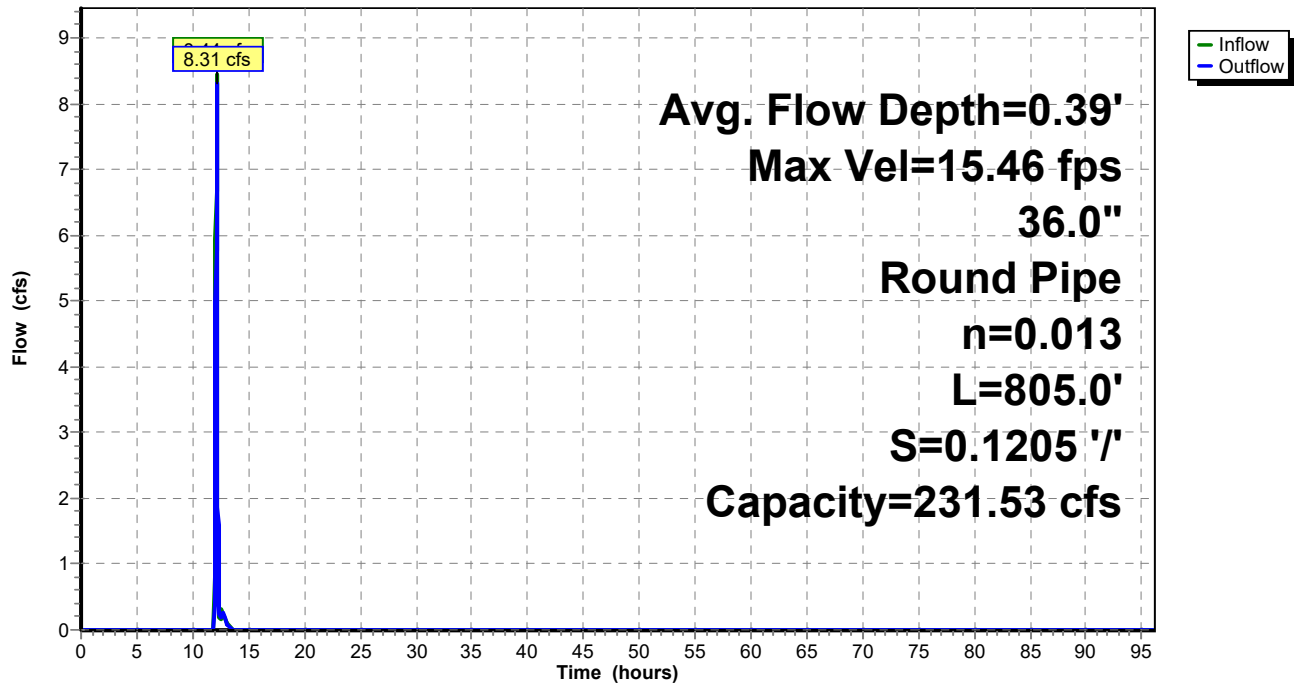
Peak Storage= 432 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 231.53 cfs

36.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 805.0' Slope= 0.1205 '/'
Inlet Invert= 355.00', Outlet Invert= 258.00'



Reach 20: 36" HDPE Pipe

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 21: A6

Runoff = 56.35 cfs @ 12.13 hrs, Volume= 149,125 cf, Depth= 4.65"

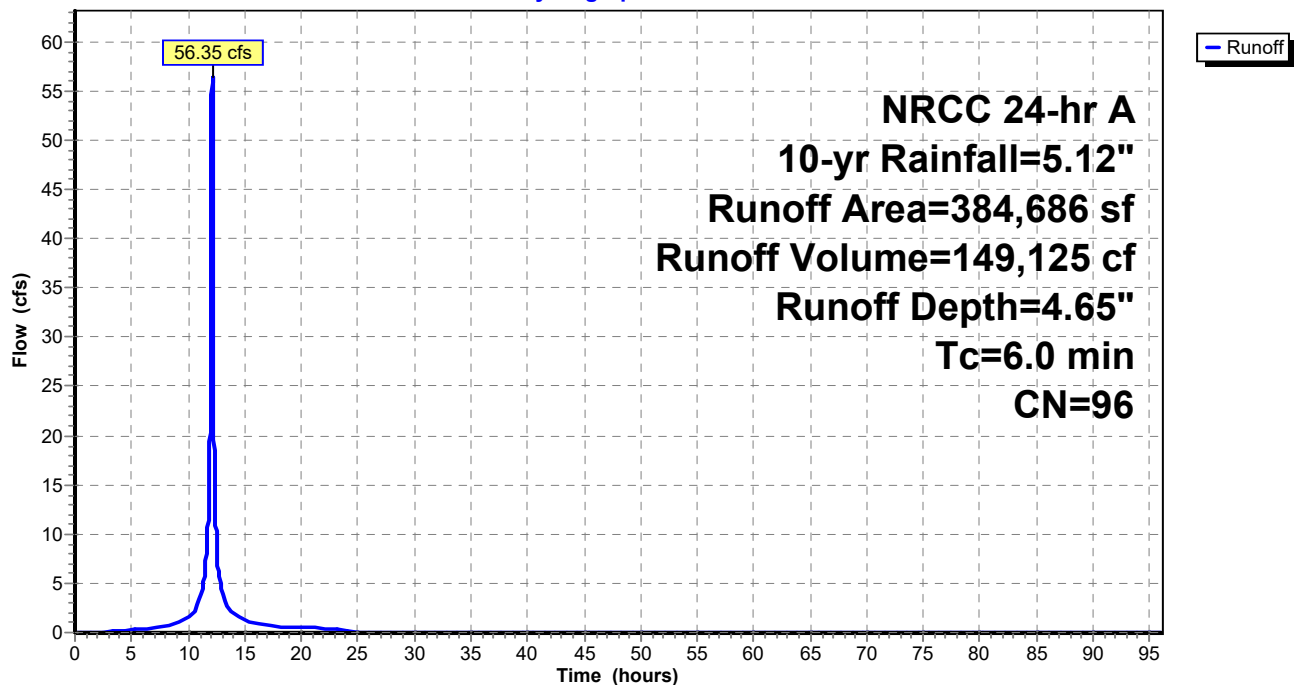
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
332,512	98	Paved parking, HSG C
52,174	86	<50% Grass cover, Poor, HSG C
384,686	96	Weighted Average
52,174		13.56% Pervious Area
332,512		86.44% Impervious Area

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

Subcatchment 21: A6

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 22: A7

Runoff = 7.34 cfs @ 12.14 hrs, Volume= 16,989 cf, Depth= 1.97"

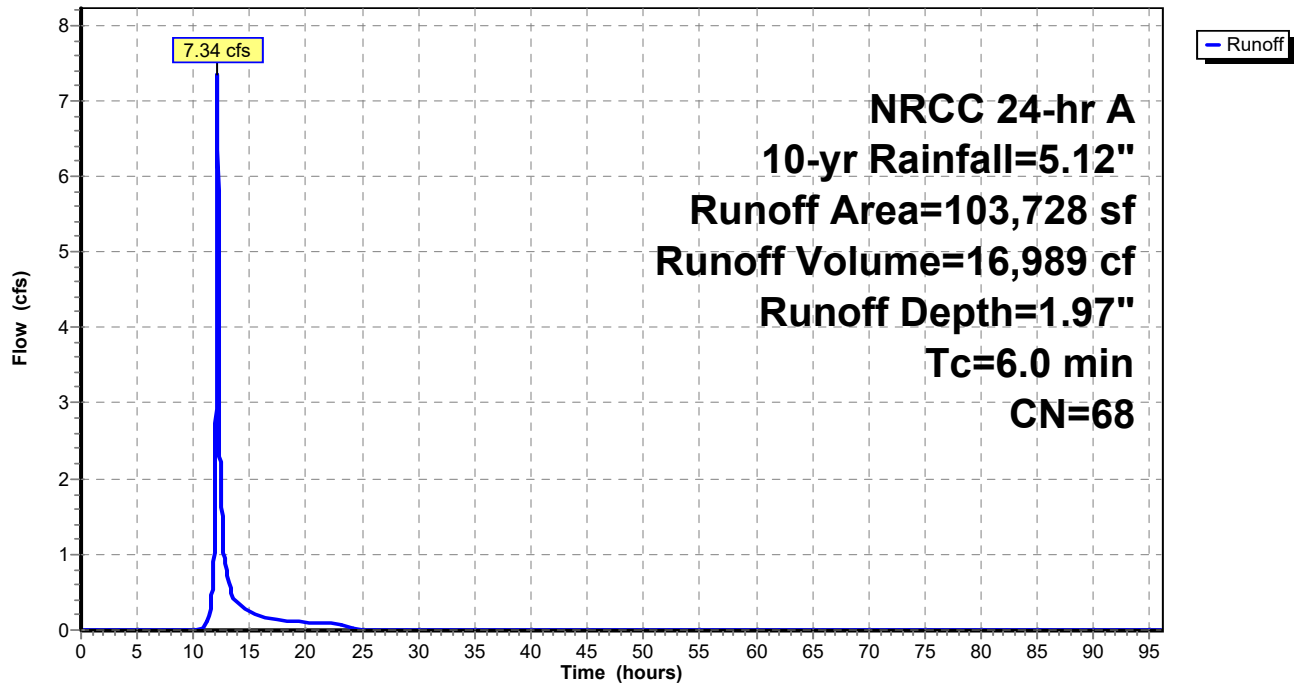
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
35,128	65	Brush, Good, HSG C
68,600	70	Woods, Good, HSG C
103,728	68	Weighted Average
103,728		100.00% Pervious Area

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

Subcatchment 22: A7

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Pond 23: Infiltration Basin (SWP-3)

Inflow Area = 488,414 sf, 68.08% Impervious, Inflow Depth = 4.21" for 10-yr event
 Inflow = 71.83 cfs @ 12.13 hrs, Volume= 171,547 cf
 Outflow = 20.62 cfs @ 12.31 hrs, Volume= 171,547 cf, Atten= 71%, Lag= 10.6 min
 Discarded = 6.00 cfs @ 12.31 hrs, Volume= 147,546 cf
 Primary = 14.62 cfs @ 12.31 hrs, Volume= 24,002 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 260.58' @ 12.31 hrs Surf.Area= 17,289 sf Storage= 60,792 cf

Plug-Flow detention time= 66.3 min calculated for 171,529 cf (100% of inflow)
 Center-of-Mass det. time= 66.3 min (833.2 - 766.9)

Volume	Invert	Avail.Storage	Storage Description		
#1	256.00'	87,144 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
256.00	9,450	527.9	0	0	9,450
258.00	12,731	565.7	22,100	22,100	12,917
260.00	16,238	603.5	28,898	50,998	16,623
262.00	19,973	641.3	36,147	87,144	20,569

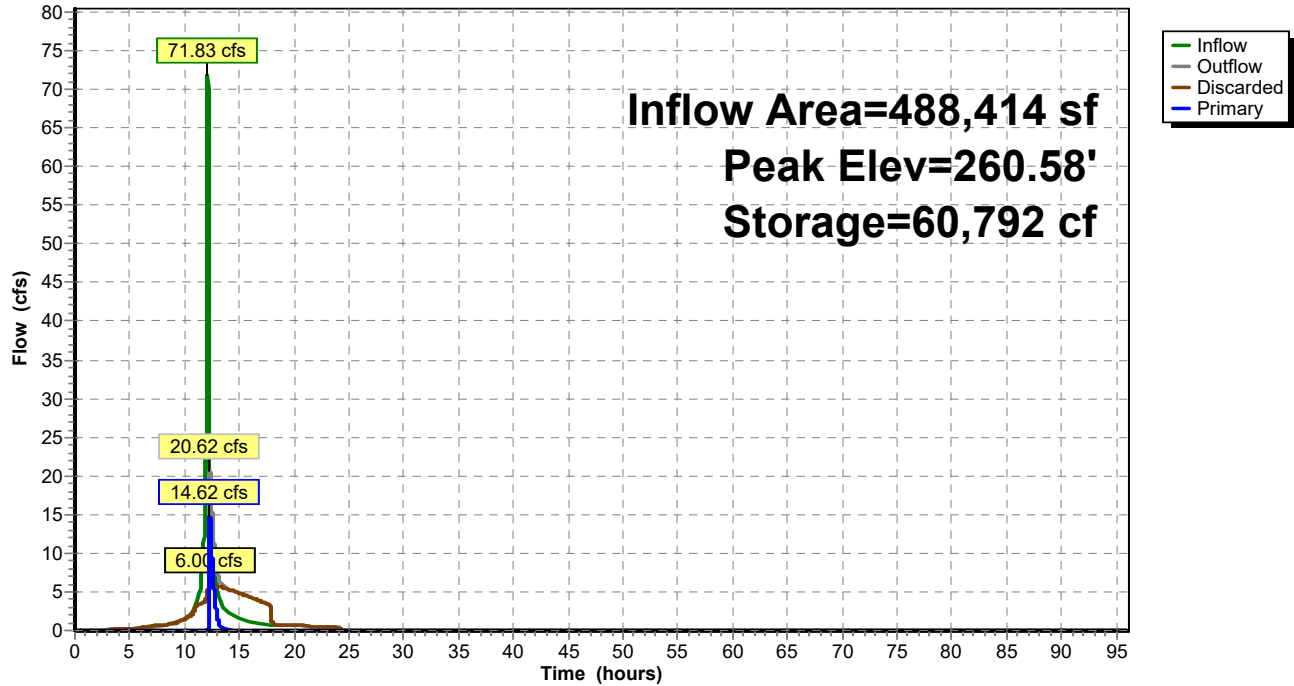
Device	Routing	Invert	Outlet Devices
#1	Primary	254.00'	36.0" Round Culvert X 2.00 L= 95.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 254.00' / 244.00' S= 0.1053 ' S= 0.1053 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	260.00'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	260.00'	3.0' long x 0.5' breadth Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	259.40'	6.0" Vert. Orifice/Grate C= 0.600
#5	Device 1	261.00'	36.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Discarded	256.00'	15.000 in/hr Exfiltration over Surface area Phase-In= 0.10'

Discarded OutFlow Max=6.00 cfs @ 12.31 hrs HW=260.58' (Free Discharge)
 ↳ **6=Exfiltration** (Exfiltration Controls 6.00 cfs)

Primary OutFlow Max=14.61 cfs @ 12.31 hrs HW=260.58' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Passes 14.61 cfs of 153.49 cfs potential flow)
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 5.48 cfs @ 2.34 fps)
 ↳ **3=Broad-Crested Rectangular Weir** (Weir Controls 8.22 cfs @ 2.34 fps)
 ↳ **4=Orifice/Grate** (Orifice Controls 0.91 cfs @ 4.65 fps)
 ↳ **5=Orifice/Grate** (Controls 0.00 cfs)

Pond 23: Infiltration Basin (SWP-3)

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 24: A9

Runoff = 4.91 cfs @ 12.13 hrs, Volume= 12,793 cf, Depth= 4.54"

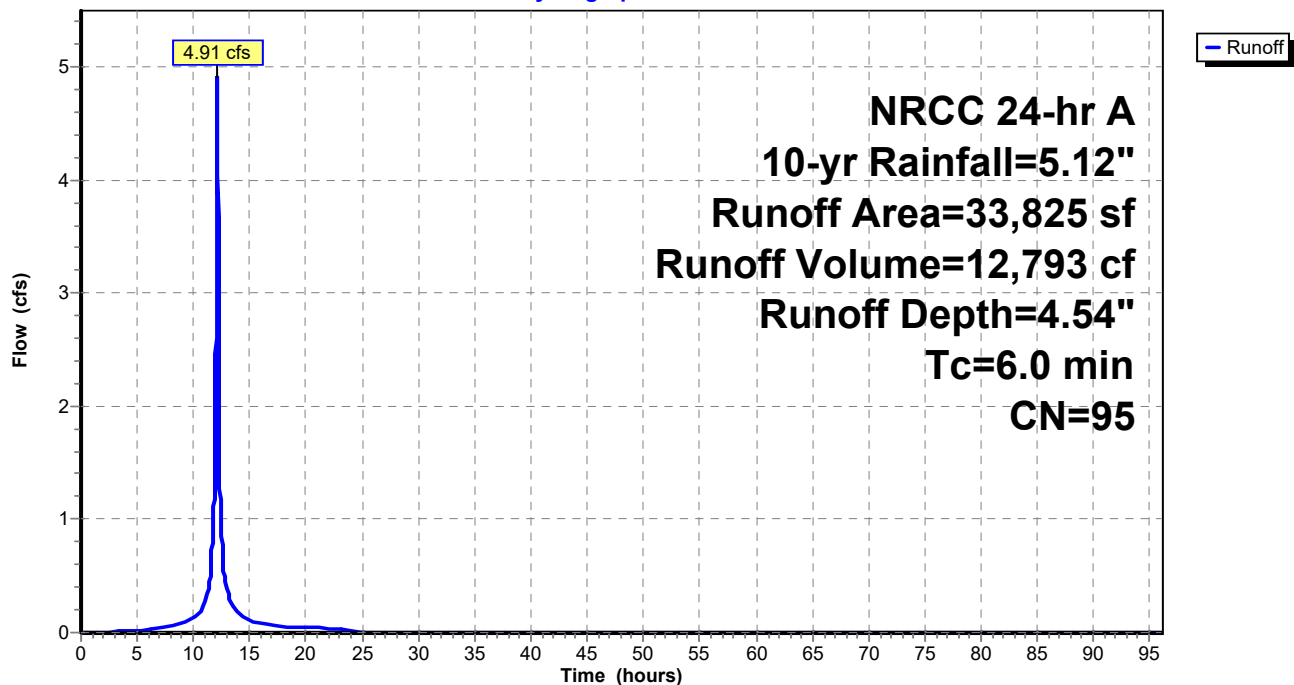
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
29,687	98	Paved parking, HSG C
4,138	74	>75% Grass cover, Good, HSG C
33,825	95	Weighted Average
4,138		12.23% Pervious Area
29,687		87.77% Impervious Area

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

Subcatchment 24: A9

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Pond 25: DIV-4

Inflow Area = 33,825 sf, 87.77% Impervious, Inflow Depth = 4.54" for 10-yr event
 Inflow = 4.91 cfs @ 12.13 hrs, Volume= 12,793 cf
 Outflow = 4.91 cfs @ 12.13 hrs, Volume= 12,793 cf, Atten= 0%, Lag= 0.0 min
 Primary = 4.91 cfs @ 12.13 hrs, Volume= 12,793 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 352.26' @ 12.14 hrs

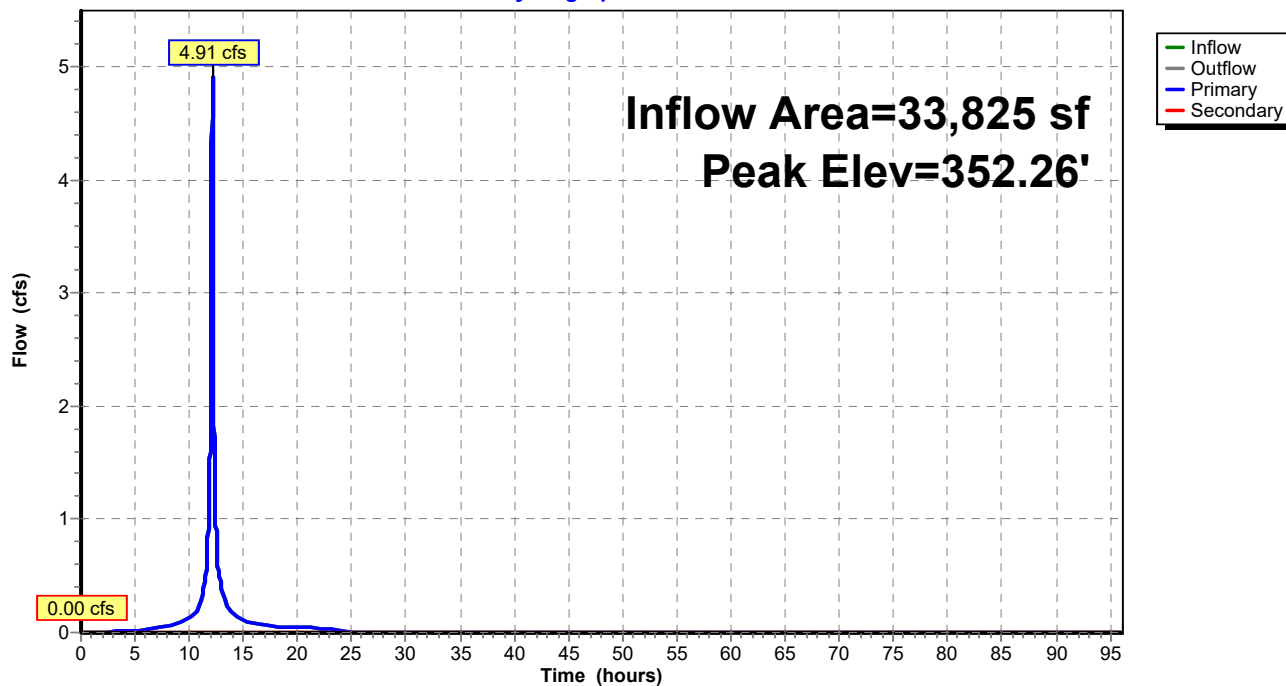
Flood Elev= 355.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	349.50'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 349.50' / 349.50' S= 0.0000 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	349.50'	18.0" Round Culvert L= 128.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 349.50' / 344.00' S= 0.0430 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	352.50'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.77 cfs @ 12.13 hrs HW=352.20' TW=350.61' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 4.77 cfs @ 6.08 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=349.50' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Controls 0.00 cfs)↑ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 25: DIV-4

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Pond 26: INF-4

Inflow Area = 33,825 sf, 87.77% Impervious, Inflow Depth = 4.54" for 10-yr event
 Inflow = 4.91 cfs @ 12.13 hrs, Volume= 12,793 cf
 Outflow = 0.52 cfs @ 11.62 hrs, Volume= 12,793 cf, Atten= 89%, Lag= 0.0 min
 Discarded = 0.52 cfs @ 11.62 hrs, Volume= 12,793 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 351.97' @ 12.71 hrs Surf.Area= 2,242 sf Storage= 4,576 cf

Plug-Flow detention time= 58.4 min calculated for 12,791 cf (100% of inflow)
 Center-of-Mass det. time= 58.4 min (823.7 - 765.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	349.00'	2,196 cf	30.50'W x 73.50'L x 3.88'H Field A 8,687 cf Overall - 3,196 cf Embedded = 5,490 cf x 40.0% Voids
#2A	349.50'	3,196 cf	Cultec R-330XLHD x 60 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
		5,393 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	349.00'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=0.52 cfs @ 11.62 hrs HW=349.05' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.52 cfs)

N60 P1 Post-A 3-17-20

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Pond 26: INF-4 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

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

10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length

6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width

6.0" Base + 30.5" Chamber Height + 10.0" Cover = 3.88' Field Height

60 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 3,196.5 cf Chamber Storage

8,686.8 cf Field - 3,196.5 cf Chambers = 5,490.3 cf Stone x 40.0% Voids = 2,196.1 cf Stone Storage

Chamber Storage + Stone Storage = 5,392.6 cf = 0.124 af

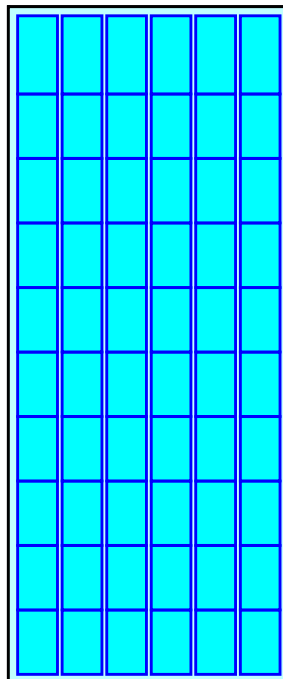
Overall Storage Efficiency = 62.1%

Overall System Size = 73.50' x 30.50' x 3.88'

60 Chambers

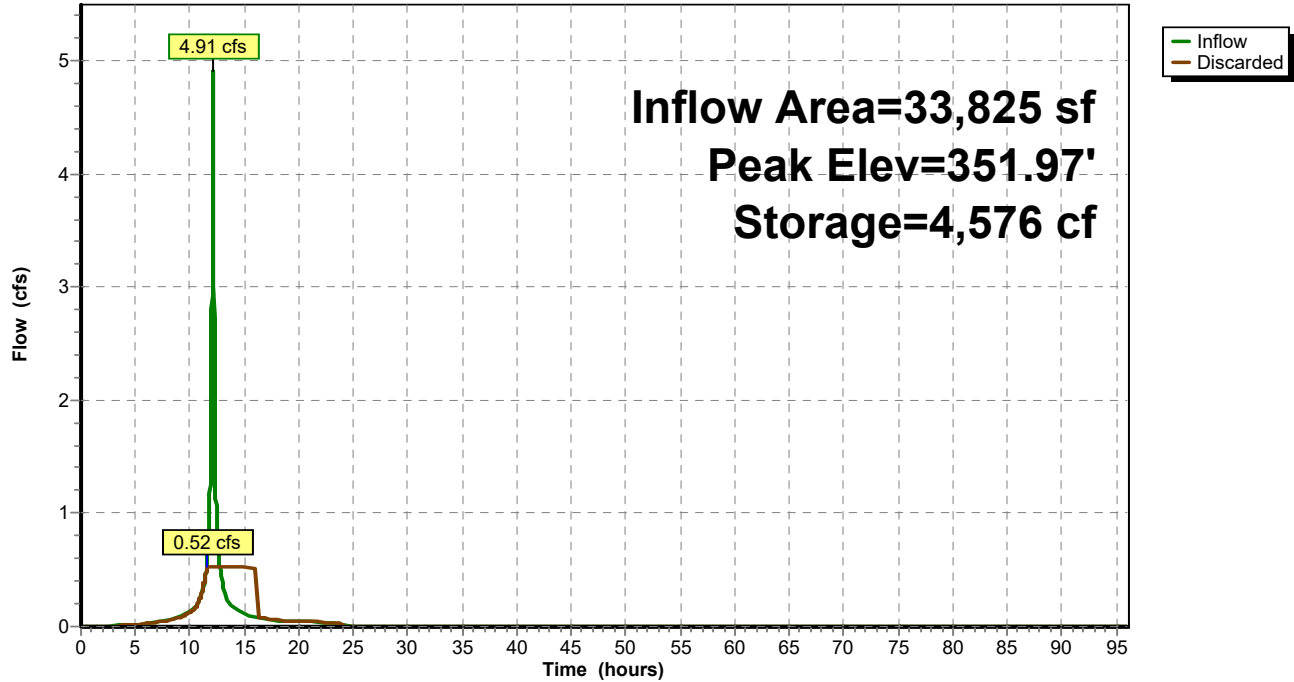
321.7 cy Field

203.3 cy Stone



Pond 26: INF-4

Hydrograph



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Summary for Subcatchment 27: A10

Runoff = 3.83 cfs @ 12.13 hrs, Volume= 8,829 cf, Depth= 2.46"

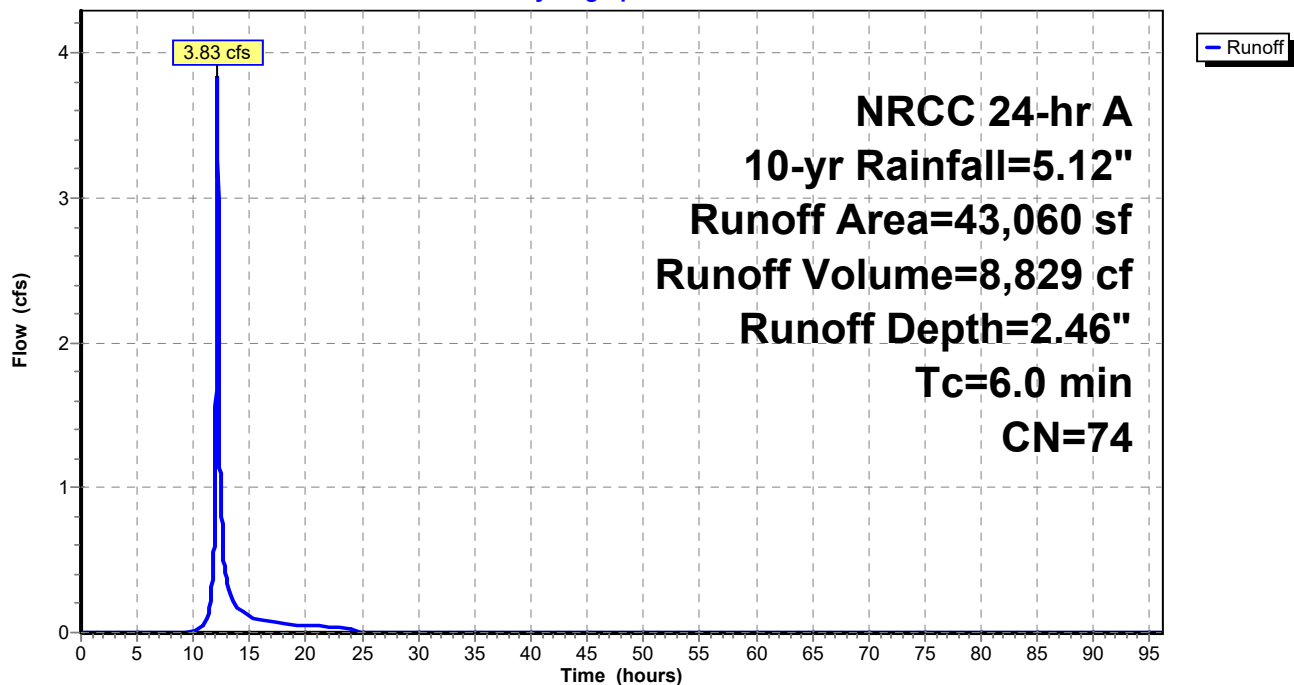
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
16,120	73	Brush, Good, HSG D
19,715	77	Brush, Poor, HSG C
7,225	70	Woods, Good, HSG C
43,060	74	Weighted Average
43,060		100.00% Pervious Area

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

Subcatchment 27: A10

Hydrograph



N60 P1 Post-A 3-17-20

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Summary for Subcatchment 28: A10

Runoff = 15.15 cfs @ 12.13 hrs, Volume= 39,510 cf, Depth= 4.54"

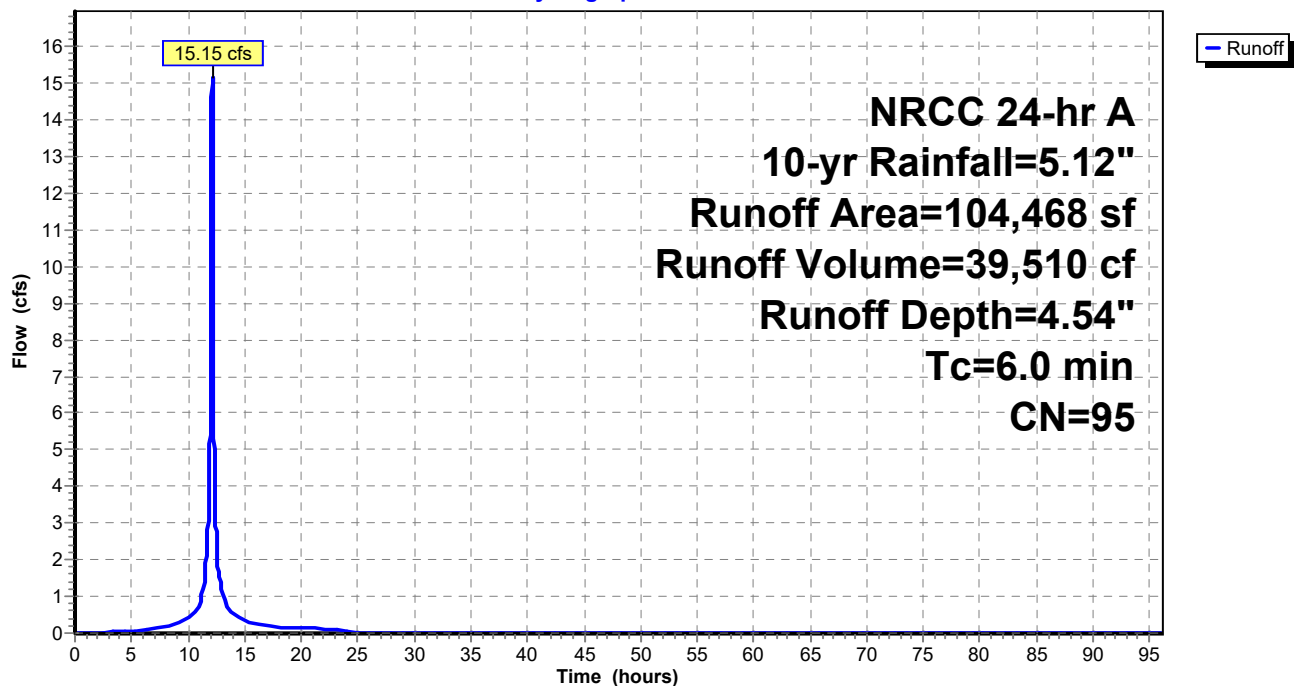
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
91,430	98	Paved parking, HSG C
7,435	74	>75% Grass cover, Good, HSG C
5,603	80	>75% Grass cover, Good, HSG D
104,468	95	Weighted Average
13,038		12.48% Pervious Area
91,430		87.52% Impervious Area

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

Subcatchment 28: A10

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Pond 29: Infiltration Basin (SWP-2)

Inflow Area = 147,528 sf, 61.97% Impervious, Inflow Depth = 3.93" for 10-yr event
 Inflow = 18.97 cfs @ 12.13 hrs, Volume= 48,338 cf
 Outflow = 2.82 cfs @ 12.58 hrs, Volume= 48,338 cf, Atten= 85%, Lag= 27.3 min
 Discarded = 2.46 cfs @ 12.58 hrs, Volume= 46,751 cf
 Primary = 0.36 cfs @ 12.58 hrs, Volume= 1,588 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 319.17' @ 12.58 hrs Surf.Area= 7,083 sf Storage= 17,434 cf

Plug-Flow detention time= 53.4 min calculated for 48,333 cf (100% of inflow)
 Center-of-Mass det. time= 53.4 min (829.5 - 776.1)

Volume	Invert	Avail.Storage	Storage Description
#1	316.00'	41,962 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
316.00	4,026	293.0	0	0	4,026
318.00	5,897	330.7	9,864	9,864	5,998
320.00	7,994	368.3	13,838	23,702	8,204
322.00	10,316	406.0	18,261	41,962	10,652

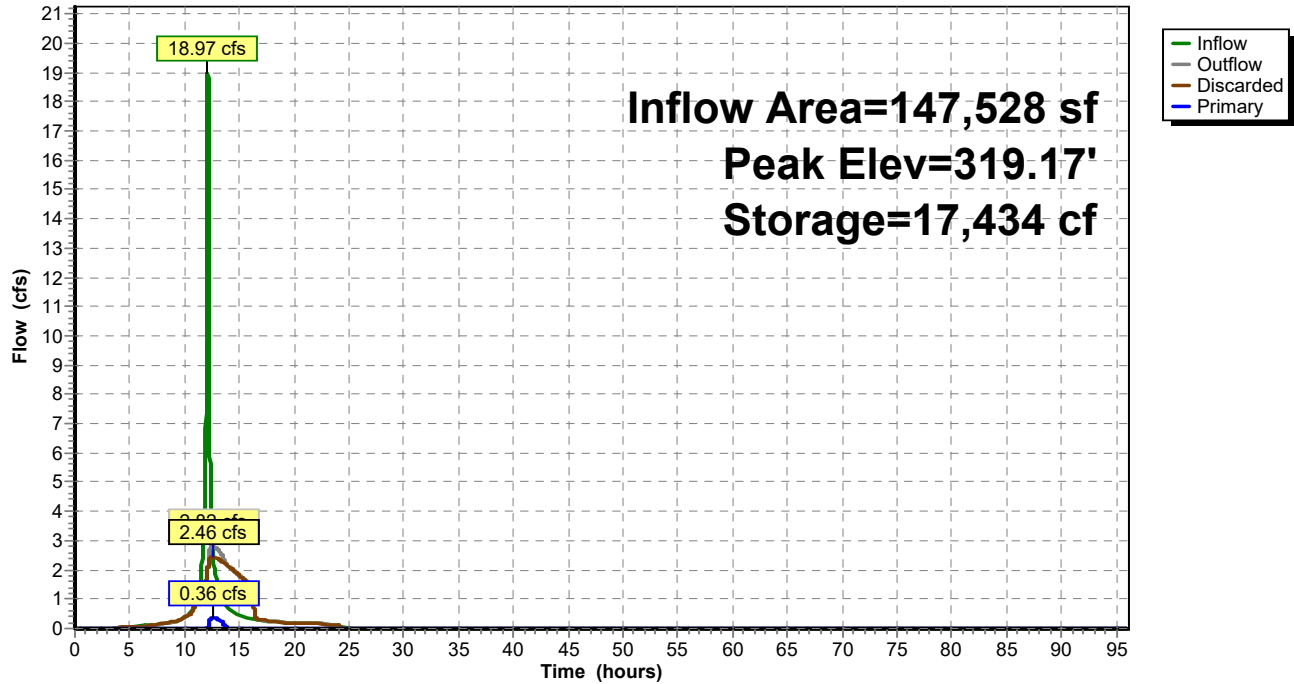
Device	Routing	Invert	Outlet Devices
#1	Primary	310.00'	15.0" Round Culvert L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 310.00' / 304.00' S= 0.1000 ' S= 0.1000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	318.25'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	320.50'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	321.00'	3.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#5	Discarded	316.00'	15.000 in/hr Exfiltration over Surface area Phase-In= 0.10'

Discarded OutFlow Max=2.46 cfs @ 12.58 hrs HW=319.17' (Free Discharge)
 ↳ **5=Exfiltration** (Exfiltration Controls 2.46 cfs)

Primary OutFlow Max=0.36 cfs @ 12.58 hrs HW=319.17' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Passes 0.36 cfs of 17.27 cfs potential flow)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.36 cfs @ 4.17 fps)
 ↳ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 29: Infiltration Basin (SWP-2)

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 30: Post A2

Runoff = 15.07 cfs @ 12.27 hrs, Volume= 52,591 cf, Depth= 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
43,743	98	Paved parking, HSG C
107,245	74	>75% Grass cover, Good, HSG C
2,876	61	>75% Grass cover, Good, HSG B
39,583	70	Woods, Good, HSG C
4,283	98	Water Surface, HSG C
33,976	65	Brush, Good, HSG C
231,706	77	Weighted Average
183,680		79.27% Pervious Area
48,026		20.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	215	0.0260	2.60		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	125	0.1000	6.42		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.4	377	0.0750	14.42	17.69	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
17.7	817	Total			

N60 P1 Post-A 3-17-20

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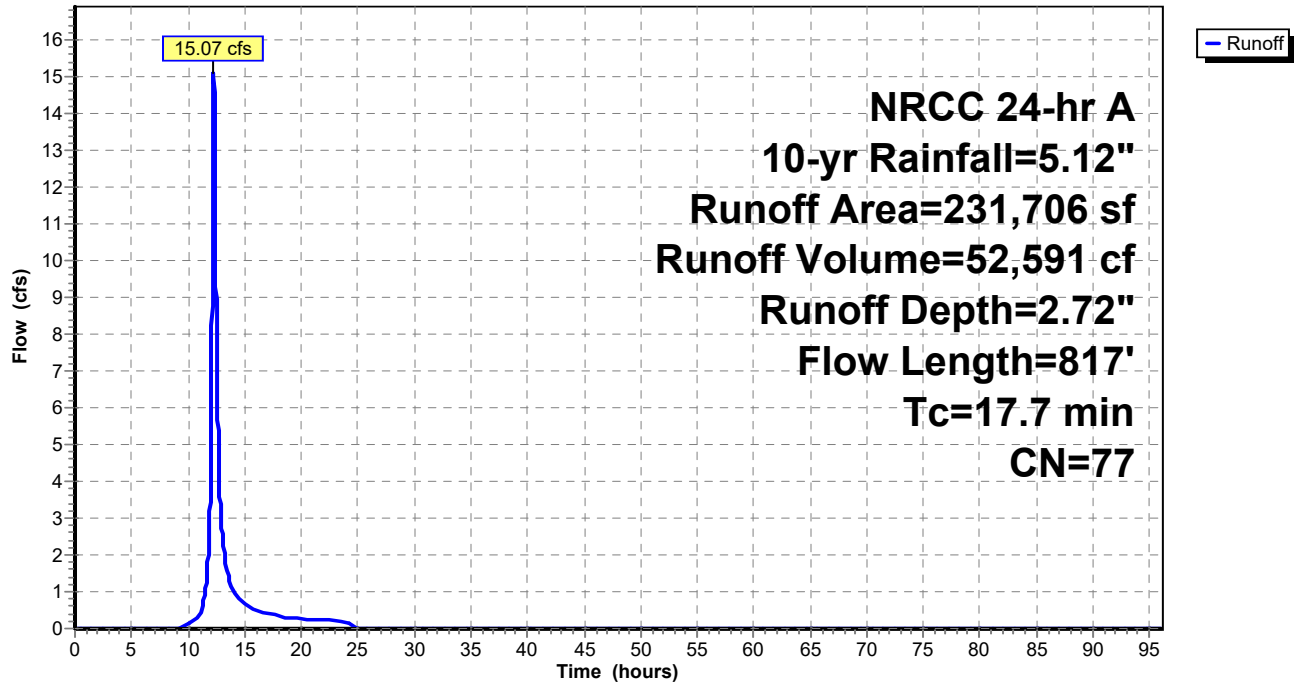
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NRCC 24-hr A 10-yr Rainfall=5.12"

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Subcatchment 30: Post A2

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Pond 31: Pocket Wetland (SWP-1)

Inflow Area = 231,706 sf, 20.73% Impervious, Inflow Depth = 2.72" for 10-yr event
 Inflow = 15.07 cfs @ 12.27 hrs, Volume= 52,591 cf
 Outflow = 0.95 cfs @ 14.15 hrs, Volume= 28,822 cf, Atten= 94%, Lag= 112.9 min
 Primary = 0.95 cfs @ 14.15 hrs, Volume= 28,822 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Starting Elev= 234.50' Surf.Area= 12,504 sf Storage= 7,835 cf
 Peak Elev= 237.57' @ 14.15 hrs Surf.Area= 17,905 sf Storage= 45,458 cf (37,623 cf above start)

Plug-Flow detention time= 1,923.5 min calculated for 20,987 cf (40% of inflow)

Center-of-Mass det. time= 1,340.0 min (2,168.5 - 828.5)

Volume	Invert	Avail.Storage	Storage Description
#1	230.00'	1,811 cf	Forebay (Irregular) Listed below (Recalc)
#2	230.00'	1,976 cf	Micropool (Irregular) Listed below (Recalc)
#3	233.90'	65,123 cf	Marsh & Storage (Irregular) Listed below (Recalc)
		68,911 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	86	34.2	0	0	86
231.00	217	53.2	147	147	225
232.00	406	72.3	307	453	426
233.00	651	91.4	524	977	688
233.90	1,233	129.1	834	1,811	1,357

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	86	34.2	0	0	86
231.00	217	53.2	147	147	225
232.00	406	72.3	307	453	426
233.00	651	91.4	524	977	688
233.90	1,646	155.1	1,000	1,976	1,942

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
233.90	4,232	530.5	0	0	4,232
234.50	9,625	400.9	4,048	4,048	13,842
235.00	10,440	413.5	5,015	9,063	14,683
236.00	12,144	438.8	11,281	20,344	16,451
237.00	13,950	464.0	13,037	33,381	18,317
238.00	15,856	489.2	14,893	48,273	20,287
239.00	17,864	514.5	16,850	65,123	22,369

Device	Routing	Invert	Outlet Devices
#1	Primary	232.00'	21.0" Round Culvert L= 74.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 232.00' / 231.00' S= 0.0135 ' / ' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 2.41 sf

N60 P1 Post-A 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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#2	Device 1	234.50'	1.1" Vert. Orifice/Grate	C= 0.600
#3	Device 1	237.50'	36.0" x 48.0" Horiz. Orifice/Grate	C= 0.600

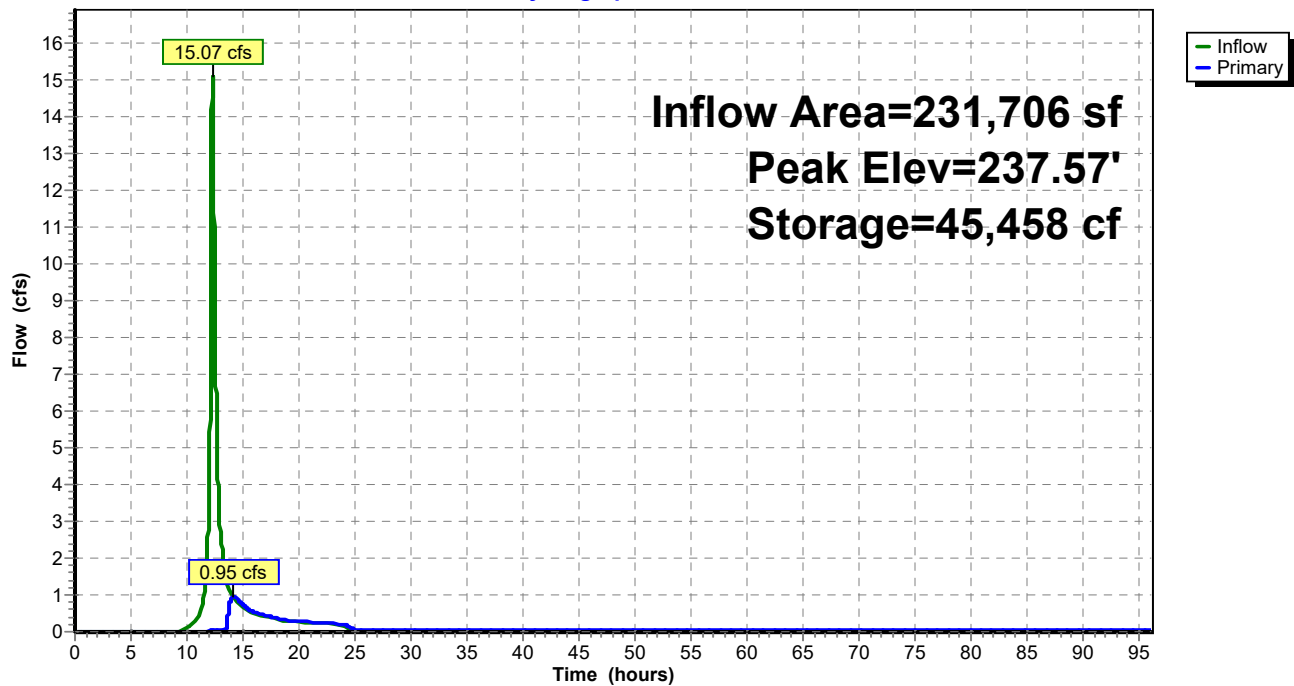
Limited to weir flow at low heads

Primary OutFlow Max=0.95 cfs @ 14.15 hrs HW=237.57' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 0.95 cfs of 17.95 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.06 cfs @ 8.38 fps)
3=Orifice/Grate (Weir Controls 0.89 cfs @ 0.88 fps)

Pond 31: Pocket Wetland (SWP-1)

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 10-yr Rainfall=5.12"

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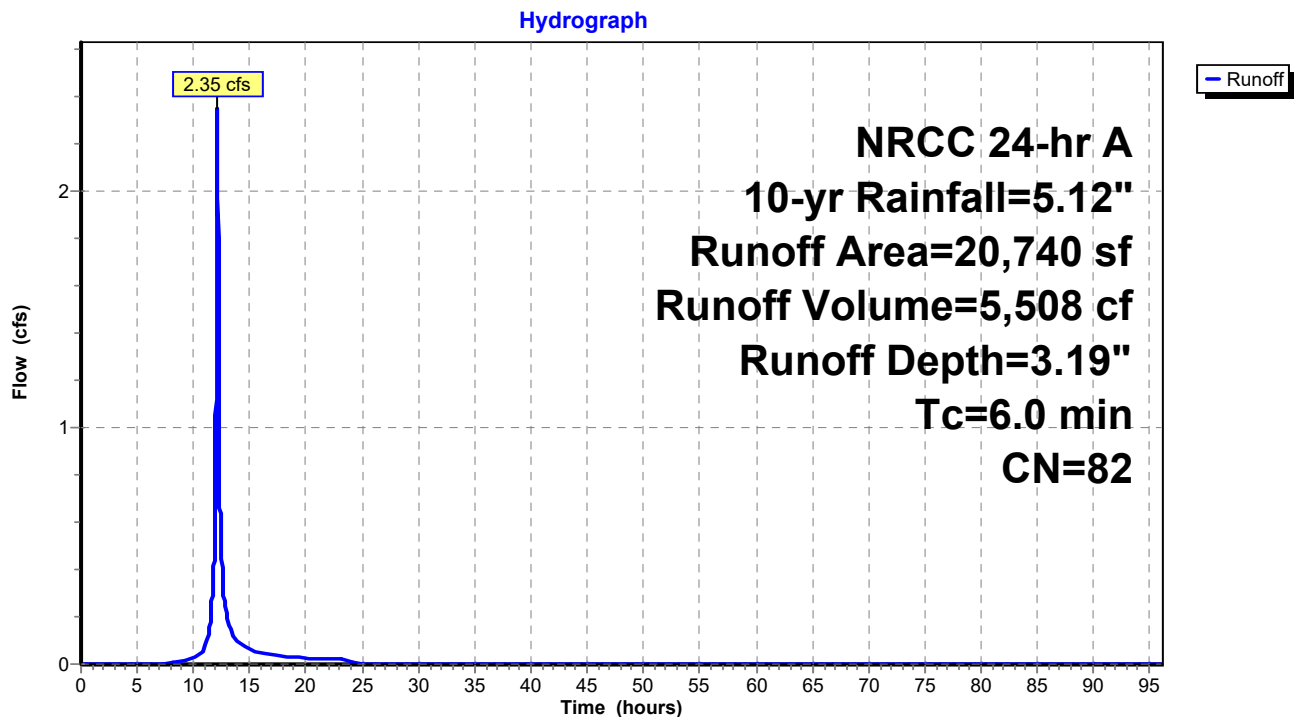
Summary for Subcatchment 32: Post A1

Runoff = 2.35 cfs @ 12.13 hrs, Volume= 5,508 cf, Depth= 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
7,304	98	Paved parking, HSG C
10,356	74	>75% Grass cover, Good, HSG C
3,080	70	Woods, Good, HSG C
20,740	82	Weighted Average
13,436		64.78% Pervious Area
7,304		35.22% Impervious Area

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

Subcatchment 32: Post A1

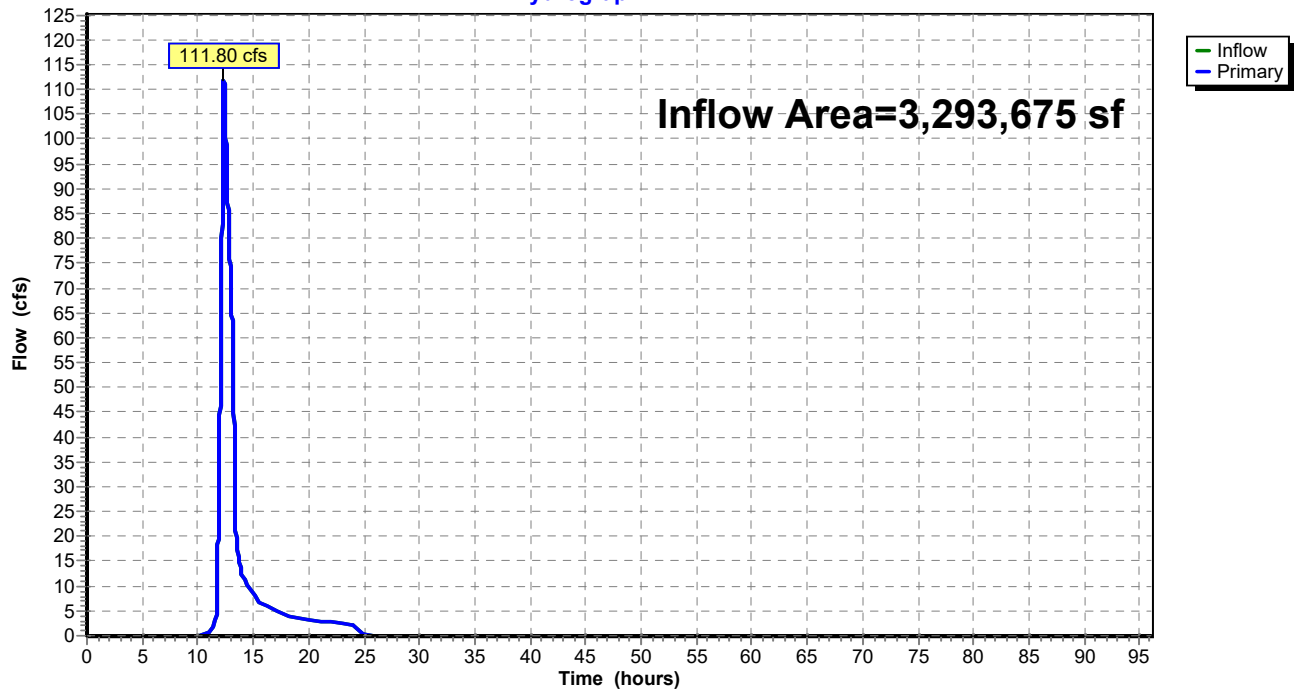
Summary for Link 33: Design Point A

Inflow Area = 3,293,675 sf, 35.25% Impervious, Inflow Depth > 2.30" for 10-yr event
 Inflow = 111.80 cfs @ 12.35 hrs, Volume= 631,628 cf
 Primary = 111.80 cfs @ 12.35 hrs, Volume= 631,628 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 33: Design Point A

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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 8: Post A0 Offsite

Runoff Area=1,115,060 sf 57.87% Impervious Runoff Depth=5.29"
Flow Length=1,018' Tc=12.5 min CN=90 Runoff=154.93 cfs 491,989 cf

Pond 9: Offsite Pond A

Peak Elev=364.35' Storage=158,428 cf Inflow=154.93 cfs 491,989 cf
Outflow=58.35 cfs 440,794 cf

Subcatchment 10: Post A4

Runoff Area=164,583 sf 10.25% Impervious Runoff Depth=3.78"
Flow Length=340' Tc=20.5 min CN=76 Runoff=13.82 cfs 51,847 cf

Reach 11: 24" Culvert Pipe

Avg. Flow Depth=0.85' Max Vel=10.93 fps Inflow=13.82 cfs 51,847 cf
24.0" Round Pipe n=0.013 L=112.0' S=0.0268 '/' Capacity=37.02 cfs Outflow=13.81 cfs 51,847 cf

Subcatchment 12: Post A8

Runoff Area=403,480 sf 2.55% Impervious Runoff Depth=3.47"
Flow Length=320' Tc=21.4 min CN=73 Runoff=30.46 cfs 116,808 cf

Pond 12A: Existing Wetland A

Peak Elev=327.71' Storage=47,511 cf Inflow=101.26 cfs 609,449 cf
36.0" Round Culvert n=0.013 L=168.0' S=0.0655 '/' Outflow=77.66 cfs 609,449 cf

Subcatchment 12B: Post A11

Runoff Area=722,164 sf 1.29% Impervious Runoff Depth=3.17"
Flow Length=475' Tc=19.8 min CN=70 Runoff=52.00 cfs 191,047 cf

Reach 13: Existing Stream A

Avg. Flow Depth=1.62' Max Vel=10.26 fps Inflow=120.99 cfs 800,496 cf
n=0.040 L=1,360.0' S=0.0721 '/' Capacity=291.69 cfs Outflow=120.27 cfs 800,496 cf

Subcatchment 14: Post A3

Runoff Area=106,378 sf 85.91% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=95 Runoff=19.66 cfs 52,025 cf

Pond 15: DIV-1

Peak Elev=327.71' Inflow=19.66 cfs 52,025 cf
Primary=5.12 cfs 37,059 cf Secondary=15.16 cfs 14,966 cf Outflow=19.66 cfs 52,025 cf

Pond 16: INF-1

Peak Elev=327.07' Storage=9,045 cf Inflow=5.12 cfs 37,059 cf
Outflow=1.18 cfs 37,059 cf

Subcatchment 17: Post A5

Runoff Area=92,926 sf 100.00% Impervious Runoff Depth=6.22"
Tc=6.0 min CN=98 Runoff=17.45 cfs 48,177 cf

Pond 18: DIV-2

Peak Elev=368.63' Inflow=17.45 cfs 48,177 cf
Primary=5.58 cfs 36,654 cf Secondary=12.50 cfs 11,524 cf Outflow=17.45 cfs 48,177 cf

Pond 19: INF-2

Peak Elev=368.08' Storage=10,364 cf Inflow=5.58 cfs 36,654 cf
Outflow=0.99 cfs 36,654 cf

Reach 20: 36" HDPE Pipe

Avg. Flow Depth=0.47' Max Vel=17.41 fps Inflow=12.50 cfs 11,524 cf
36.0" Round Pipe n=0.013 L=805.0' S=0.1205 '/' Capacity=231.53 cfs Outflow=12.37 cfs 11,524 cf

Subcatchment 21: A6

Runoff Area=384,686 sf 86.44% Impervious Runoff Depth=5.99"
Tc=6.0 min CN=96 Runoff=71.57 cfs 191,880 cf

N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Subcatchment22: A7Runoff Area=103,728 sf 0.00% Impervious Runoff Depth=2.98"
Tc=6.0 min CN=68 Runoff=11.18 cfs 25,749 cf**Pond 23: Infiltration Basin (SWP-3)**Peak Elev=261.16' Storage=71,092 cf Inflow=94.95 cfs 229,153 cf
Discarded=6.38 cfs 168,976 cf Primary=45.76 cfs 60,177 cf Outflow=52.13 cfs 229,153 cf**Subcatchment24: A9**Runoff Area=33,825 sf 87.77% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=95 Runoff=6.25 cfs 16,542 cf**Pond 25: DIV-4**Peak Elev=352.67' Inflow=6.25 cfs 16,542 cf
Primary=5.23 cfs 15,026 cf Secondary=1.53 cfs 1,517 cf Outflow=6.25 cfs 16,542 cf**Pond 26: INF-4**Peak Elev=352.61' Storage=5,151 cf Inflow=5.23 cfs 15,026 cf
Outflow=0.52 cfs 15,026 cf**Subcatchment27: A10**Runoff Area=43,060 sf 0.00% Impervious Runoff Depth=3.58"
Tc=6.0 min CN=74 Runoff=5.53 cfs 12,830 cf**Subcatchment28: A10**Runoff Area=104,468 sf 87.52% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=95 Runoff=19.31 cfs 51,091 cf**Pond 29: Infiltration Basin (SWP-2)**Peak Elev=320.11' Storage=24,626 cf Inflow=24.83 cfs 63,920 cf
Discarded=2.82 cfs 60,065 cf Primary=0.55 cfs 3,855 cf Outflow=3.37 cfs 63,920 cf**Subcatchment30: Post A2**Runoff Area=231,706 sf 20.73% Impervious Runoff Depth=3.88"
Flow Length=817' Tc=17.7 min CN=77 Runoff=21.45 cfs 74,991 cf**Pond 31: Pocket Wetland (SWP-1)**Peak Elev=237.77' Storage=48,398 cf Inflow=21.45 cfs 74,991 cf
Outflow=6.32 cfs 51,204 cf**Subcatchment32: Post A1**Runoff Area=20,740 sf 35.22% Impervious Runoff Depth=4.41"
Tc=6.0 min CN=82 Runoff=3.20 cfs 7,626 cf**Link 33: Design Point A**Inflow=157.32 cfs 939,840 cf
Primary=157.32 cfs 939,840 cf**Total Runoff Area = 3,526,804 sf Runoff Volume = 1,332,602 cf Average Runoff Depth = 4.53"**
61.01% Pervious = 2,151,703 sf 38.99% Impervious = 1,375,101 sf

N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 8: Post A0 Offsite

Runoff = 154.93 cfs @ 12.20 hrs, Volume= 491,989 cf, Depth= 5.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
645,334	98	Paved parking, HSG C
443,611	80	>75% Grass cover, Good, HSG D
23,572	74	>75% Grass cover, Good, HSG C
2,543	61	>75% Grass cover, Good, HSG B
1,115,060	90	Weighted Average
469,726		42.13% Pervious Area
645,334		57.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.0150	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	148	0.0574	3.86		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	740	0.0270	10.25	32.22	Pipe Channel, 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.015 Concrete sewer w/manholes & inlets
12.5	1,018	Total			

N60 P1 Post-A 3-17-20

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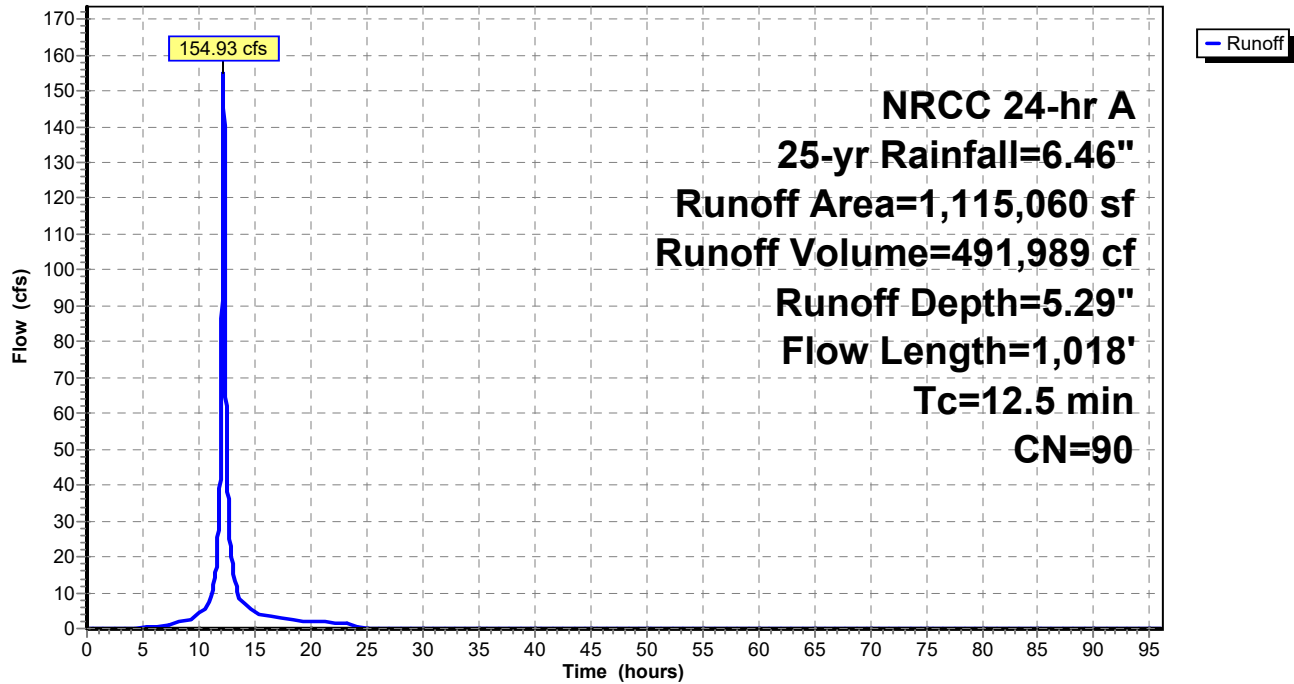
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NRCC 24-hr A 25-yr Rainfall=6.46"

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Subcatchment 8: Post A0 Offsite

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Pond 9: Offsite Pond A

Inflow Area = 1,115,060 sf, 57.87% Impervious, Inflow Depth = 5.29" for 25-yr event
 Inflow = 154.93 cfs @ 12.20 hrs, Volume= 491,989 cf
 Outflow = 58.35 cfs @ 12.45 hrs, Volume= 440,794 cf, Atten= 62%, Lag= 14.8 min
 Primary = 58.35 cfs @ 12.45 hrs, Volume= 440,794 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 364.35' @ 12.45 hrs Surf.Area= 31,319 sf Storage= 158,428 cf

Plug-Flow detention time= 90.4 min calculated for 440,794 cf (90% of inflow)
 Center-of-Mass det. time= 42.1 min (826.5 - 784.4)

Volume	Invert	Avail.Storage	Storage Description		
#1	357.00'	221,816 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
357.00	14,633	679.0	0	0	14,633
358.00	16,652	698.0	15,632	15,632	16,826
359.00	17,534	715.0	17,091	32,723	18,864
360.00	19,427	745.0	18,472	51,195	22,425
362.00	24,453	804.0	43,784	94,979	29,861
364.00	28,701	854.0	53,097	148,076	36,663
365.00	36,602	901.0	32,572	180,648	43,285
366.00	45,910	1,262.0	41,168	221,816	105,432

Device	Routing	Invert	Outlet Devices
#1	Primary	357.00'	30.0" Round Culvert L= 125.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 357.00' / 351.00' S= 0.0480 ' S= 0.0480 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#2	Device 1	360.00'	36.0" x 48.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#3	Primary	364.75'	150.0' long x 36.0' 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=58.35 cfs @ 12.45 hrs HW=364.34' TW=327.40' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 58.35 cfs @ 11.89 fps)
 2=Orifice/Grate (Passes 58.35 cfs of 240.87 cfs potential flow)
 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

N60 P1 Post-A 3-17-20

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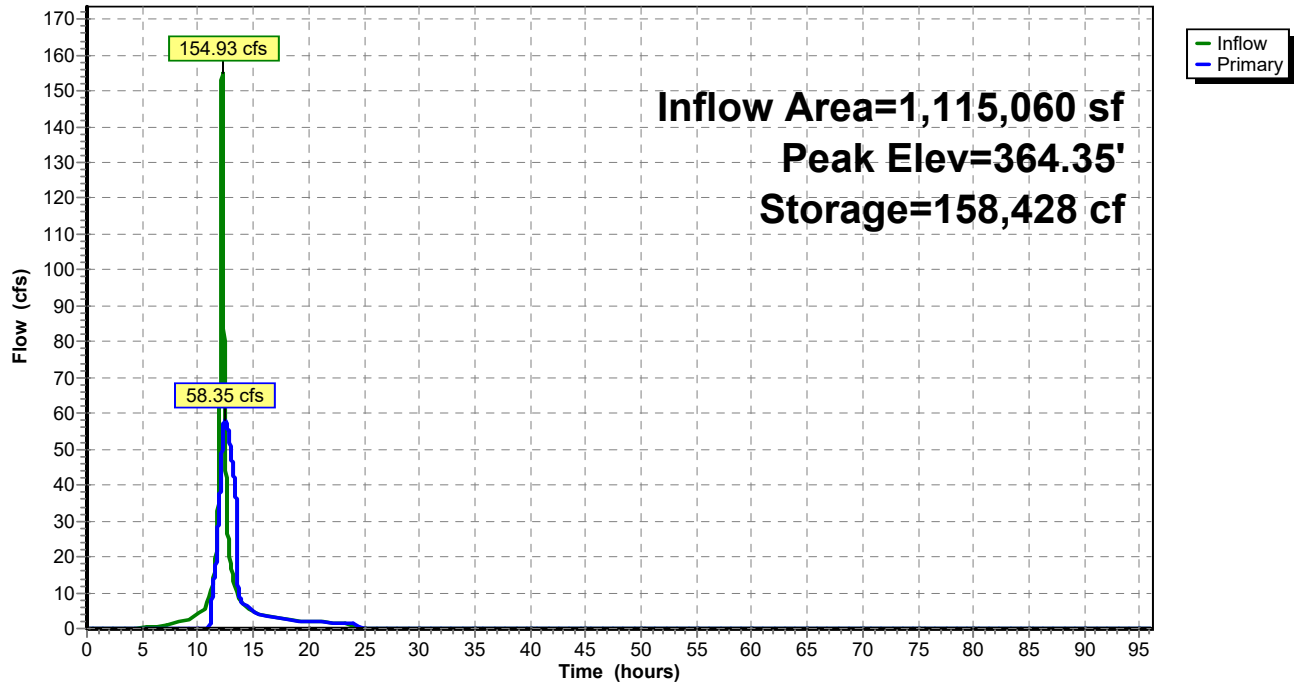
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NRCC 24-hr A 25-yr Rainfall=6.46"

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Pond 9: Offsite Pond A

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 10: Post A4

Runoff = 13.82 cfs @ 12.30 hrs, Volume= 51,847 cf, Depth= 3.78"

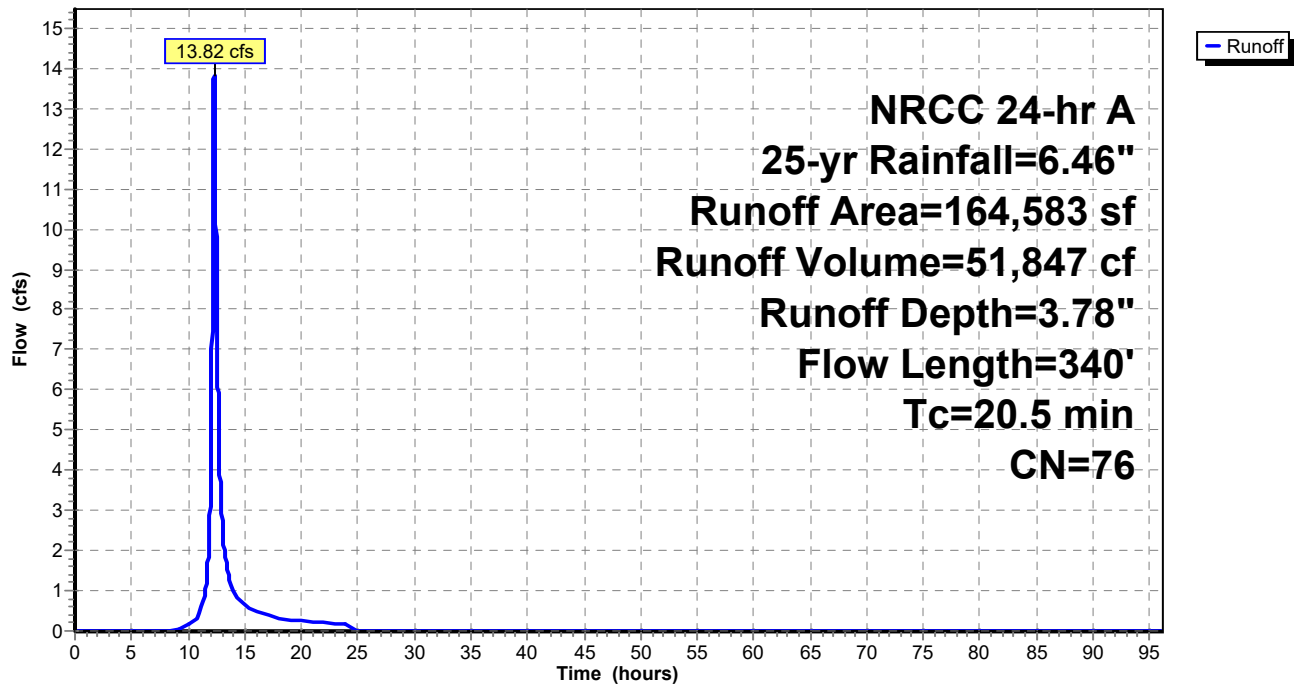
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
15,990	74	>75% Grass cover, Good, HSG C
65,271	70	Woods, Good, HSG C
66,457	77	Woods, Good, HSG D
16,865	98	Water Surface, HSG D
164,583	76	Weighted Average
147,718		89.75% Pervious Area
16,865		10.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.7	240	0.0208	2.32		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
20.5	340	Total			

Subcatchment 10: Post A4

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 25-yr Rainfall=6.46"

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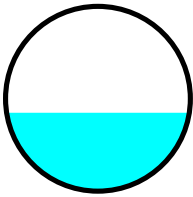
Summary for Reach 11: 24" Culvert Pipe

Inflow Area = 164,583 sf, 10.25% Impervious, Inflow Depth = 3.78" for 25-yr event
Inflow = 13.82 cfs @ 12.30 hrs, Volume= 51,847 cf
Outflow = 13.81 cfs @ 12.30 hrs, Volume= 51,847 cf, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.93 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.86 fps, Avg. Travel Time= 0.5 min

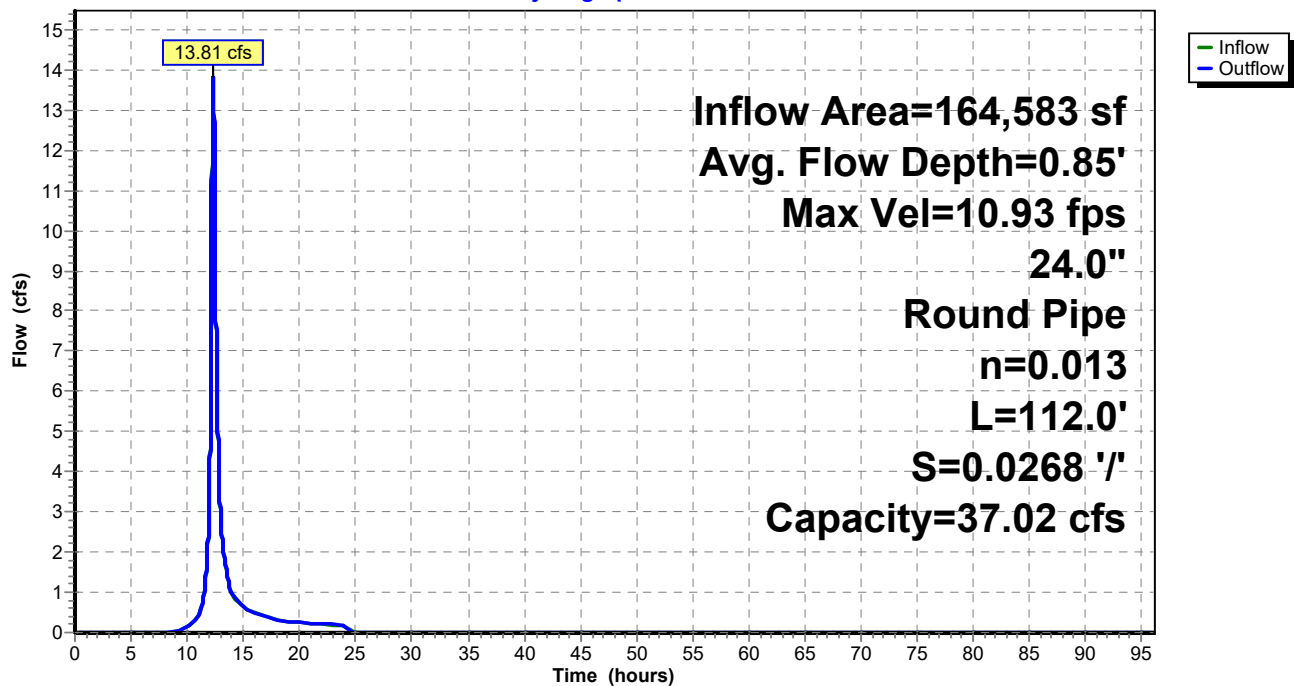
Peak Storage= 142 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.85'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 37.02 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 112.0' Slope= 0.0268 '/'
Inlet Invert= 349.00', Outlet Invert= 346.00'



Reach 11: 24" Culvert Pipe

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 12: Post A8

Runoff = 30.46 cfs @ 12.32 hrs, Volume= 116,808 cf, Depth= 3.47"

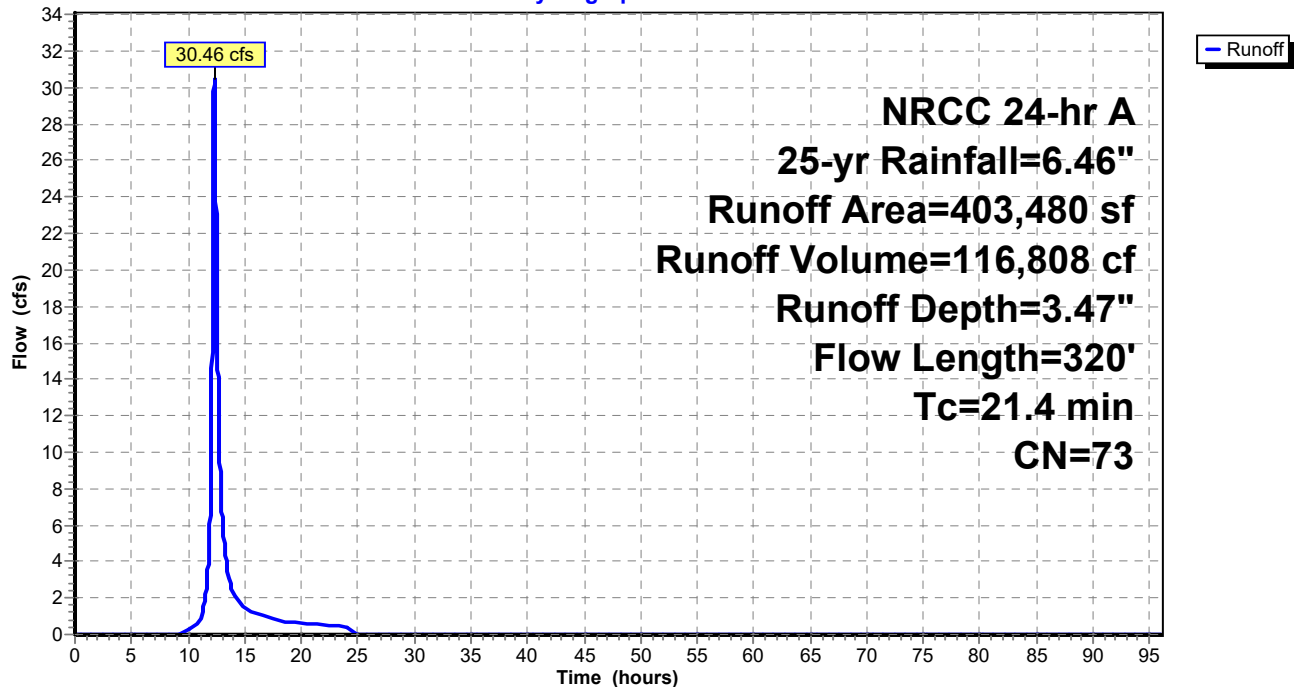
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
278,057	70	Woods, Good, HSG C
108,143	77	Woods, Good, HSG D
10,280	98	Paved parking, HSG D
6,532	74	>75% Grass cover, Good, HSG C
468	80	>75% Grass cover, Good, HSG D
403,480	73	Weighted Average
393,200		97.45% Pervious Area
10,280		2.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.9	220	0.0636	4.06		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
21.4	320	Total			

Subcatchment 12: Post A8

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Pond 12A: Existing Wetland A

Inflow Area = 1,683,123 sf, 39.95% Impervious, Inflow Depth = 4.35" for 25-yr event
 Inflow = 101.26 cfs @ 12.33 hrs, Volume= 609,449 cf
 Outflow = 77.66 cfs @ 12.64 hrs, Volume= 609,449 cf, Atten= 23%, Lag= 18.3 min
 Primary = 77.66 cfs @ 12.64 hrs, Volume= 609,449 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 327.71' @ 12.64 hrs Surf.Area= 19,055 sf Storage= 47,511 cf

Plug-Flow detention time= 5.2 min calculated for 609,449 cf (100% of inflow)
 Center-of-Mass det. time= 5.1 min (832.3 - 827.3)

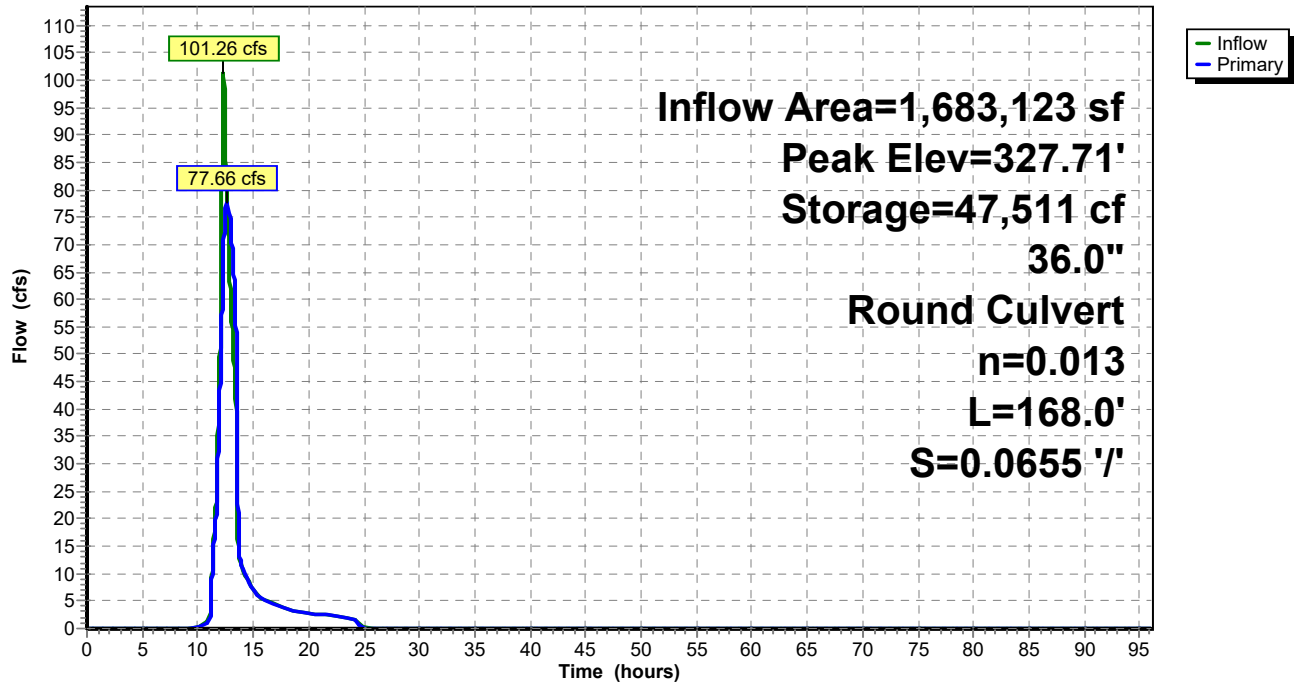
Volume	Invert	Avail.Storage	Storage Description		
#1	321.00'	190,307 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
321.00	124	53.2	0	0	124
322.00	1,084	175.8	525	525	2,361
324.00	4,913	341.5	5,536	6,061	9,202
326.00	11,332	638.2	15,804	21,866	32,354
328.00	20,583	804.3	31,458	53,324	51,475
330.00	34,086	1,075.5	54,104	107,428	92,087
332.00	49,257	1,268.5	82,879	190,307	128,164

Device	Routing	Invert	Outlet Devices
#1	Primary	321.00'	36.0" Round Culvert L= 168.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 321.00' / 310.00' S= 0.0655 ' S Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=77.66 cfs @ 12.64 hrs HW=327.71' TW=313.49' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 77.66 cfs @ 10.99 fps)

Pond 12A: Existing Wetland A

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 12B: Post A11

Runoff = 52.00 cfs @ 12.30 hrs, Volume= 191,047 cf, Depth= 3.17"

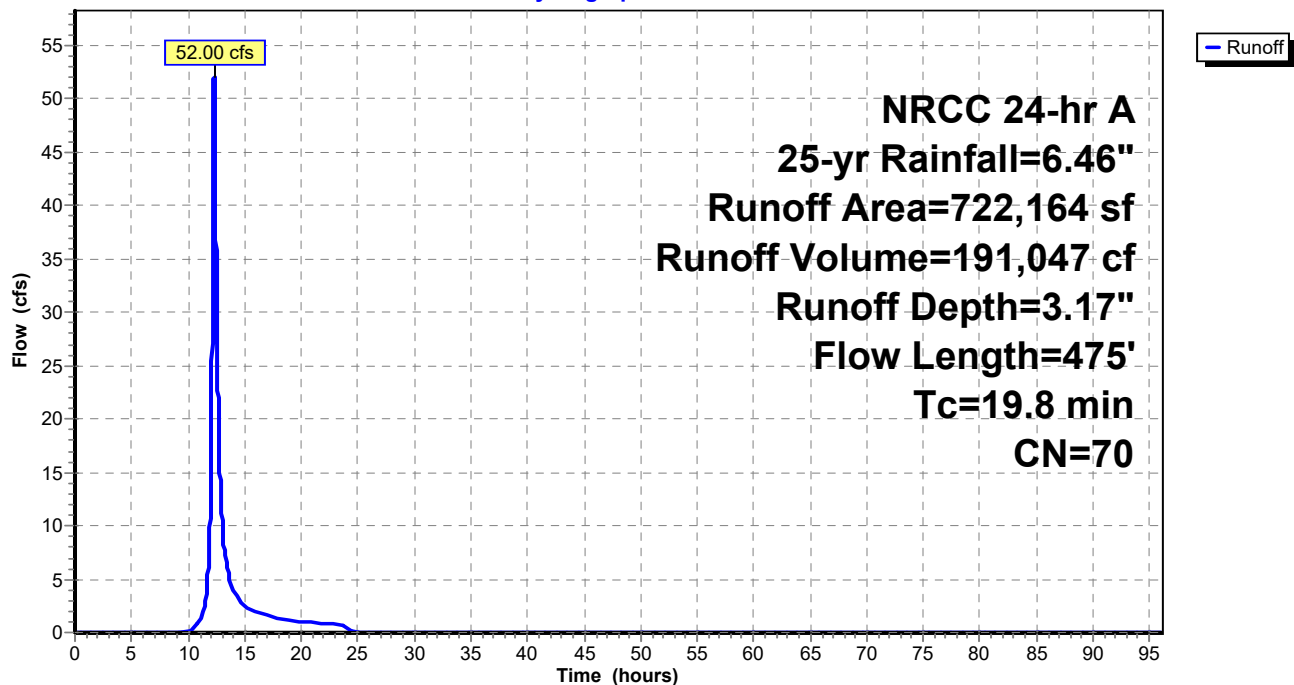
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
17,361	55	Woods, Good, HSG B
681,082	70	Woods, Good, HSG C
11,683	77	Woods, Good, HSG D
9,345	98	Paved parking, HSG C
2,693	74	>75% Grass cover, Good, HSG C
722,164	70	Weighted Average
712,819		98.71% Pervious Area
9,345		1.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.0	375	0.1400	6.02		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
19.8	475	Total			

Subcatchment 12B: Post A11

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Reach 13: Existing Stream A

Inflow Area = 2,405,287 sf, 28.35% Impervious, Inflow Depth = 3.99" for 25-yr event
Inflow = 120.99 cfs @ 12.34 hrs, Volume= 800,496 cf
Outflow = 120.27 cfs @ 12.36 hrs, Volume= 800,496 cf, Atten= 1%, Lag= 1.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.26 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 2.76 fps, Avg. Travel Time= 8.2 min

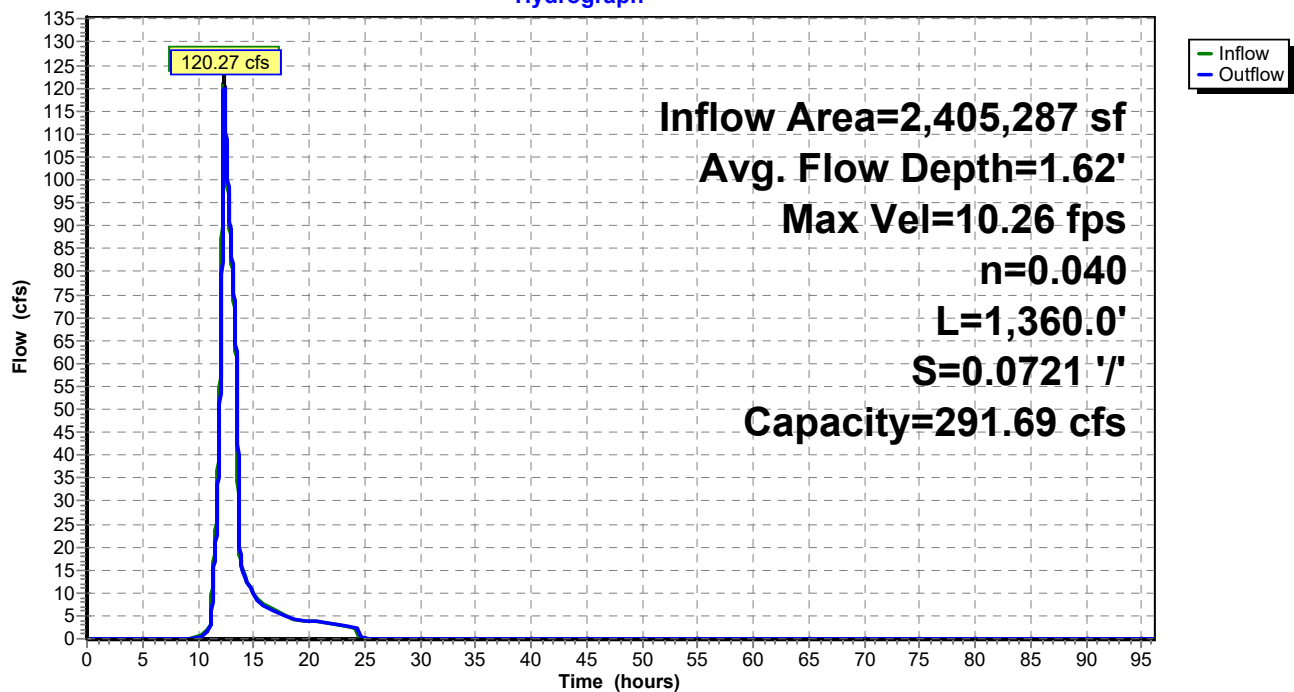
Peak Storage= 15,948 cf @ 12.36 hrs
Average Depth at Peak Storage= 1.62'
Bank-Full Depth= 2.50' Flow Area= 22.5 sf, Capacity= 291.69 cfs

4.00' x 2.50' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 ' ' Top Width= 14.00'
Length= 1,360.0' Slope= 0.0721 ' '
Inlet Invert= 312.00', Outlet Invert= 214.00'



Reach 13: Existing Stream A

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 25-yr Rainfall=6.46"

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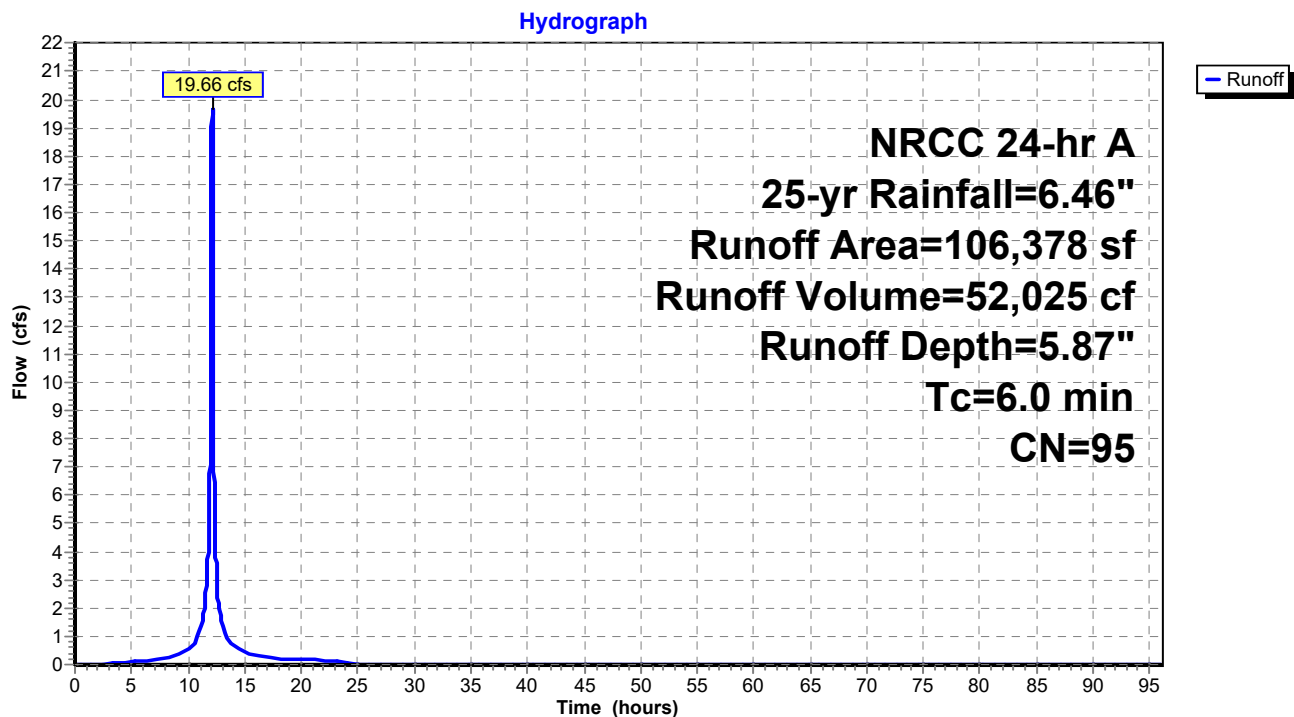
Summary for Subcatchment 14: Post A3

Runoff = 19.66 cfs @ 12.13 hrs, Volume= 52,025 cf, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
91,392	98	Paved parking, HSG C
14,986	74	>75% Grass cover, Good, HSG C
106,378	95	Weighted Average
14,986		14.09% Pervious Area
91,392		85.91% Impervious Area

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

Subcatchment 14: Post A3

N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Pond 15: DIV-1

Inflow Area = 106,378 sf, 85.91% Impervious, Inflow Depth = 5.87" for 25-yr event
 Inflow = 19.66 cfs @ 12.13 hrs, Volume= 52,025 cf
 Outflow = 19.66 cfs @ 12.13 hrs, Volume= 52,025 cf, Atten= 0%, Lag= 0.0 min
 Primary = 5.12 cfs @ 11.86 hrs, Volume= 37,059 cf
 Secondary = 15.16 cfs @ 12.13 hrs, Volume= 14,966 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 327.71' @ 12.13 hrs

Flood Elev= 330.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 324.50' / 324.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	324.50'	24.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 324.50' / 320.00' S= 0.0900 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	327.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.05 cfs @ 11.86 hrs HW=327.05' TW=325.26' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 5.05 cfs @ 6.43 fps)**Secondary OutFlow** Max=15.15 cfs @ 12.13 hrs HW=327.71' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 15.15 cfs of 22.46 cfs potential flow)↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 15.15 cfs @ 2.68 fps)

N60 P1 Post-A 3-17-20

Prepared by {enter your company name here}

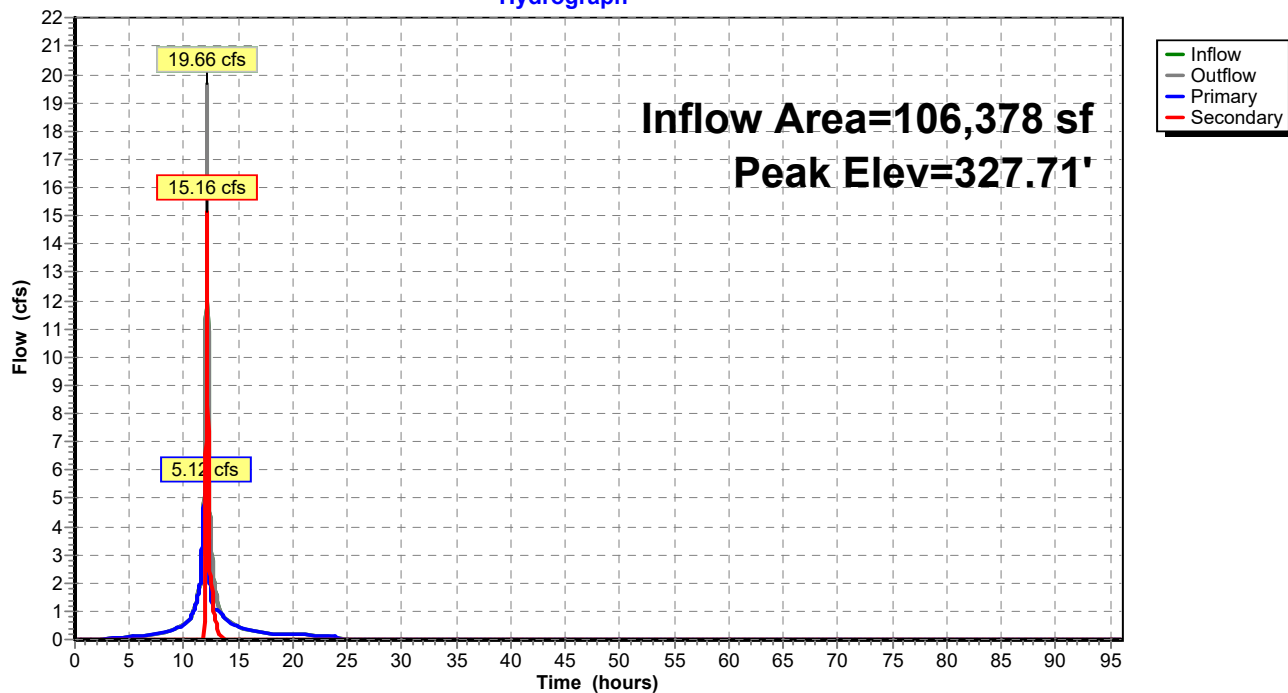
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NRCC 24-hr A 25-yr Rainfall=6.46"

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Pond 15: DIV-1

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Pond 16: INF-1

Inflow Area = 106,378 sf, 85.91% Impervious, Inflow Depth = 4.18" for 25-yr event
 Inflow = 5.12 cfs @ 11.86 hrs, Volume= 37,059 cf
 Outflow = 1.18 cfs @ 11.20 hrs, Volume= 37,059 cf, Atten= 77%, Lag= 0.0 min
 Discarded = 1.18 cfs @ 11.20 hrs, Volume= 37,059 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 327.07' @ 12.59 hrs Surf.Area= 4,245 sf Storage= 9,045 cf

Plug-Flow detention time= 48.8 min calculated for 37,055 cf (100% of inflow)
 Center-of-Mass det. time= 48.8 min (819.4 - 770.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	324.00'	4,688 cf	36.75'W x 115.50'L x 4.33'H Field A 18,393 cf Overall - 6,674 cf Embedded = 11,720 cf x 40.0% Voids
#2A	324.50'	6,674 cf	Cultec R-360HD x 180 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 180 Chambers in 6 Rows Cap Storage= +6.5 cf x 2 x 6 rows = 77.5 cf
		11,361 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	324.00'	12.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=1.18 cfs @ 11.20 hrs HW=324.05' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 1.18 cfs)

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 25-yr Rainfall=6.46"

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Pond 16: INF-1 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 6 rows = 77.5 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

30 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 112.50' Row Length +18.0" End Stone x 2 = 115.50' Base Length

6 Rows x 60.0" Wide + 9.0" Spacing x 5 + 18.0" Side Stone x 2 = 36.75' Base Width

6.0" Base + 36.0" Chamber Height + 10.0" Cover = 4.33' Field Height

180 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 6 Rows = 6,673.6 cf Chamber Storage

18,393.4 cf Field - 6,673.6 cf Chambers = 11,719.8 cf Stone x 40.0% Voids = 4,687.9 cf Stone Storage

Chamber Storage + Stone Storage = 11,361.5 cf = 0.261 af

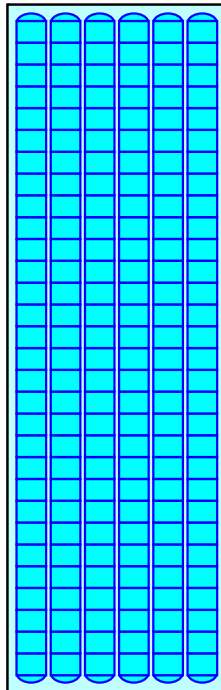
Overall Storage Efficiency = 61.8%

Overall System Size = 115.50' x 36.75' x 4.33'

180 Chambers

681.2 cy Field

434.1 cy Stone



N60 P1 Post-A 3-17-20

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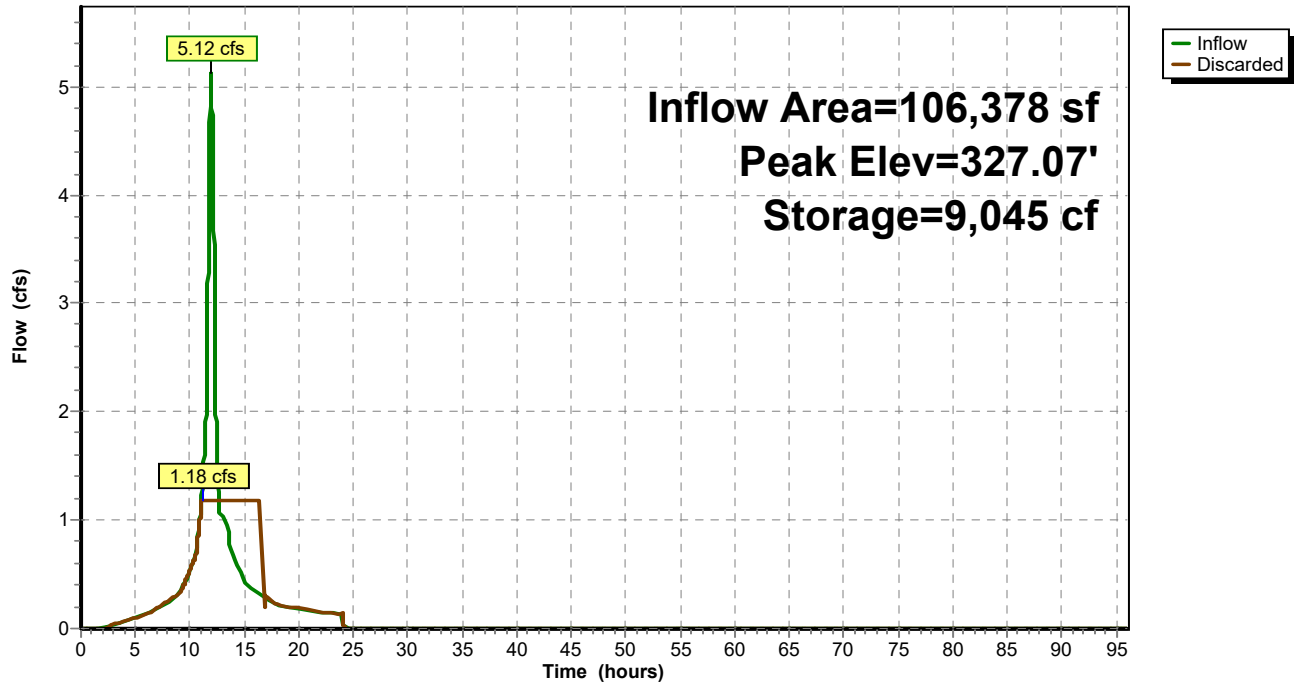
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NRCC 24-hr A 25-yr Rainfall=6.46"

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Pond 16: INF-1

Hydrograph



N60 P1 Post-A 3-17-20

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Summary for Subcatchment 17: Post A5

Runoff = 17.45 cfs @ 12.13 hrs, Volume= 48,177 cf, Depth= 6.22"

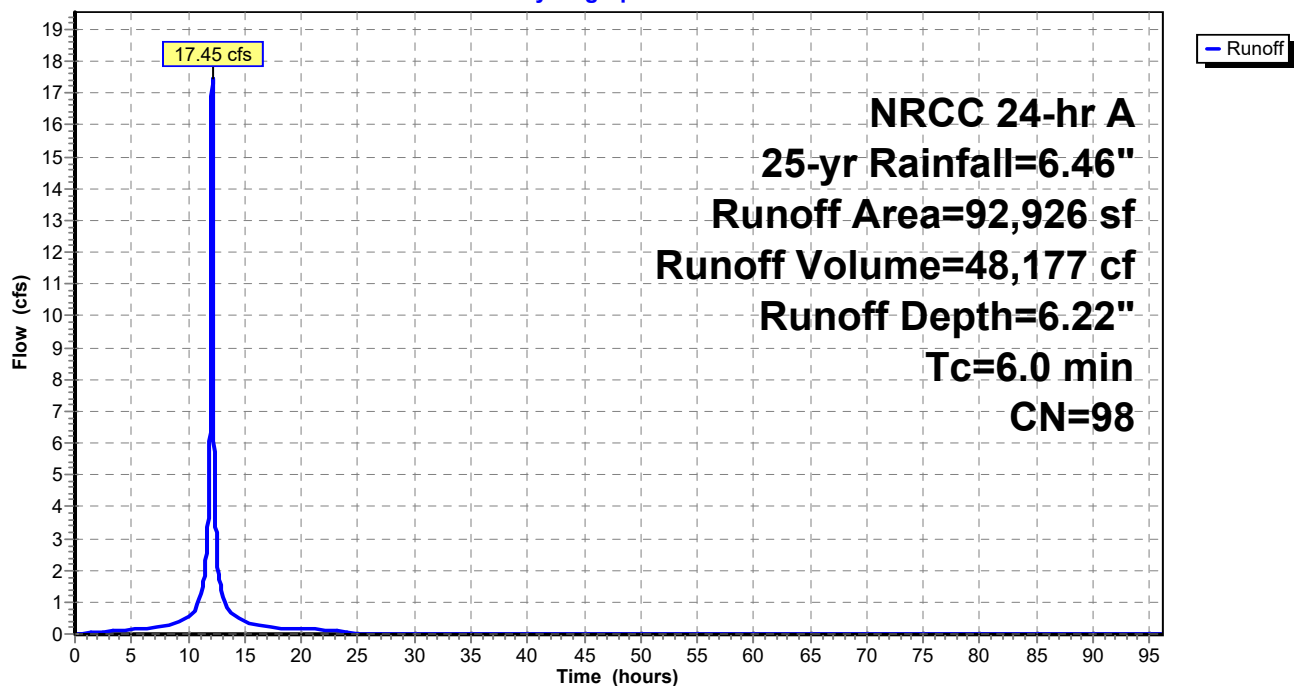
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
92,926	98	Roofs, HSG C
92,926		100.00% Impervious Area

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

Subcatchment 17: Post A5

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Pond 18: DIV-2

Inflow Area = 92,926 sf, 100.00% Impervious, Inflow Depth = 6.22" for 25-yr event
 Inflow = 17.45 cfs @ 12.13 hrs, Volume= 48,177 cf
 Outflow = 17.45 cfs @ 12.13 hrs, Volume= 48,177 cf, Atten= 0%, Lag= 0.0 min
 Primary = 5.58 cfs @ 11.90 hrs, Volume= 36,654 cf
 Secondary = 12.50 cfs @ 12.13 hrs, Volume= 11,524 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 368.63' @ 12.13 hrs

Flood Elev= 371.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	365.00'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 365.00' / 365.00' S= 0.0000 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	366.50'	24.0" Round Culvert L= 550.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 366.50' / 355.00' S= 0.0209 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	368.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.50 cfs @ 11.90 hrs HW=368.02' TW=365.91' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 5.50 cfs @ 7.00 fps)**Secondary OutFlow** Max=12.49 cfs @ 12.13 hrs HW=368.63' TW=355.47' (Dynamic Tailwater)↑ **2=Culvert** (Passes 12.49 cfs of 16.09 cfs potential flow)↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 12.49 cfs @ 2.47 fps)

N60 P1 Post-A 3-17-20

Prepared by {enter your company name here}

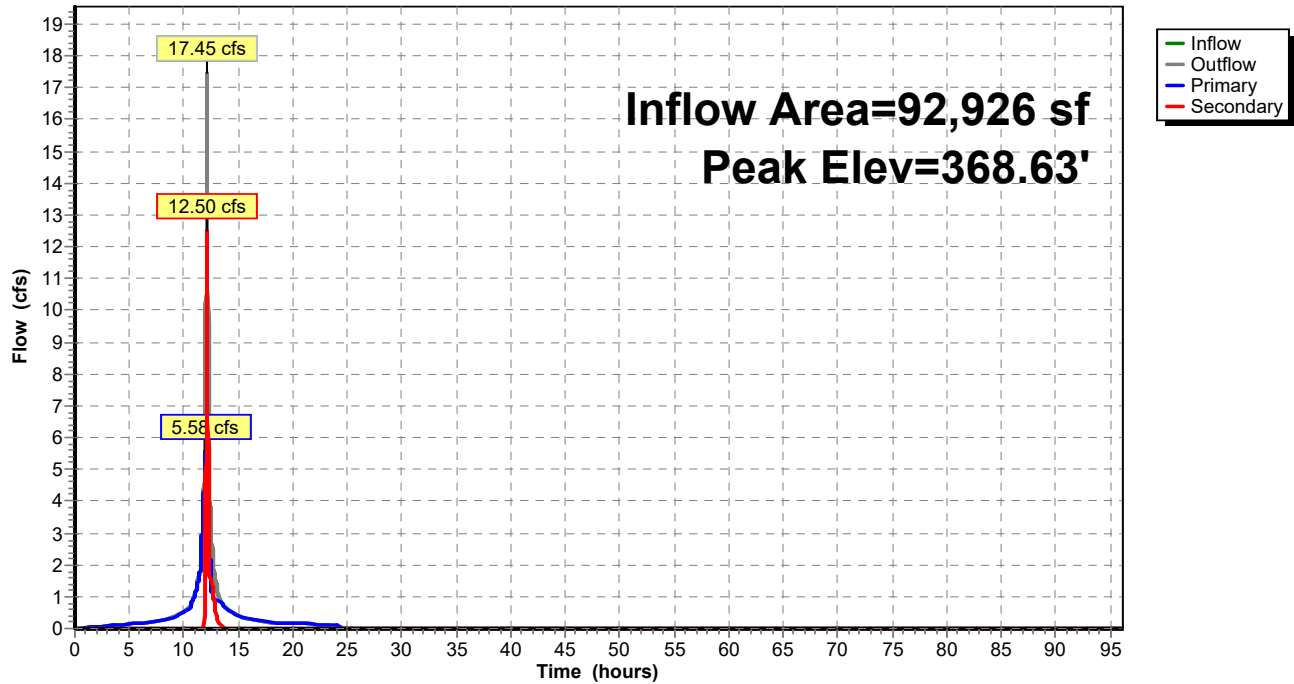
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NRCC 24-hr A 25-yr Rainfall=6.46"

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Pond 18: DIV-2

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Pond 19: INF-2

Inflow Area = 92,926 sf, 100.00% Impervious, Inflow Depth = 4.73" for 25-yr event
 Inflow = 5.58 cfs @ 11.90 hrs, Volume= 36,654 cf
 Outflow = 0.99 cfs @ 11.13 hrs, Volume= 36,654 cf, Atten= 82%, Lag= 0.0 min
 Discarded = 0.99 cfs @ 11.13 hrs, Volume= 36,654 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 368.08' @ 12.60 hrs Surf.Area= 4,295 sf Storage= 10,364 cf

Plug-Flow detention time= 67.3 min calculated for 36,650 cf (100% of inflow)
 Center-of-Mass det. time= 67.3 min (813.6 - 746.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	364.50'	4,639 cf	41.50'W x 103.50'L x 4.33'H Field A 18,613 cf Overall - 7,016 cf Embedded = 11,596 cf x 40.0% Voids
#2A	365.00'	7,016 cf	Cultec R-360HD x 189 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 189 Chambers in 7 Rows Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf
		11,655 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	364.50'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=0.99 cfs @ 11.13 hrs HW=364.55' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.99 cfs)

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 25-yr Rainfall=6.46"

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Pond 19: INF-2 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

27 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 101.50' Row Length +12.0" End Stone x 2 = 103.50' Base Length

7 Rows x 60.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 41.50' Base Width

6.0" Base + 36.0" Chamber Height + 10.0" Cover = 4.33' Field Height

189 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 7 Rows = 7,016.3 cf Chamber Storage

18,612.7 cf Field - 7,016.3 cf Chambers = 11,596.5 cf Stone x 40.0% Voids = 4,638.6 cf Stone Storage

Chamber Storage + Stone Storage = 11,654.9 cf = 0.268 af

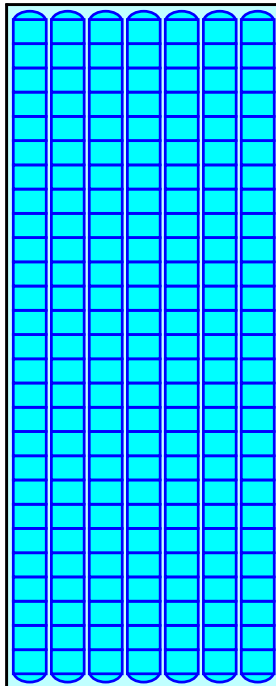
Overall Storage Efficiency = 62.6%

Overall System Size = 103.50' x 41.50' x 4.33'

189 Chambers

689.4 cy Field

429.5 cy Stone



N60 P1 Post-A 3-17-20

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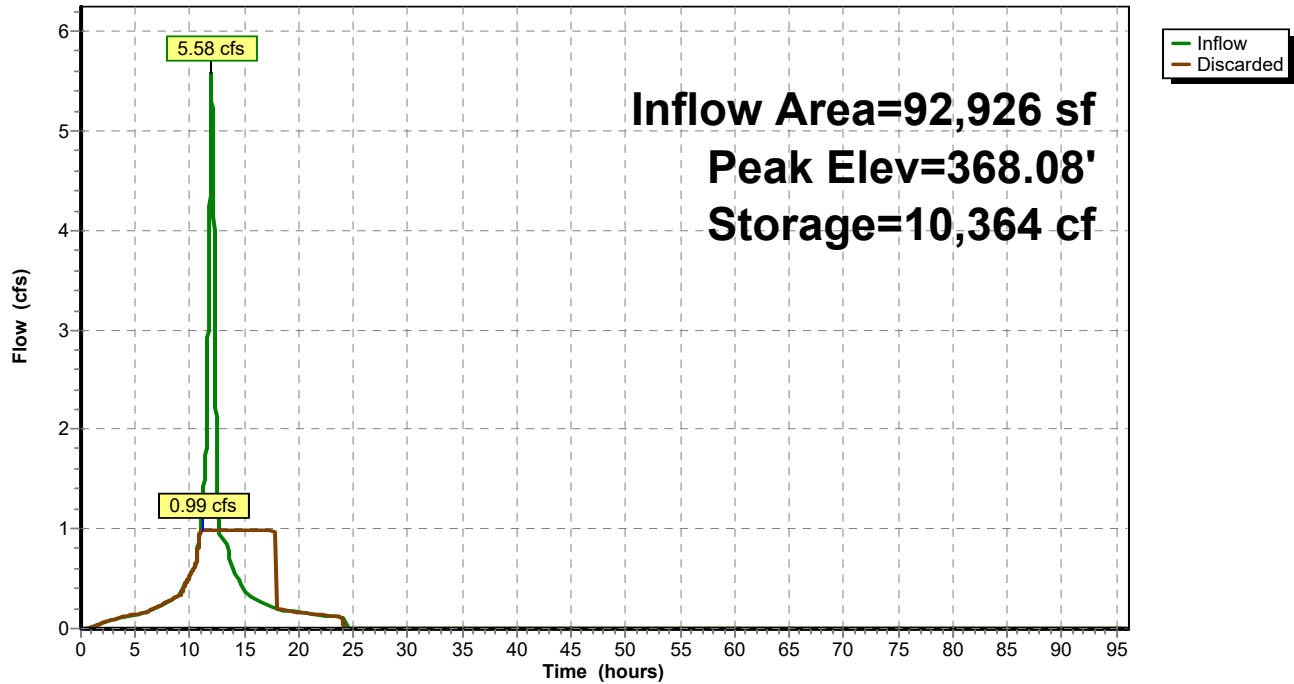
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NRCC 24-hr A 25-yr Rainfall=6.46"

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Pond 19: INF-2

Hydrograph



N60 P1 Post-A 3-17-20

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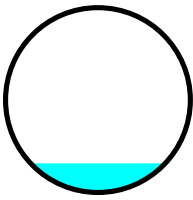
Summary for Reach 20: 36" HDPE Pipe

Inflow = 12.50 cfs @ 12.13 hrs, Volume= 11,524 cf
Outflow = 12.37 cfs @ 12.14 hrs, Volume= 11,524 cf, Atten= 1%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 17.41 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 7.58 fps, Avg. Travel Time= 1.8 min

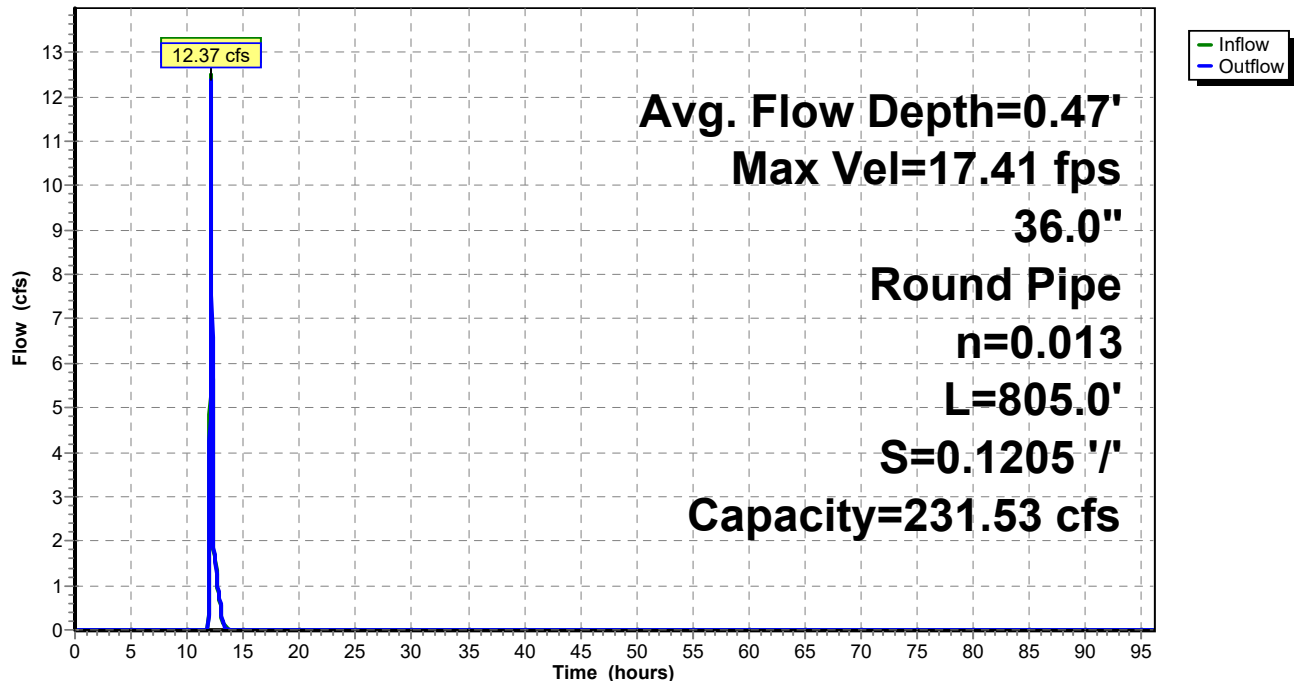
Peak Storage= 572 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.47'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 231.53 cfs

36.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 805.0' Slope= 0.1205 '/
Inlet Invert= 355.00', Outlet Invert= 258.00'



Reach 20: 36" HDPE Pipe

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 21: A6

Runoff = 71.57 cfs @ 12.13 hrs, Volume= 191,880 cf, Depth= 5.99"

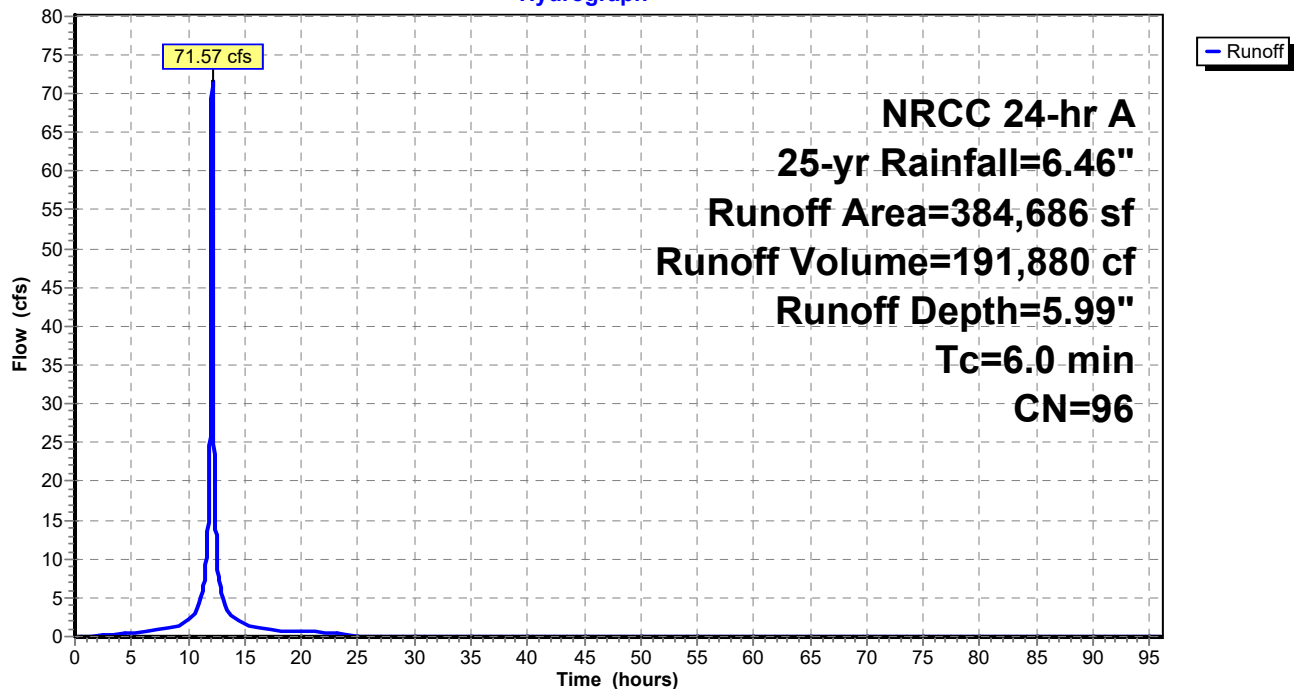
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
332,512	98	Paved parking, HSG C
52,174	86	<50% Grass cover, Poor, HSG C
384,686	96	Weighted Average
52,174		13.56% Pervious Area
332,512		86.44% Impervious Area

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

Subcatchment 21: A6

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 22: A7

Runoff = 11.18 cfs @ 12.13 hrs, Volume= 25,749 cf, Depth= 2.98"

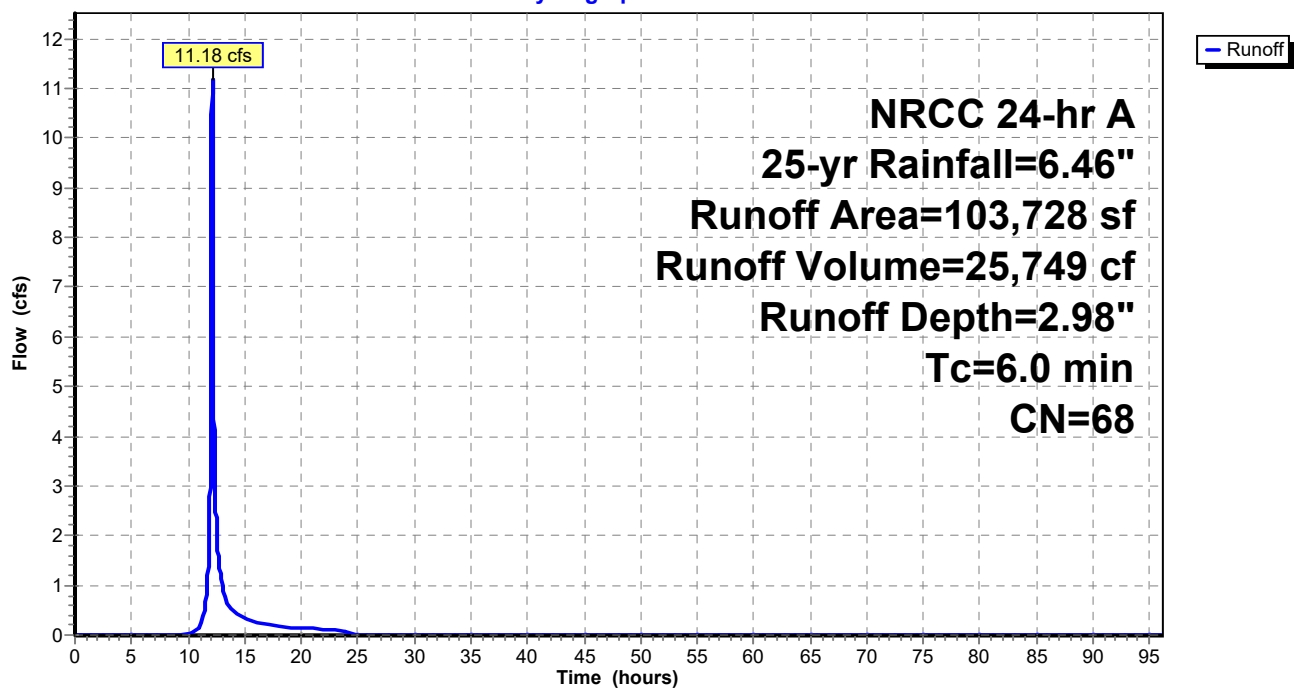
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
35,128	65	Brush, Good, HSG C
68,600	70	Woods, Good, HSG C
103,728	68	Weighted Average
103,728		100.00% Pervious Area

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

Subcatchment 22: A7

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Pond 23: Infiltration Basin (SWP-3)

Inflow Area = 488,414 sf, 68.08% Impervious, Inflow Depth = 5.63" for 25-yr event
 Inflow = 94.95 cfs @ 12.13 hrs, Volume= 229,153 cf
 Outflow = 52.13 cfs @ 12.21 hrs, Volume= 229,153 cf, Atten= 45%, Lag= 4.9 min
 Discarded = 6.38 cfs @ 12.21 hrs, Volume= 168,976 cf
 Primary = 45.76 cfs @ 12.21 hrs, Volume= 60,177 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 261.16' @ 12.21 hrs Surf.Area= 18,362 sf Storage= 71,092 cf

Plug-Flow detention time= 58.0 min calculated for 229,129 cf (100% of inflow)
 Center-of-Mass det. time= 58.0 min (820.4 - 762.4)

Volume	Invert	Avail.Storage	Storage Description		
#1	256.00'	87,144 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
256.00	9,450	527.9	0	0	9,450
258.00	12,731	565.7	22,100	22,100	12,917
260.00	16,238	603.5	28,898	50,998	16,623
262.00	19,973	641.3	36,147	87,144	20,569

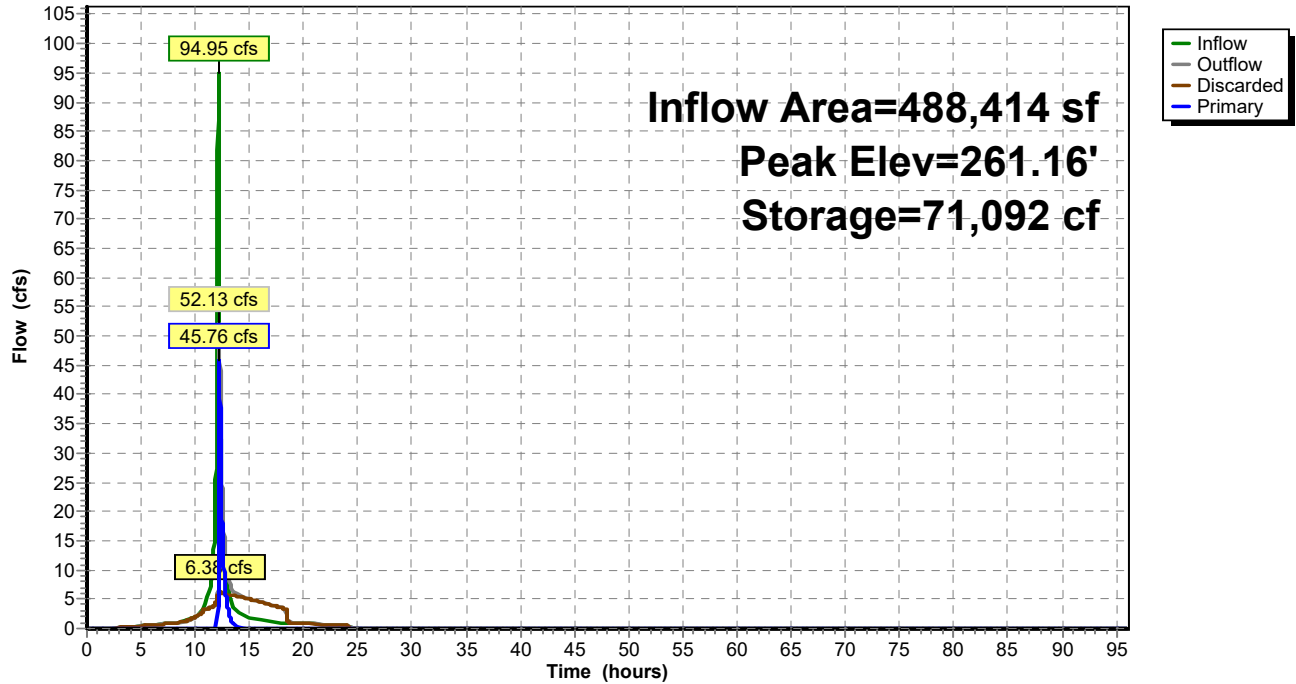
Device	Routing	Invert	Outlet Devices
#1	Primary	254.00'	36.0" Round Culvert X 2.00 L= 95.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 254.00' / 244.00' S= 0.1053 ' S= 0.1053 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	260.00'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	260.00'	3.0' long x 0.5' breadth Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	259.40'	6.0" Vert. Orifice/Grate C= 0.600
#5	Device 1	261.00'	36.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Discarded	256.00'	15.000 in/hr Exfiltration over Surface area Phase-In= 0.10'

Discarded OutFlow Max=6.37 cfs @ 12.21 hrs HW=261.16' (Free Discharge)
 ↳ **6=Exfiltration** (Exfiltration Controls 6.37 cfs)

Primary OutFlow Max=45.68 cfs @ 12.21 hrs HW=261.16' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Passes 45.68 cfs of 161.96 cfs potential flow)
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 16.62 cfs @ 3.58 fps)
 ↳ **3=Broad-Crested Rectangular Weir** (Weir Controls 24.93 cfs @ 3.58 fps)
 ↳ **4=Orifice/Grate** (Orifice Controls 1.16 cfs @ 5.92 fps)
 ↳ **5=Orifice/Grate** (Weir Controls 2.97 cfs @ 1.31 fps)

Pond 23: Infiltration Basin (SWP-3)

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 25-yr Rainfall=6.46"

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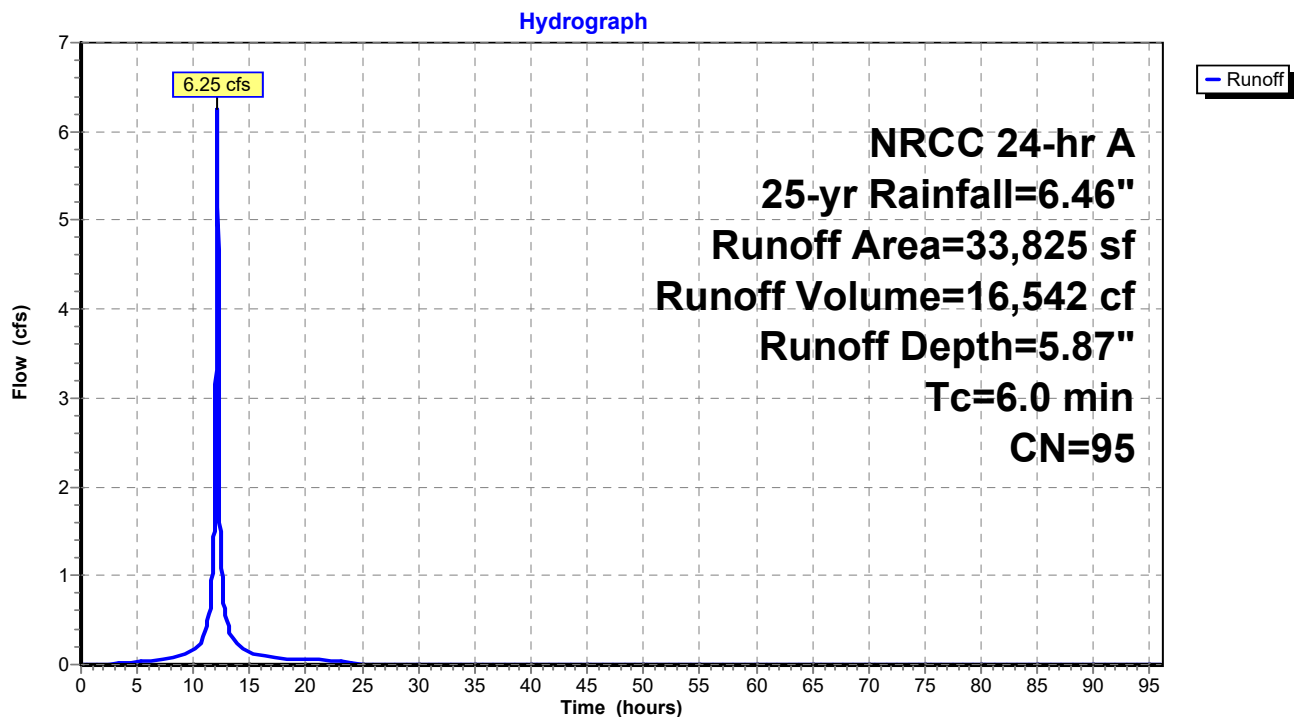
Summary for Subcatchment 24: A9

Runoff = 6.25 cfs @ 12.13 hrs, Volume= 16,542 cf, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
29,687	98	Paved parking, HSG C
4,138	74	>75% Grass cover, Good, HSG C
33,825	95	Weighted Average
4,138		12.23% Pervious Area
29,687		87.77% Impervious Area

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

Subcatchment 24: A9

N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Pond 25: DIV-4

Inflow Area = 33,825 sf, 87.77% Impervious, Inflow Depth = 5.87" for 25-yr event
 Inflow = 6.25 cfs @ 12.13 hrs, Volume= 16,542 cf
 Outflow = 6.25 cfs @ 12.13 hrs, Volume= 16,542 cf, Atten= 0%, Lag= 0.0 min
 Primary = 5.23 cfs @ 12.08 hrs, Volume= 15,026 cf
 Secondary = 1.53 cfs @ 12.14 hrs, Volume= 1,517 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 352.67' @ 12.14 hrs

Flood Elev= 355.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	349.50'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 349.50' / 349.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	349.50'	18.0" Round Culvert L= 128.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 349.50' / 344.00' S= 0.0430 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	352.50'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.05 cfs @ 12.08 hrs HW=352.52' TW=350.73' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 5.05 cfs @ 6.44 fps)**Secondary OutFlow** Max=1.52 cfs @ 12.14 hrs HW=352.67' TW=0.00' (Dynamic Tailwater)↑**2=Culvert** (Passes 1.52 cfs of 13.23 cfs potential flow)↑**3=Broad-Crested Rectangular Weir** (Weir Controls 1.52 cfs @ 1.14 fps)

N60 P1 Post-A 3-17-20

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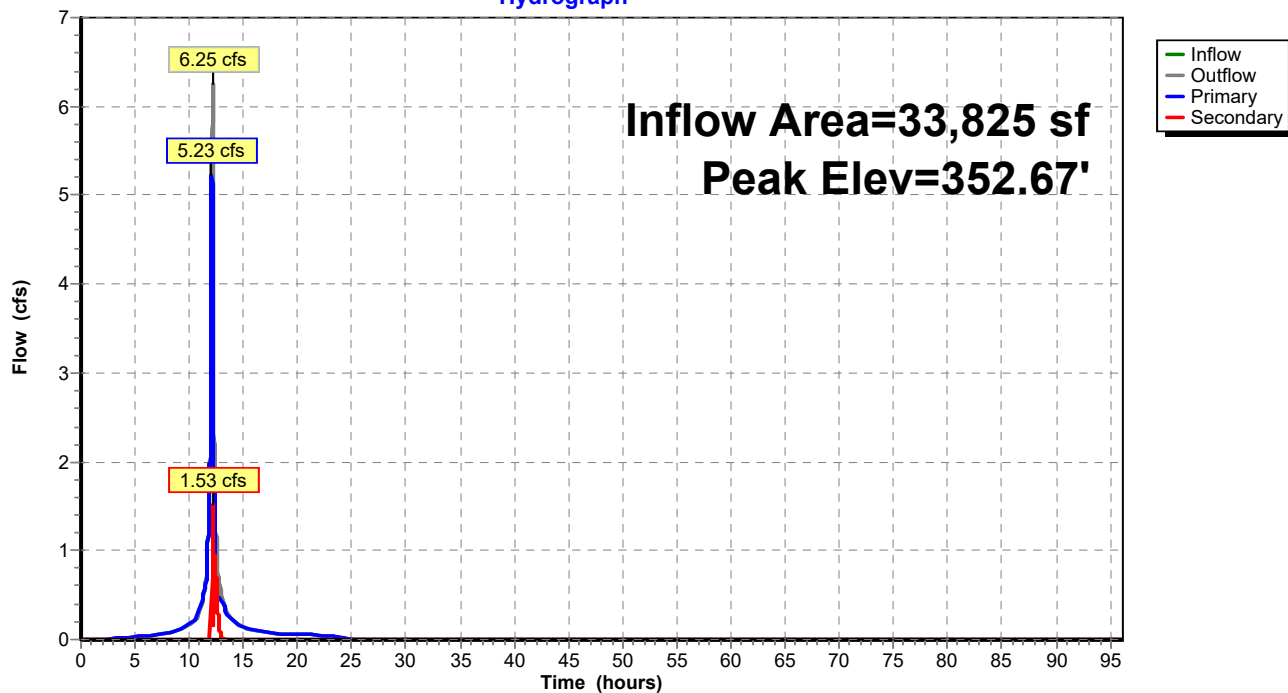
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NRCC 24-hr A 25-yr Rainfall=6.46"

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Pond 25: DIV-4

Hydrograph



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NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Pond 26: INF-4

Inflow Area = 33,825 sf, 87.77% Impervious, Inflow Depth = 5.33" for 25-yr event
 Inflow = 5.23 cfs @ 12.08 hrs, Volume= 15,026 cf
 Outflow = 0.52 cfs @ 11.47 hrs, Volume= 15,026 cf, Atten= 90%, Lag= 0.0 min
 Discarded = 0.52 cfs @ 11.47 hrs, Volume= 15,026 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 352.61' @ 12.37 hrs Surf.Area= 2,242 sf Storage= 5,151 cf

Plug-Flow detention time= 65.8 min calculated for 15,024 cf (100% of inflow)
 Center-of-Mass det. time= 65.8 min (827.7 - 761.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	349.00'	2,196 cf	30.50'W x 73.50'L x 3.88'H Field A 8,687 cf Overall - 3,196 cf Embedded = 5,490 cf x 40.0% Voids
#2A	349.50'	3,196 cf	Cultec R-330XLHD x 60 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
		5,393 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	349.00'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=0.52 cfs @ 11.47 hrs HW=349.04' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.52 cfs)

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Pond 26: INF-4 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

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

10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length

6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width

6.0" Base + 30.5" Chamber Height + 10.0" Cover = 3.88' Field Height

60 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 3,196.5 cf Chamber Storage

8,686.8 cf Field - 3,196.5 cf Chambers = 5,490.3 cf Stone x 40.0% Voids = 2,196.1 cf Stone Storage

Chamber Storage + Stone Storage = 5,392.6 cf = 0.124 af

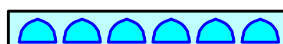
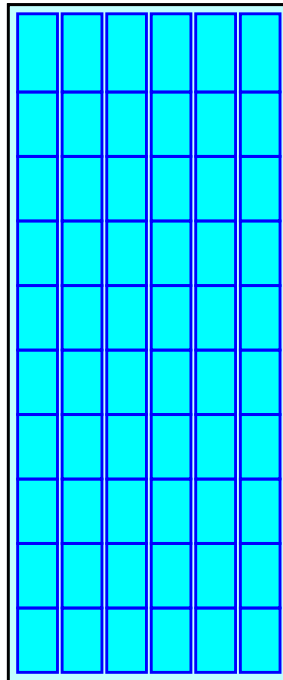
Overall Storage Efficiency = 62.1%

Overall System Size = 73.50' x 30.50' x 3.88'

60 Chambers

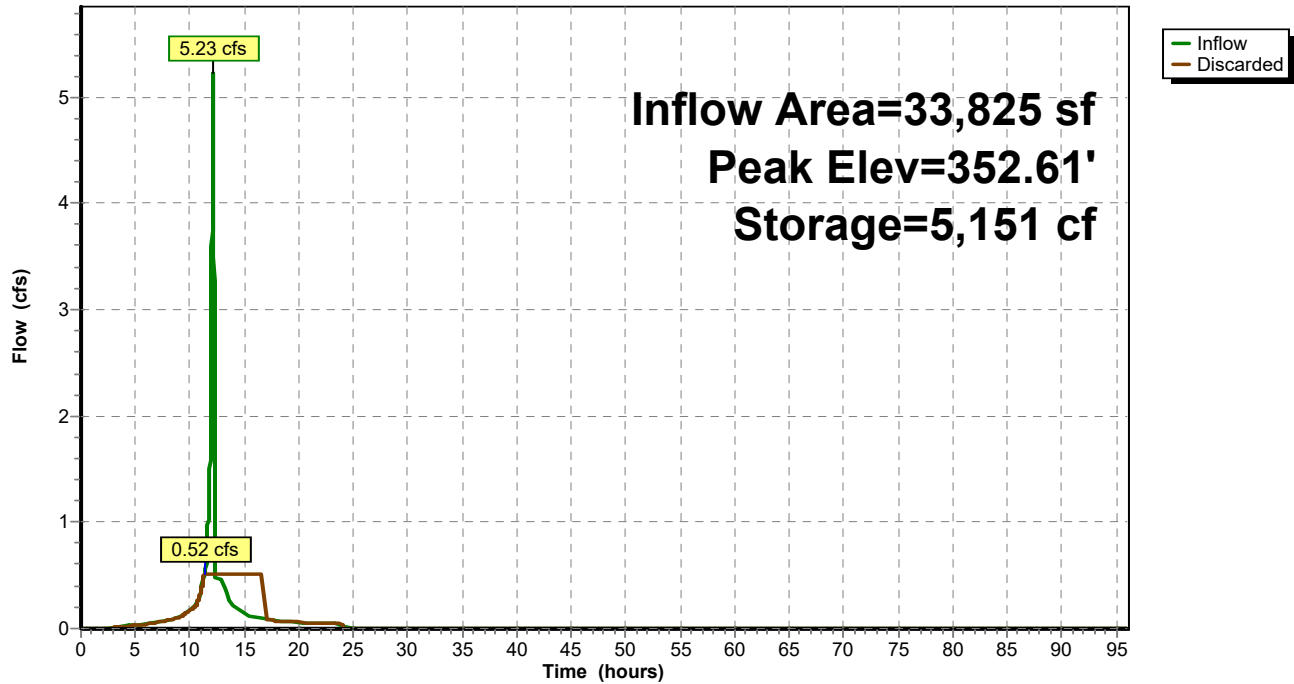
321.7 cy Field

203.3 cy Stone



Pond 26: INF-4

Hydrograph



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NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 27: A10

Runoff = 5.53 cfs @ 12.13 hrs, Volume= 12,830 cf, Depth= 3.58"

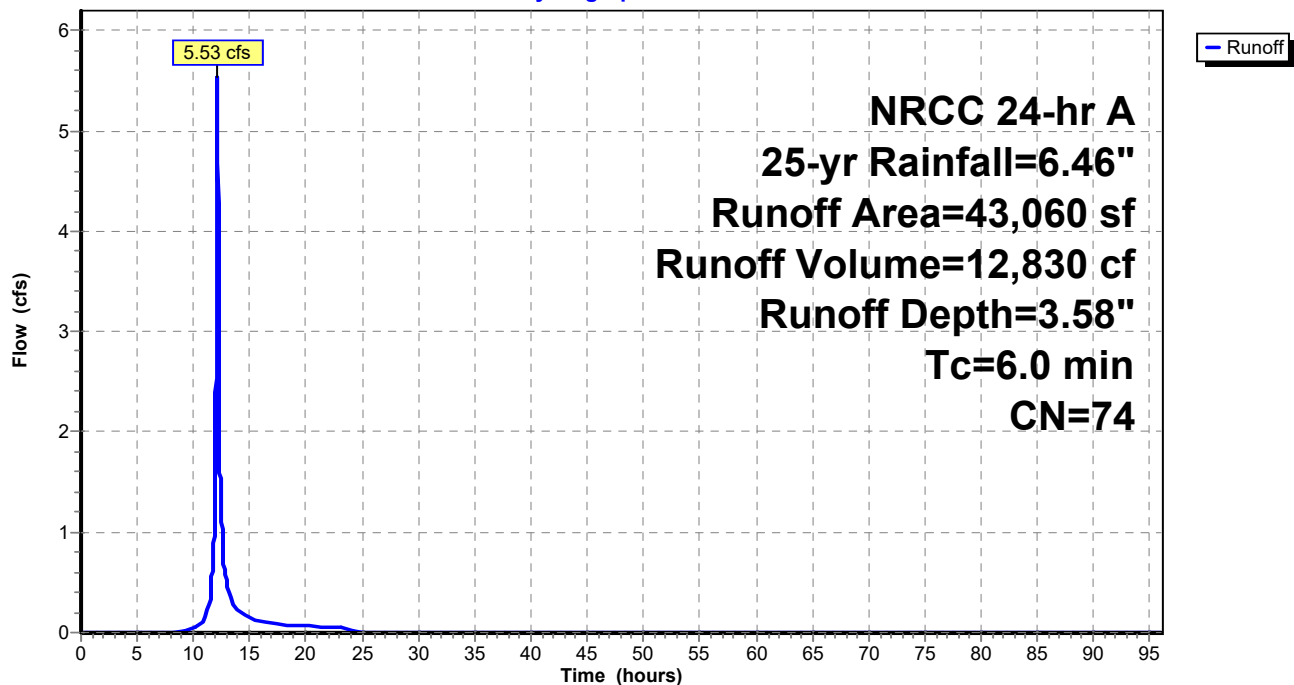
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
16,120	73	Brush, Good, HSG D
19,715	77	Brush, Poor, HSG C
7,225	70	Woods, Good, HSG C
43,060	74	Weighted Average
43,060		100.00% Pervious Area

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

Subcatchment 27: A10

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 28: A10

Runoff = 19.31 cfs @ 12.13 hrs, Volume= 51,091 cf, Depth= 5.87"

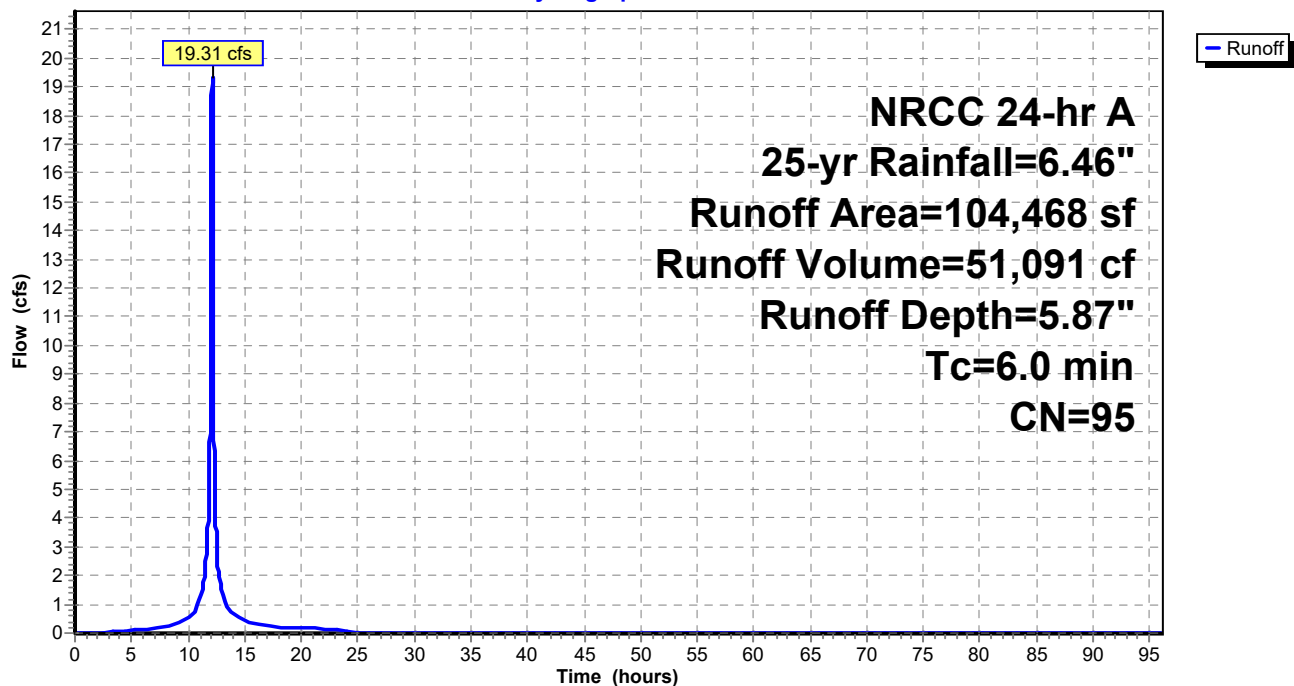
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
91,430	98	Paved parking, HSG C
7,435	74	>75% Grass cover, Good, HSG C
5,603	80	>75% Grass cover, Good, HSG D
104,468	95	Weighted Average
13,038		12.48% Pervious Area
91,430		87.52% Impervious Area

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

Subcatchment 28: A10

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Pond 29: Infiltration Basin (SWP-2)

Inflow Area = 147,528 sf, 61.97% Impervious, Inflow Depth = 5.20" for 25-yr event
 Inflow = 24.83 cfs @ 12.13 hrs, Volume= 63,920 cf
 Outflow = 3.37 cfs @ 12.60 hrs, Volume= 63,920 cf, Atten= 86%, Lag= 28.4 min
 Discarded = 2.82 cfs @ 12.60 hrs, Volume= 60,065 cf
 Primary = 0.55 cfs @ 12.60 hrs, Volume= 3,855 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 320.11' @ 12.60 hrs Surf.Area= 8,119 sf Storage= 24,626 cf

Plug-Flow detention time= 65.9 min calculated for 63,914 cf (100% of inflow)
 Center-of-Mass det. time= 65.9 min (837.1 - 771.2)

Volume	Invert	Avail.Storage	Storage Description
#1	316.00'	41,962 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
316.00	4,026	293.0	0	0	4,026
318.00	5,897	330.7	9,864	9,864	5,998
320.00	7,994	368.3	13,838	23,702	8,204
322.00	10,316	406.0	18,261	41,962	10,652

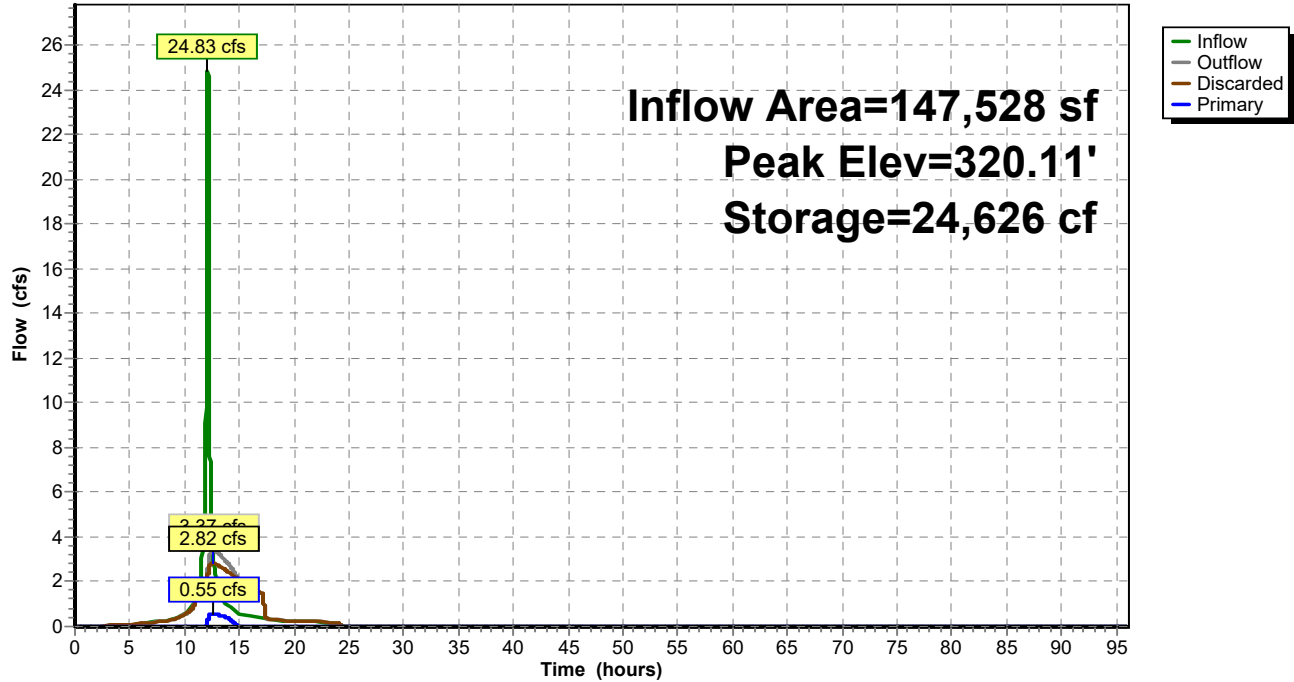
Device	Routing	Invert	Outlet Devices
#1	Primary	310.00'	15.0" Round Culvert L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 310.00' / 304.00' S= 0.1000 ' S= 0.1000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	318.25'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	320.50'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	321.00'	3.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#5	Discarded	316.00'	15.000 in/hr Exfiltration over Surface area Phase-In= 0.10'

Discarded OutFlow Max=2.82 cfs @ 12.60 hrs HW=320.11' (Free Discharge)
 ↳ **5=Exfiltration** (Exfiltration Controls 2.82 cfs)

Primary OutFlow Max=0.55 cfs @ 12.60 hrs HW=320.11' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Passes 0.55 cfs of 18.20 cfs potential flow)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.55 cfs @ 6.27 fps)
 ↳ **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
 ↳ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 29: Infiltration Basin (SWP-2)

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 30: Post A2

Runoff = 21.45 cfs @ 12.26 hrs, Volume= 74,991 cf, Depth= 3.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
43,743	98	Paved parking, HSG C
107,245	74	>75% Grass cover, Good, HSG C
2,876	61	>75% Grass cover, Good, HSG B
39,583	70	Woods, Good, HSG C
4,283	98	Water Surface, HSG C
33,976	65	Brush, Good, HSG C
231,706	77	Weighted Average
183,680		79.27% Pervious Area
48,026		20.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	215	0.0260	2.60		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	125	0.1000	6.42		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.4	377	0.0750	14.42	17.69	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
17.7	817	Total			

N60 P1 Post-A 3-17-20

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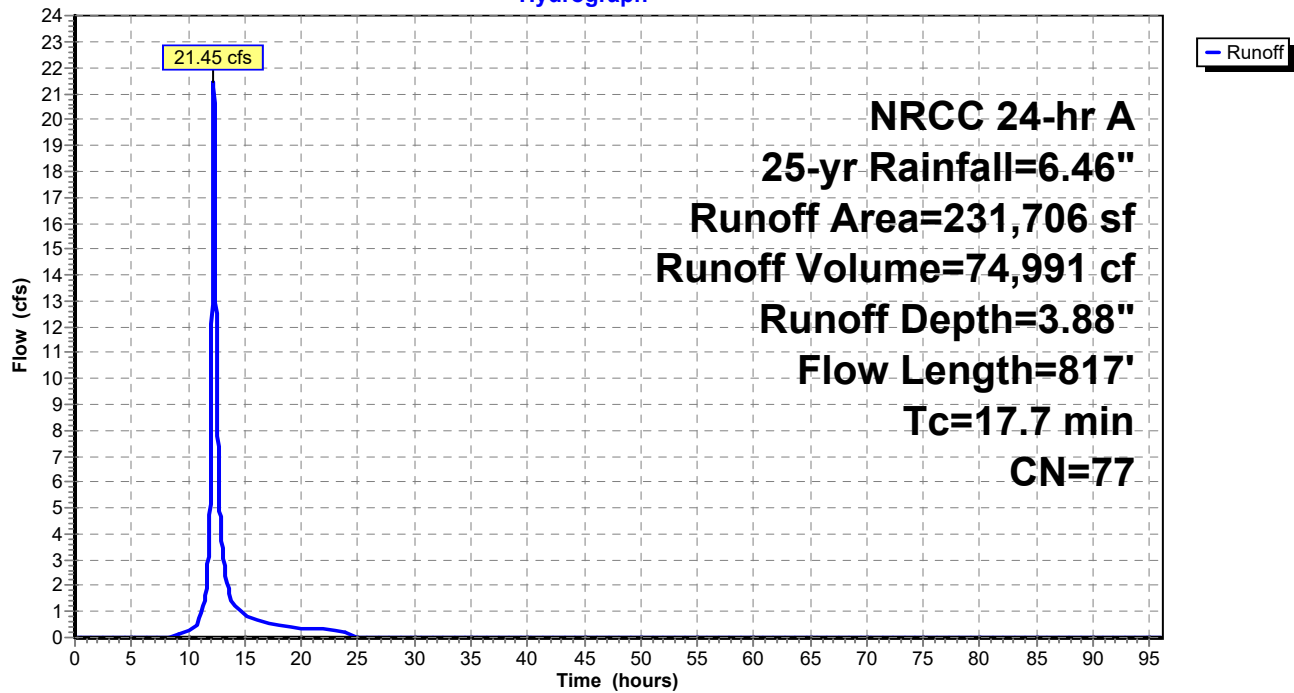
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NRCC 24-hr A 25-yr Rainfall=6.46"

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Subcatchment 30: Post A2

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Pond 31: Pocket Wetland (SWP-1)

Inflow Area = 231,706 sf, 20.73% Impervious, Inflow Depth = 3.88" for 25-yr event
 Inflow = 21.45 cfs @ 12.26 hrs, Volume= 74,991 cf
 Outflow = 6.32 cfs @ 12.71 hrs, Volume= 51,204 cf, Atten= 71%, Lag= 26.9 min
 Primary = 6.32 cfs @ 12.71 hrs, Volume= 51,204 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Starting Elev= 234.50' Surf.Area= 12,504 sf Storage= 7,835 cf
 Peak Elev= 237.77' @ 12.71 hrs Surf.Area= 18,277 sf Storage= 48,398 cf (40,563 cf above start)

Plug-Flow detention time= 1,013.8 min calculated for 43,369 cf (58% of inflow)

Center-of-Mass det. time= 769.9 min (1,589.9 - 819.9)

Volume	Invert	Avail.Storage	Storage Description
#1	230.00'	1,811 cf	Forebay (Irregular) Listed below (Recalc)
#2	230.00'	1,976 cf	Micropool (Irregular) Listed below (Recalc)
#3	233.90'	65,123 cf	Marsh & Storage (Irregular) Listed below (Recalc)
		68,911 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	86	34.2	0	0	86
231.00	217	53.2	147	147	225
232.00	406	72.3	307	453	426
233.00	651	91.4	524	977	688
233.90	1,233	129.1	834	1,811	1,357

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	86	34.2	0	0	86
231.00	217	53.2	147	147	225
232.00	406	72.3	307	453	426
233.00	651	91.4	524	977	688
233.90	1,646	155.1	1,000	1,976	1,942

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
233.90	4,232	530.5	0	0	4,232
234.50	9,625	400.9	4,048	4,048	13,842
235.00	10,440	413.5	5,015	9,063	14,683
236.00	12,144	438.8	11,281	20,344	16,451
237.00	13,950	464.0	13,037	33,381	18,317
238.00	15,856	489.2	14,893	48,273	20,287
239.00	17,864	514.5	16,850	65,123	22,369

Device	Routing	Invert	Outlet Devices
#1	Primary	232.00'	21.0" Round Culvert L= 74.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 232.00' / 231.00' S= 0.0135 ' / ' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 2.41 sf

N60 P1 Post-A 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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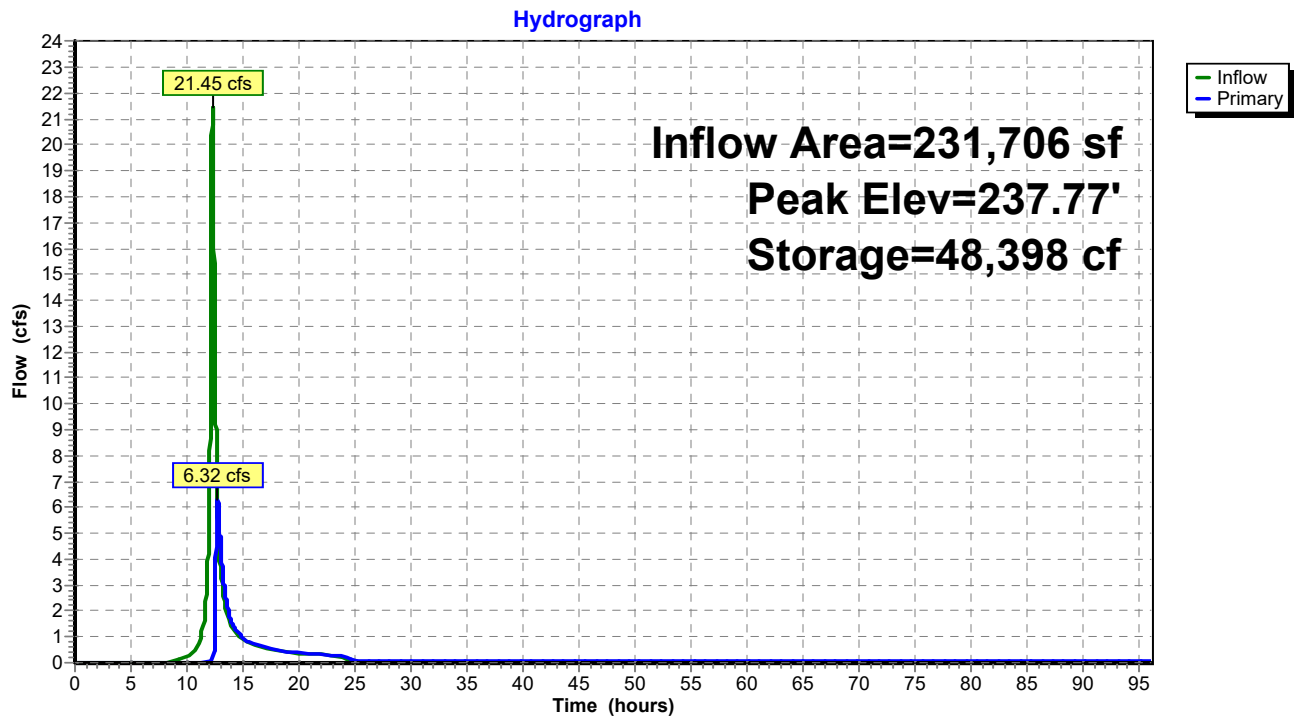
#2	Device 1	234.50'	1.1" Vert. Orifice/Grate	C= 0.600
#3	Device 1	237.50'	36.0" x 48.0" Horiz. Orifice/Grate	C= 0.600

Limited to weir flow at low heads

Primary OutFlow Max=6.32 cfs @ 12.71 hrs HW=237.77' TW=0.00' (Dynamic Tailwater)

1=Culvert (Passes 6.32 cfs of 18.31 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.06 cfs @ 8.64 fps)
3=Orifice/Grate (Weir Controls 6.27 cfs @ 1.69 fps)

Pond 31: Pocket Wetland (SWP-1)



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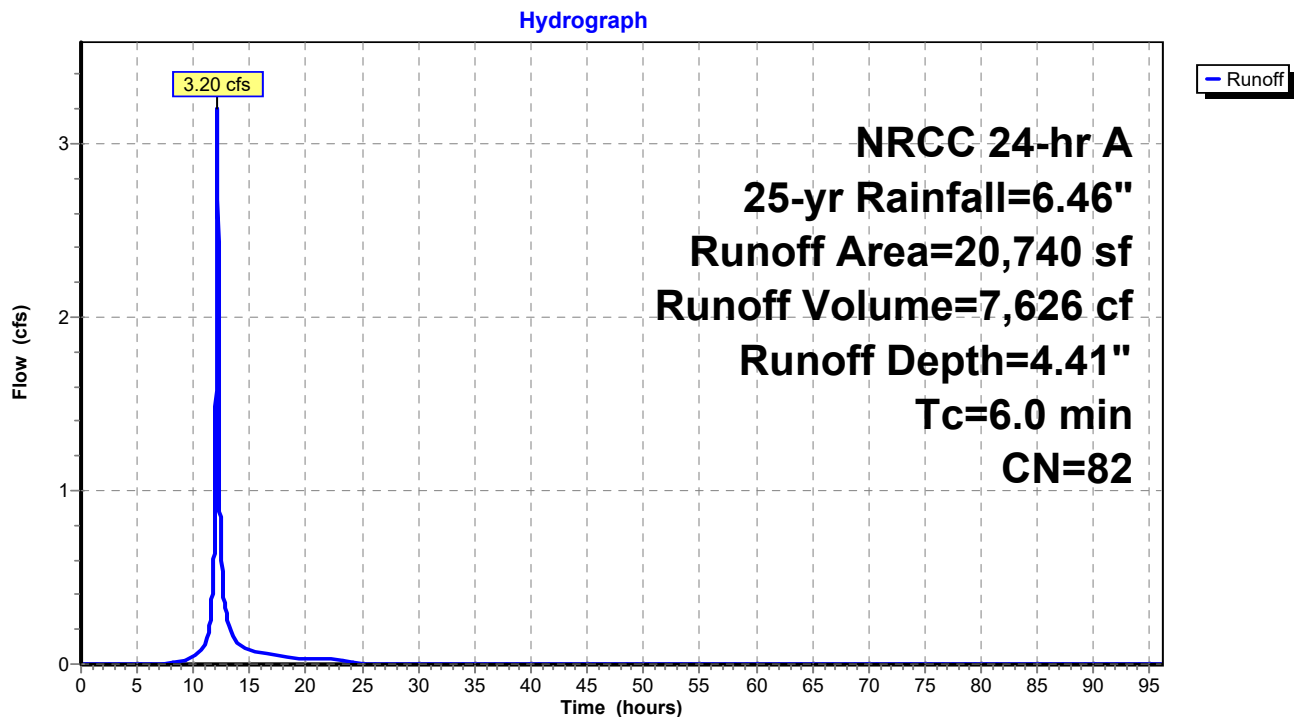
Summary for Subcatchment 32: Post A1

Runoff = 3.20 cfs @ 12.13 hrs, Volume= 7,626 cf, Depth= 4.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
7,304	98	Paved parking, HSG C
10,356	74	>75% Grass cover, Good, HSG C
3,080	70	Woods, Good, HSG C
20,740	82	Weighted Average
13,436		64.78% Pervious Area
7,304		35.22% Impervious Area

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

Subcatchment 32: Post A1

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 25-yr Rainfall=6.46"

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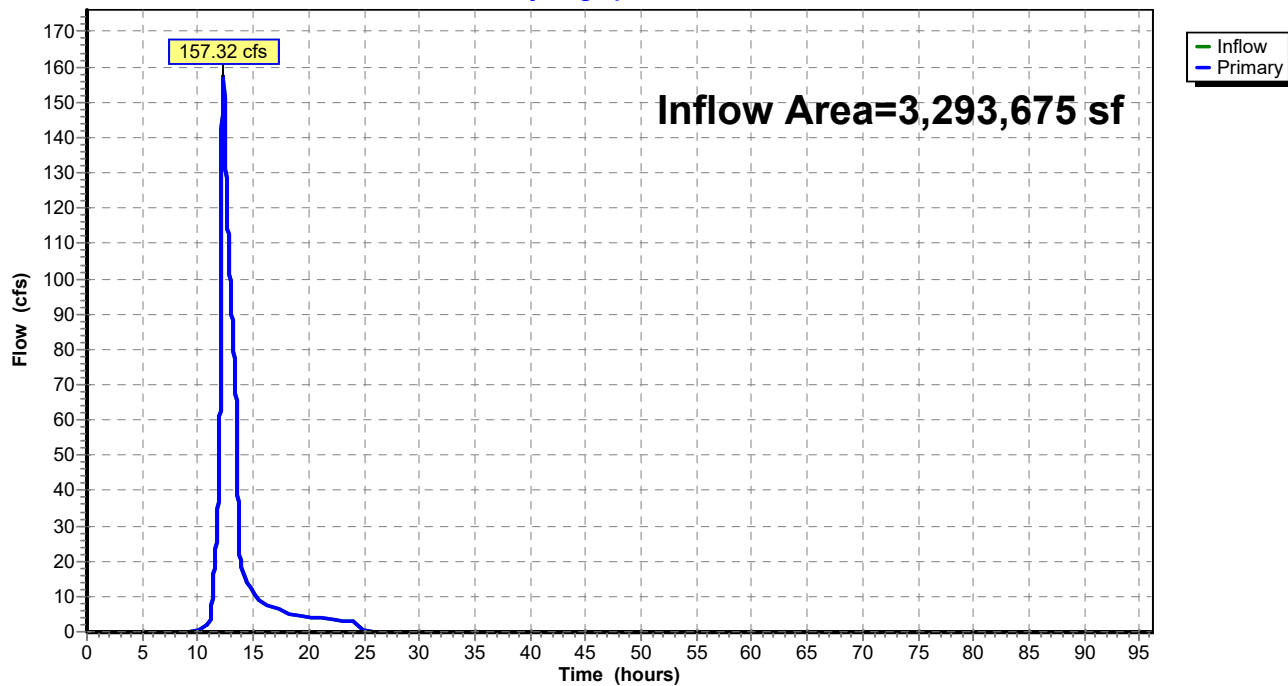
Summary for Link 33: Design Point A

Inflow Area = 3,293,675 sf, 35.25% Impervious, Inflow Depth > 3.42" for 25-yr event
Inflow = 157.32 cfs @ 12.27 hrs, Volume= 939,840 cf
Primary = 157.32 cfs @ 12.27 hrs, Volume= 939,840 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 33: Design Point A

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment8: Post A0 OffsiteRunoff Area=1,115,060 sf 57.87% Impervious Runoff Depth=6.51"
Flow Length=1,018' Tc=12.5 min CN=90 Runoff=188.18 cfs 604,958 cf**Pond 9: Offsite Pond A**Peak Elev=364.99' Storage=180,130 cf Inflow=188.18 cfs 604,958 cf
Outflow=107.44 cfs 553,763 cf**Subcatchment10: Post A4**Runoff Area=164,583 sf 10.25% Impervious Runoff Depth=4.89"
Flow Length=340' Tc=20.5 min CN=76 Runoff=17.79 cfs 67,008 cf**Reach 11: 24" Culvert Pipe**Avg. Flow Depth=0.98' Max Vel=11.67 fps Inflow=17.79 cfs 67,008 cf
24.0" Round Pipe n=0.013 L=112.0' S=0.0268 '/' Capacity=37.02 cfs Outflow=17.78 cfs 67,008 cf**Subcatchment12: Post A8**Runoff Area=403,480 sf 2.55% Impervious Runoff Depth=4.55"
Flow Length=320' Tc=21.4 min CN=73 Runoff=39.81 cfs 152,820 cf**Pond 12A: Existing Wetland A**Peak Elev=329.26' Storage=84,220 cf Inflow=163.97 cfs 773,591 cf
36.0" Round Culvert n=0.013 L=168.0' S=0.0655 '/' Outflow=88.49 cfs 773,591 cf**Subcatchment12B: Post A11**Runoff Area=722,164 sf 1.29% Impervious Runoff Depth=4.21"
Flow Length=475' Tc=19.8 min CN=70 Runoff=69.08 cfs 253,215 cf**Reach 13: Existing Stream A**Avg. Flow Depth=1.77' Max Vel=10.77 fps Inflow=145.14 cfs 1,026,807 cf
n=0.040 L=1,360.0' S=0.0721 '/' Capacity=291.69 cfs Outflow=144.35 cfs 1,026,807 cf**Subcatchment14: Post A3**Runoff Area=106,378 sf 85.91% Impervious Runoff Depth=7.10"
Tc=6.0 min CN=95 Runoff=23.56 cfs 62,963 cf**Pond 15: DIV-1**Peak Elev=327.81' Inflow=23.56 cfs 62,963 cf
Primary=4.95 cfs 41,243 cf Secondary=19.41 cfs 21,720 cf Outflow=23.56 cfs 62,963 cf**Pond 16: INF-1**Peak Elev=327.17' Storage=9,292 cf Inflow=4.95 cfs 41,243 cf
Outflow=1.18 cfs 41,243 cf**Subcatchment17: Post A5**Runoff Area=92,926 sf 100.00% Impervious Runoff Depth=7.46"
Tc=6.0 min CN=98 Runoff=20.82 cfs 57,772 cf**Pond 18: DIV-2**Peak Elev=368.73' Inflow=20.82 cfs 57,772 cf
Primary=5.36 cfs 40,322 cf Secondary=16.26 cfs 17,450 cf Outflow=20.82 cfs 57,772 cf**Pond 19: INF-2**Peak Elev=368.17' Storage=10,517 cf Inflow=5.36 cfs 40,322 cf
Outflow=0.99 cfs 40,322 cf**Reach 20: 36" HDPE Pipe**Avg. Flow Depth=0.54' Max Vel=18.83 fps Inflow=16.26 cfs 17,450 cf
36.0" Round Pipe n=0.013 L=805.0' S=0.1205 '/' Capacity=231.53 cfs Outflow=16.12 cfs 17,450 cf**Subcatchment21: A6**Runoff Area=384,686 sf 86.44% Impervious Runoff Depth=7.22"
Tc=6.0 min CN=96 Runoff=85.61 cfs 231,504 cf

N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Subcatchment22: A7Runoff Area=103,728 sf 0.00% Impervious Runoff Depth=3.98"
Tc=6.0 min CN=68 Runoff=14.91 cfs 34,442 cf**Pond 23: Infiltration Basin (SWP-3)**Peak Elev=261.53' Storage=77,883 cf Inflow=116.47 cfs 283,397 cf
Discarded=6.62 cfs 187,442 cf Primary=81.27 cfs 95,955 cf Outflow=87.88 cfs 283,397 cf**Subcatchment24: A9**Runoff Area=33,825 sf 87.77% Impervious Runoff Depth=7.10"
Tc=6.0 min CN=95 Runoff=7.49 cfs 20,020 cf**Pond 25: DIV-4**Peak Elev=352.78' Inflow=7.49 cfs 20,020 cf
Primary=5.00 cfs 16,524 cf Secondary=3.33 cfs 3,497 cf Outflow=7.49 cfs 20,020 cf**Pond 26: INF-4**Peak Elev=352.68' Storage=5,213 cf Inflow=5.00 cfs 16,524 cf
Outflow=0.52 cfs 16,524 cf**Subcatchment27: A10**Runoff Area=43,060 sf 0.00% Impervious Runoff Depth=4.66"
Tc=6.0 min CN=74 Runoff=7.15 cfs 16,715 cf**Subcatchment28: A10**Runoff Area=104,468 sf 87.52% Impervious Runoff Depth=7.10"
Tc=6.0 min CN=95 Runoff=23.13 cfs 61,832 cf**Pond 29: Infiltration Basin (SWP-2)**Peak Elev=320.84' Storage=30,770 cf Inflow=30.28 cfs 78,548 cf
Discarded=3.10 cfs 70,926 cf Primary=1.78 cfs 7,622 cf Outflow=4.88 cfs 78,548 cf**Subcatchment30: Post A2**Runoff Area=231,706 sf 20.73% Impervious Runoff Depth=5.00"
Flow Length=817' Tc=17.7 min CN=77 Runoff=27.47 cfs 96,542 cf**Pond 31: Pocket Wetland (SWP-1)**Peak Elev=237.96' Storage=51,483 cf Inflow=27.47 cfs 96,542 cf
Outflow=14.50 cfs 72,742 cf**Subcatchment32: Post A1**Runoff Area=20,740 sf 35.22% Impervious Runoff Depth=5.58"
Tc=6.0 min CN=82 Runoff=3.99 cfs 9,636 cf**Link 33: Design Point A**Inflow=207.13 cfs 1,237,978 cf
Primary=207.13 cfs 1,237,978 cf**Total Runoff Area = 3,526,804 sf Runoff Volume = 1,669,430 cf Average Runoff Depth = 5.68"**
61.01% Pervious = 2,151,703 sf 38.99% Impervious = 1,375,101 sf

N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 8: Post A0 Offsite

Runoff = 188.18 cfs @ 12.20 hrs, Volume= 604,958 cf, Depth= 6.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
645,334	98	Paved parking, HSG C
443,611	80	>75% Grass cover, Good, HSG D
23,572	74	>75% Grass cover, Good, HSG C
2,543	61	>75% Grass cover, Good, HSG B
1,115,060	90	Weighted Average
469,726		42.13% Pervious Area
645,334		57.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.0150	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	148	0.0574	3.86		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	740	0.0270	10.25	32.22	Pipe Channel, 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.015 Concrete sewer w/manholes & inlets
12.5	1,018	Total			

N60 P1 Post-A 3-17-20

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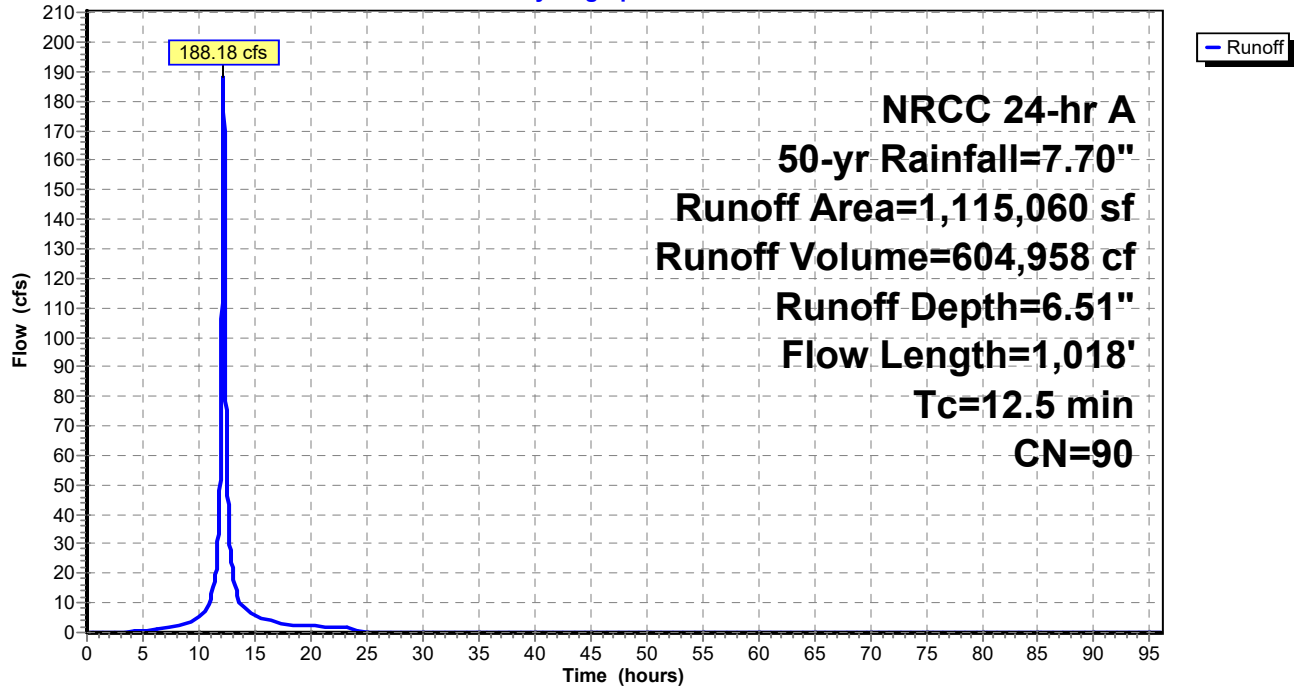
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NRCC 24-hr A 50-yr Rainfall=7.70"

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Subcatchment 8: Post A0 Offsite

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Pond 9: Offsite Pond A

Inflow Area = 1,115,060 sf, 57.87% Impervious, Inflow Depth = 6.51" for 50-yr event
 Inflow = 188.18 cfs @ 12.20 hrs, Volume= 604,958 cf
 Outflow = 107.44 cfs @ 12.35 hrs, Volume= 553,763 cf, Atten= 43%, Lag= 8.9 min
 Primary = 107.44 cfs @ 12.35 hrs, Volume= 553,763 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 364.99' @ 12.35 hrs Surf.Area= 36,483 sf Storage= 180,130 cf

Plug-Flow detention time= 83.1 min calculated for 553,763 cf (92% of inflow)
 Center-of-Mass det. time= 41.1 min (820.8 - 779.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	357.00'	221,816 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
357.00	14,633	679.0	0	0	14,633
358.00	16,652	698.0	15,632	15,632	16,826
359.00	17,534	715.0	17,091	32,723	18,864
360.00	19,427	745.0	18,472	51,195	22,425
362.00	24,453	804.0	43,784	94,979	29,861
364.00	28,701	854.0	53,097	148,076	36,663
365.00	36,602	901.0	32,572	180,648	43,285
366.00	45,910	1,262.0	41,168	221,816	105,432

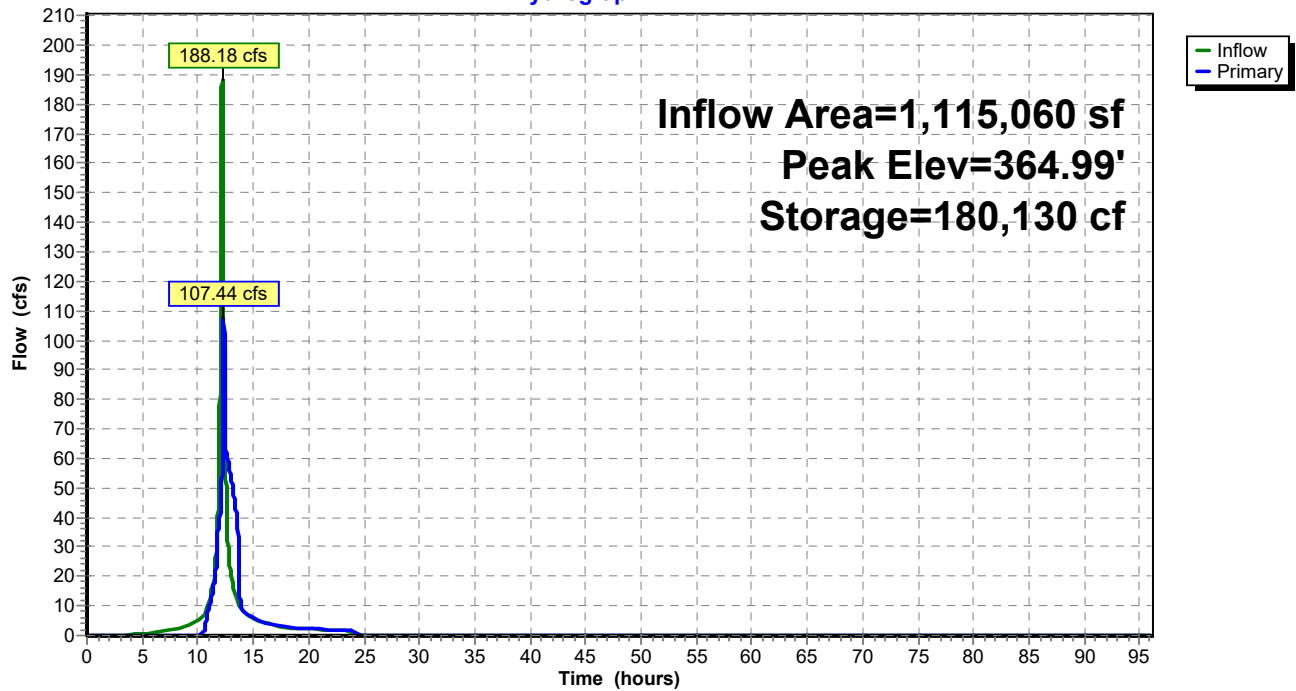
Device	Routing	Invert	Outlet Devices
#1	Primary	357.00'	30.0" Round Culvert L= 125.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 357.00' / 351.00' S= 0.0480 ' S= 0.0480 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#2	Device 1	360.00'	36.0" x 48.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#3	Primary	364.75'	150.0' long x 36.0' 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=107.34 cfs @ 12.35 hrs HW=364.99' TW=327.96' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 61.34 cfs @ 12.50 fps)
 2=Orifice/Grate (Passes 61.34 cfs of 258.02 cfs potential flow)
 3=Broad-Crested Rectangular Weir (Weir Controls 46.00 cfs @ 1.30 fps)

Pond 9: Offsite Pond A

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 10: Post A4

Runoff = 17.79 cfs @ 12.30 hrs, Volume= 67,008 cf, Depth= 4.89"

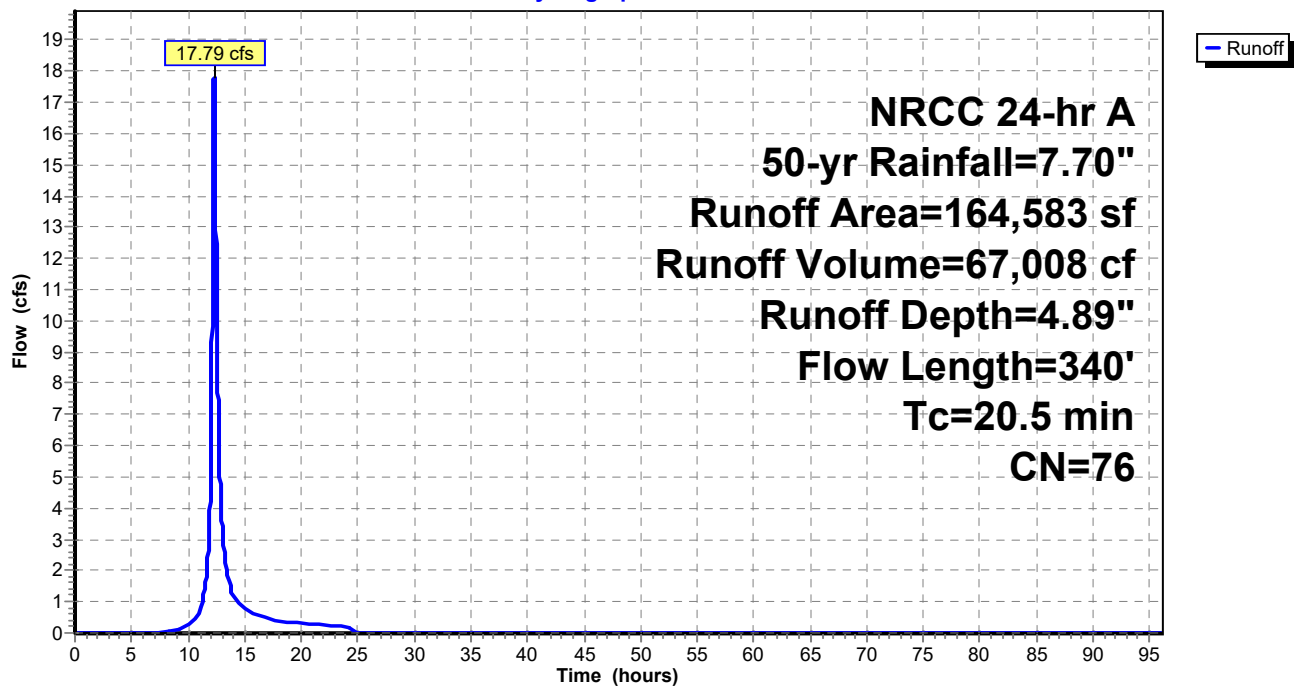
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
15,990	74	>75% Grass cover, Good, HSG C
65,271	70	Woods, Good, HSG C
66,457	77	Woods, Good, HSG D
16,865	98	Water Surface, HSG D
164,583	76	Weighted Average
147,718		89.75% Pervious Area
16,865		10.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.7	240	0.0208	2.32		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
20.5	340	Total			

Subcatchment 10: Post A4

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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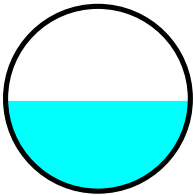
Summary for Reach 11: 24" Culvert Pipe

Inflow Area = 164,583 sf, 10.25% Impervious, Inflow Depth = 4.89" for 50-yr event
Inflow = 17.79 cfs @ 12.30 hrs, Volume= 67,008 cf
Outflow = 17.78 cfs @ 12.30 hrs, Volume= 67,008 cf, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 11.67 fps, Min. Travel Time= 0.2 min
Avg. Velocity= 4.08 fps, Avg. Travel Time= 0.5 min

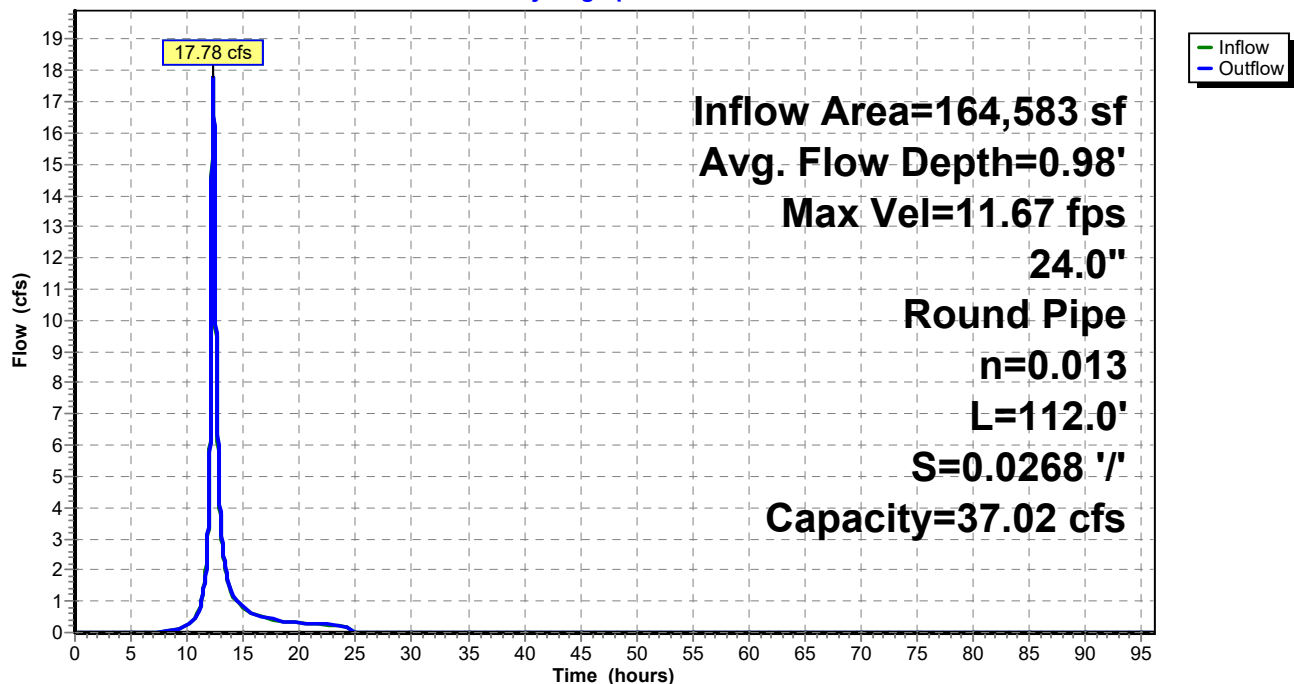
Peak Storage= 171 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.98'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 37.02 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 112.0' Slope= 0.0268 '/
Inlet Invert= 349.00', Outlet Invert= 346.00'



Reach 11: 24" Culvert Pipe

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 12: Post A8

Runoff = 39.81 cfs @ 12.31 hrs, Volume= 152,820 cf, Depth= 4.55"

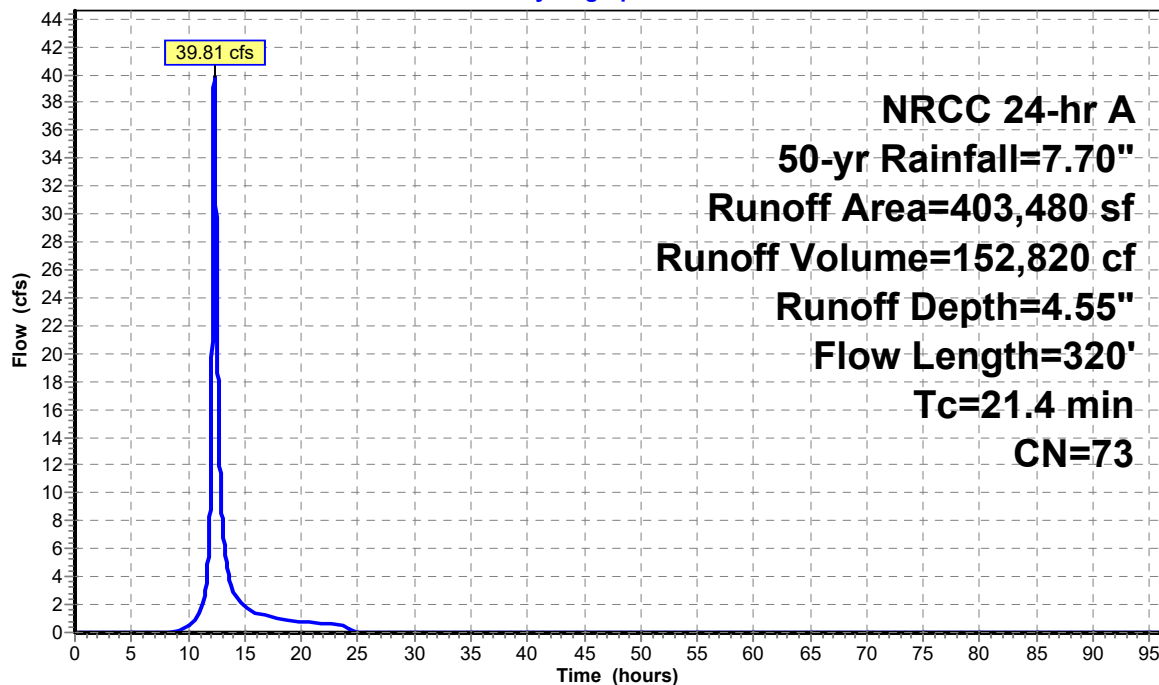
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
278,057	70	Woods, Good, HSG C
108,143	77	Woods, Good, HSG D
10,280	98	Paved parking, HSG D
6,532	74	>75% Grass cover, Good, HSG C
468	80	>75% Grass cover, Good, HSG D
403,480	73	Weighted Average
393,200		97.45% Pervious Area
10,280		2.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.9	220	0.0636	4.06		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
21.4	320	Total			

Subcatchment 12: Post A8

Hydrograph



Runoff

N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Pond 12A: Existing Wetland A

Inflow Area = 1,683,123 sf, 39.95% Impervious, Inflow Depth = 5.52" for 50-yr event
 Inflow = 163.97 cfs @ 12.34 hrs, Volume= 773,591 cf
 Outflow = 88.49 cfs @ 12.61 hrs, Volume= 773,591 cf, Atten= 46%, Lag= 15.9 min
 Primary = 88.49 cfs @ 12.61 hrs, Volume= 773,591 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 329.26' @ 12.61 hrs Surf.Area= 28,693 sf Storage= 84,220 cf

Plug-Flow detention time= 7.5 min calculated for 773,591 cf (100% of inflow)
 Center-of-Mass det. time= 7.3 min (828.8 - 821.4)

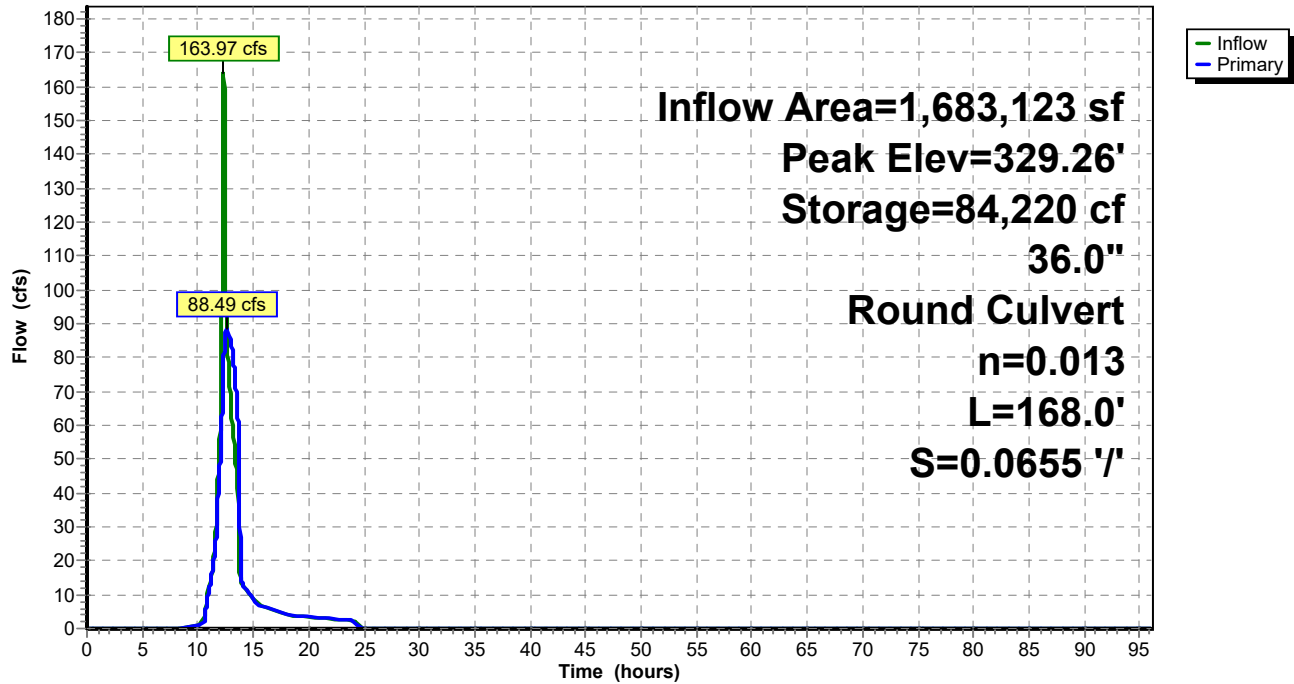
Volume	Invert	Avail.Storage	Storage Description		
#1	321.00'	190,307 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
321.00	124	53.2	0	0	124
322.00	1,084	175.8	525	525	2,361
324.00	4,913	341.5	5,536	6,061	9,202
326.00	11,332	638.2	15,804	21,866	32,354
328.00	20,583	804.3	31,458	53,324	51,475
330.00	34,086	1,075.5	54,104	107,428	92,087
332.00	49,257	1,268.5	82,879	190,307	128,164

Device	Routing	Invert	Outlet Devices
#1	Primary	321.00'	36.0" Round Culvert L= 168.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 321.00' / 310.00' S= 0.0655 ' S= 0.0655 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=88.49 cfs @ 12.61 hrs HW=329.26' TW=313.63' (Dynamic Tailwater)
 ↑**1=Culvert** (Inlet Controls 88.49 cfs @ 12.52 fps)

Pond 12A: Existing Wetland A

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 12B: Post A11

Runoff = 69.08 cfs @ 12.30 hrs, Volume= 253,215 cf, Depth= 4.21"

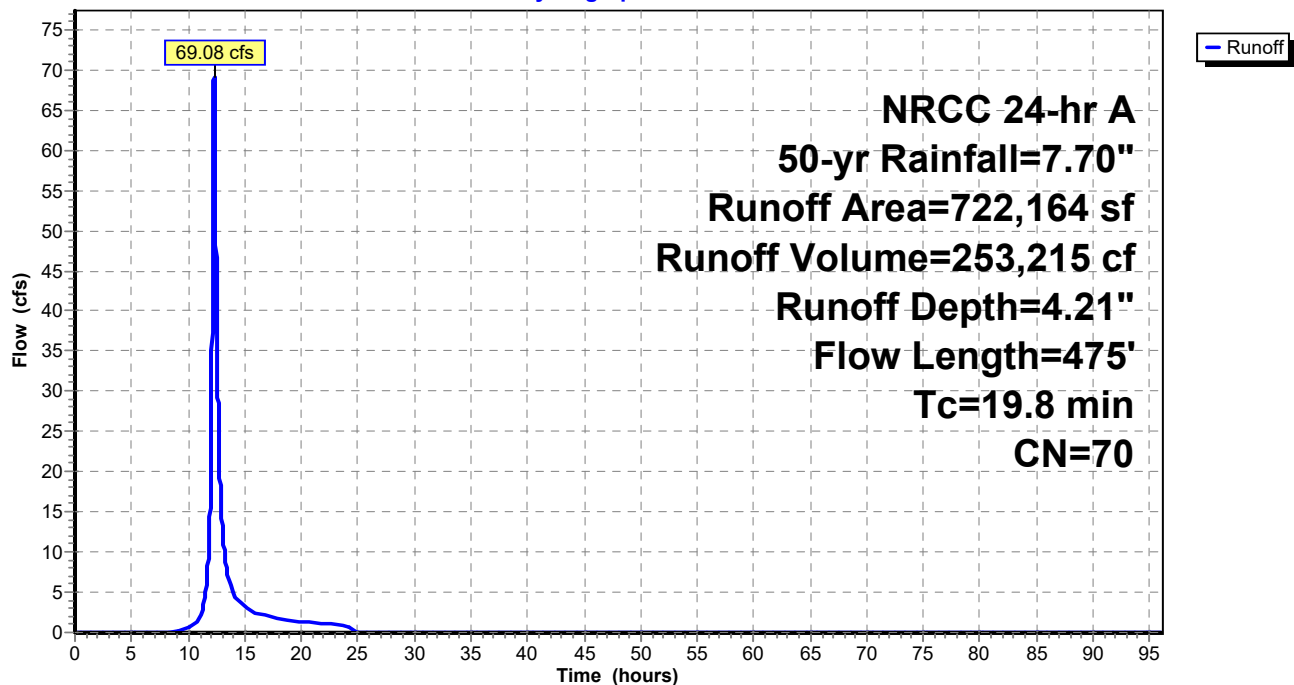
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
17,361	55	Woods, Good, HSG B
681,082	70	Woods, Good, HSG C
11,683	77	Woods, Good, HSG D
9,345	98	Paved parking, HSG C
2,693	74	>75% Grass cover, Good, HSG C
722,164	70	Weighted Average
712,819		98.71% Pervious Area
9,345		1.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.0	375	0.1400	6.02		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
19.8	475	Total			

Subcatchment 12B: Post A11

Hydrograph



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NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Reach 13: Existing Stream A

Inflow Area = 2,405,287 sf, 28.35% Impervious, Inflow Depth = 5.12" for 50-yr event
Inflow = 145.14 cfs @ 12.34 hrs, Volume= 1,026,807 cf
Outflow = 144.35 cfs @ 12.37 hrs, Volume= 1,026,807 cf, Atten= 1%, Lag= 1.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.77 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 2.96 fps, Avg. Travel Time= 7.7 min

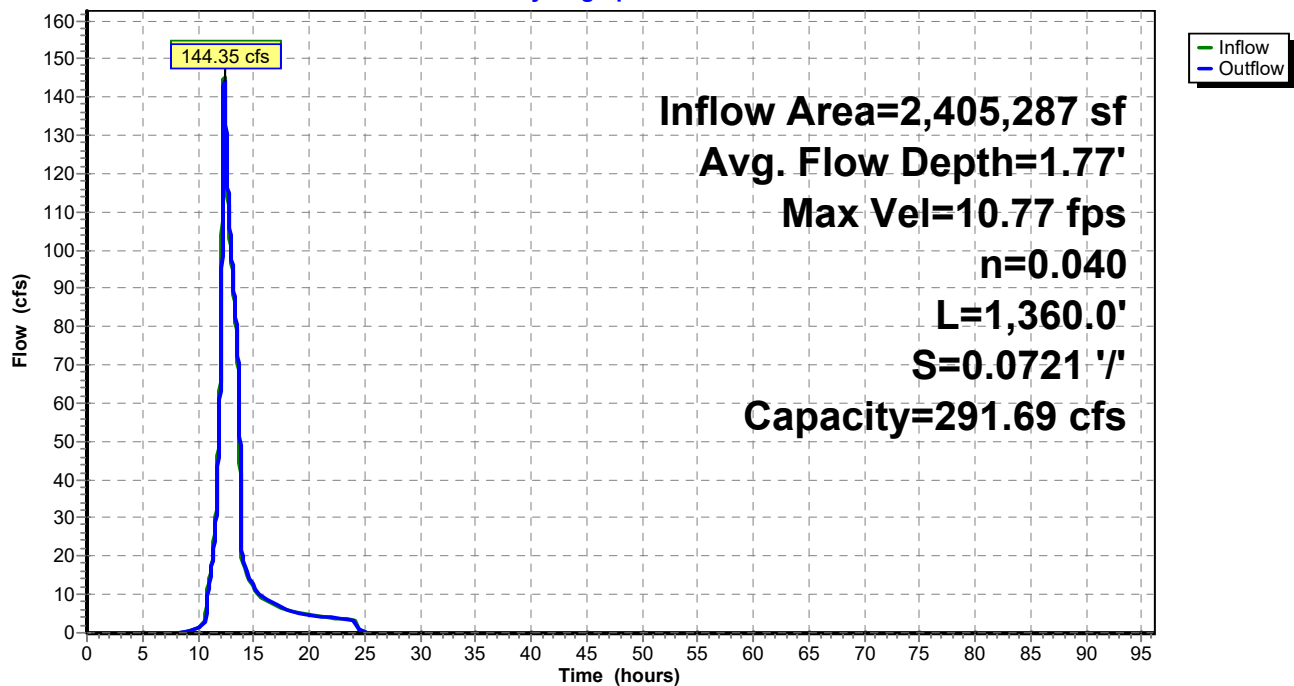
Peak Storage= 18,226 cf @ 12.37 hrs
Average Depth at Peak Storage= 1.77'
Bank-Full Depth= 2.50' Flow Area= 22.5 sf, Capacity= 291.69 cfs

4.00' x 2.50' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 ' ' Top Width= 14.00'
Length= 1,360.0' Slope= 0.0721 ' '
Inlet Invert= 312.00', Outlet Invert= 214.00'



Reach 13: Existing Stream A

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 14: Post A3

Runoff = 23.56 cfs @ 12.13 hrs, Volume= 62,963 cf, Depth= 7.10"

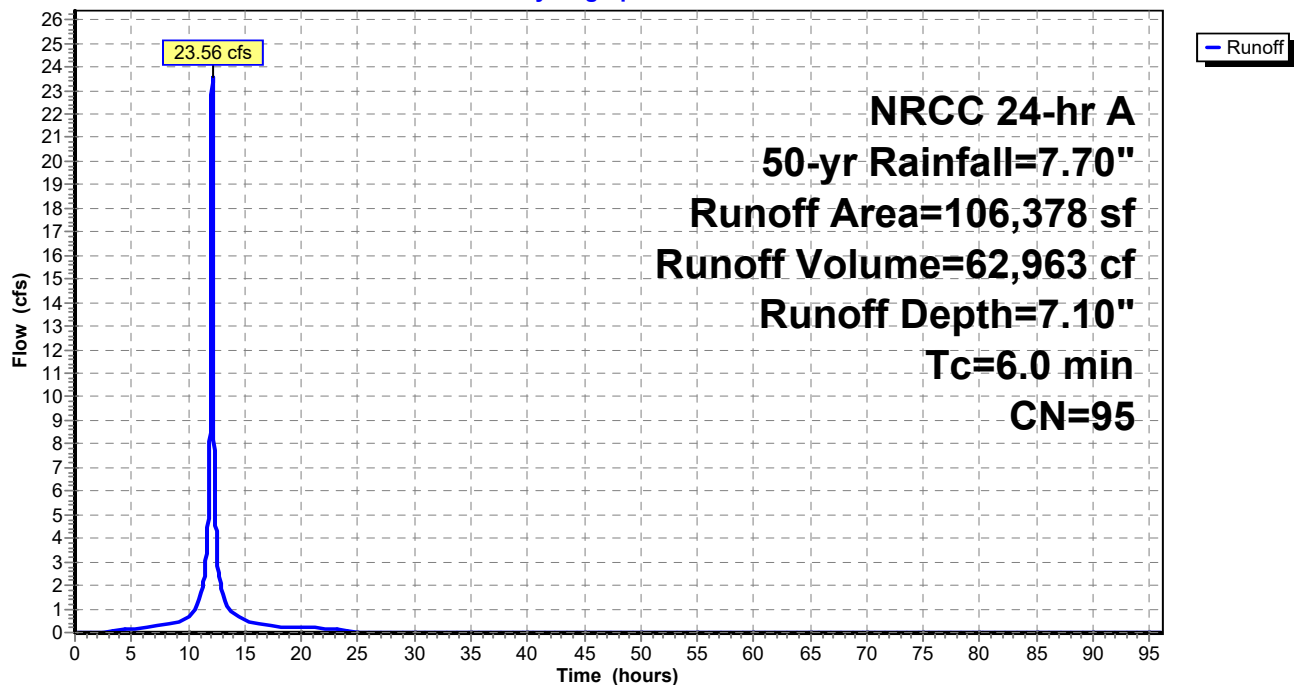
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
91,392	98	Paved parking, HSG C
14,986	74	>75% Grass cover, Good, HSG C
106,378	95	Weighted Average
14,986		14.09% Pervious Area
91,392		85.91% Impervious Area

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

Subcatchment 14: Post A3

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

Prepared by {enter your company name here}

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Summary for Pond 15: DIV-1

Inflow Area = 106,378 sf, 85.91% Impervious, Inflow Depth = 7.10" for 50-yr event
 Inflow = 23.56 cfs @ 12.13 hrs, Volume= 62,963 cf
 Outflow = 23.56 cfs @ 12.13 hrs, Volume= 62,963 cf, Atten= 0%, Lag= 0.0 min
 Primary = 4.95 cfs @ 11.79 hrs, Volume= 41,243 cf
 Secondary = 19.41 cfs @ 12.13 hrs, Volume= 21,720 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 327.81' @ 12.13 hrs

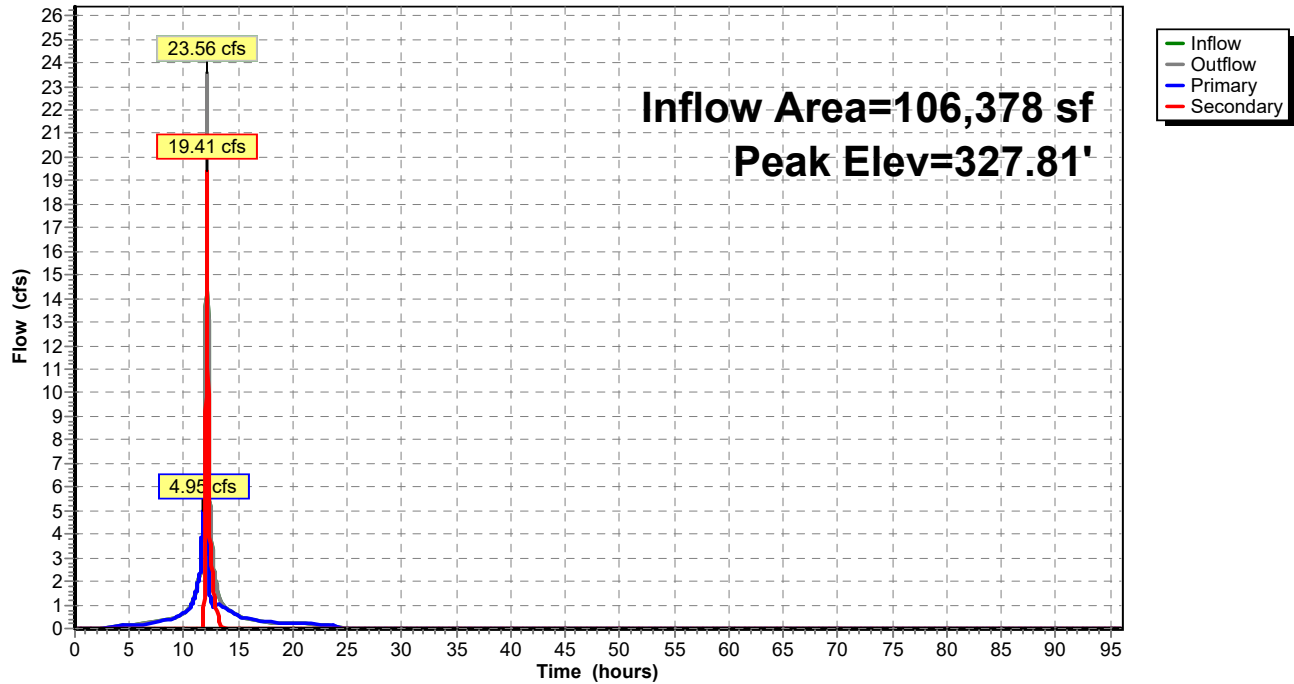
Flood Elev= 330.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 324.50' / 324.50' S= 0.0000 ' S= 0.0000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	324.50'	24.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 324.50' / 320.00' S= 0.0900 ' S= 0.0900 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	327.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.89 cfs @ 11.79 hrs HW=327.04' TW=325.37' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 4.89 cfs @ 6.22 fps)**Secondary OutFlow** Max=19.41 cfs @ 12.13 hrs HW=327.81' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 19.41 cfs of 23.01 cfs potential flow)↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 19.41 cfs @ 2.98 fps)

Pond 15: DIV-1

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Printed 3/24/2020

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Summary for Pond 16: INF-1

Inflow Area = 106,378 sf, 85.91% Impervious, Inflow Depth = 4.65" for 50-yr event
 Inflow = 4.95 cfs @ 11.79 hrs, Volume= 41,243 cf
 Outflow = 1.18 cfs @ 11.03 hrs, Volume= 41,243 cf, Atten= 76%, Lag= 0.0 min
 Discarded = 1.18 cfs @ 11.03 hrs, Volume= 41,243 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 327.17' @ 12.47 hrs Surf.Area= 4,245 sf Storage= 9,292 cf

Plug-Flow detention time= 49.7 min calculated for 41,239 cf (100% of inflow)
 Center-of-Mass det. time= 49.7 min (817.6 - 767.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	324.00'	4,688 cf	36.75'W x 115.50'L x 4.33'H Field A 18,393 cf Overall - 6,674 cf Embedded = 11,720 cf x 40.0% Voids
#2A	324.50'	6,674 cf	Cultec R-360HD x 180 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 180 Chambers in 6 Rows Cap Storage= +6.5 cf x 2 x 6 rows = 77.5 cf
		11,361 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	324.00'	12.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=1.18 cfs @ 11.03 hrs HW=324.05' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 1.18 cfs)

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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Pond 16: INF-1 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 6 rows = 77.5 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

30 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 112.50' Row Length +18.0" End Stone x 2 = 115.50' Base Length

6 Rows x 60.0" Wide + 9.0" Spacing x 5 + 18.0" Side Stone x 2 = 36.75' Base Width

6.0" Base + 36.0" Chamber Height + 10.0" Cover = 4.33' Field Height

180 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 6 Rows = 6,673.6 cf Chamber Storage

18,393.4 cf Field - 6,673.6 cf Chambers = 11,719.8 cf Stone x 40.0% Voids = 4,687.9 cf Stone Storage

Chamber Storage + Stone Storage = 11,361.5 cf = 0.261 af

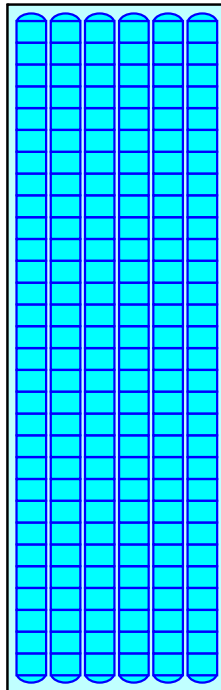
Overall Storage Efficiency = 61.8%

Overall System Size = 115.50' x 36.75' x 4.33'

180 Chambers

681.2 cy Field

434.1 cy Stone



N60 P1 Post-A 3-17-20

Prepared by {enter your company name here}

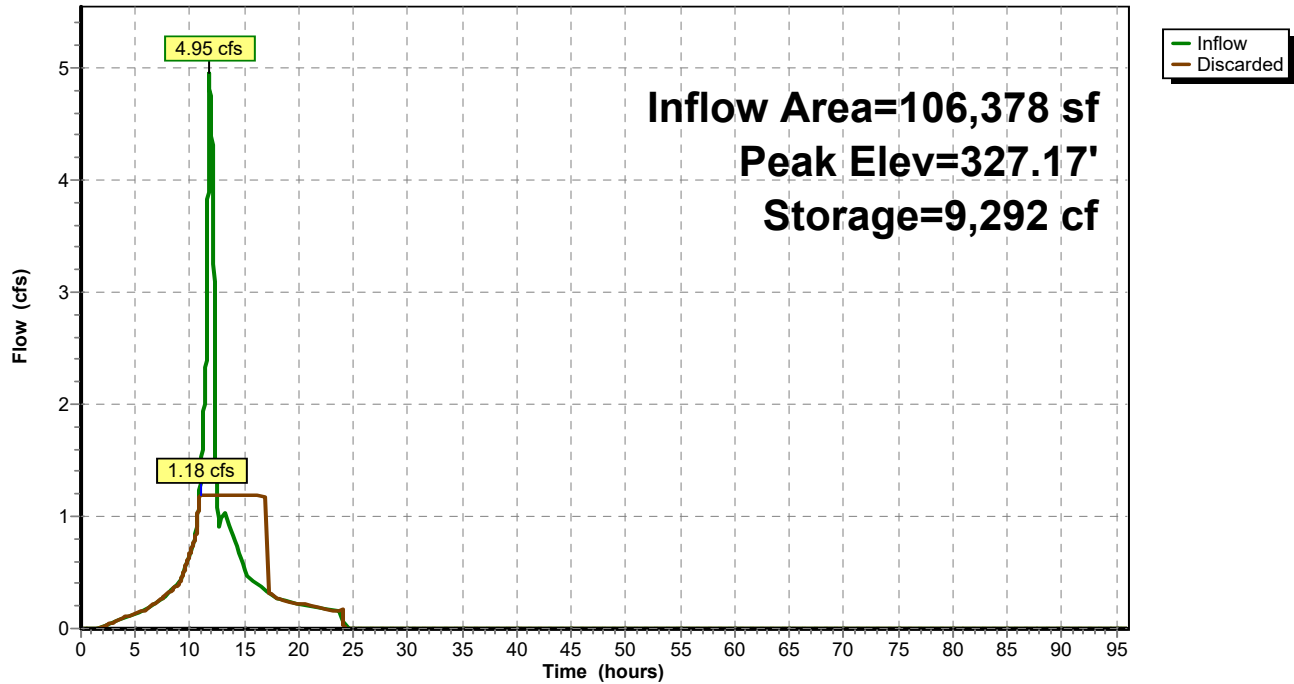
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NRCC 24-hr A 50-yr Rainfall=7.70"

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Pond 16: INF-1

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 17: Post A5

Runoff = 20.82 cfs @ 12.13 hrs, Volume= 57,772 cf, Depth= 7.46"

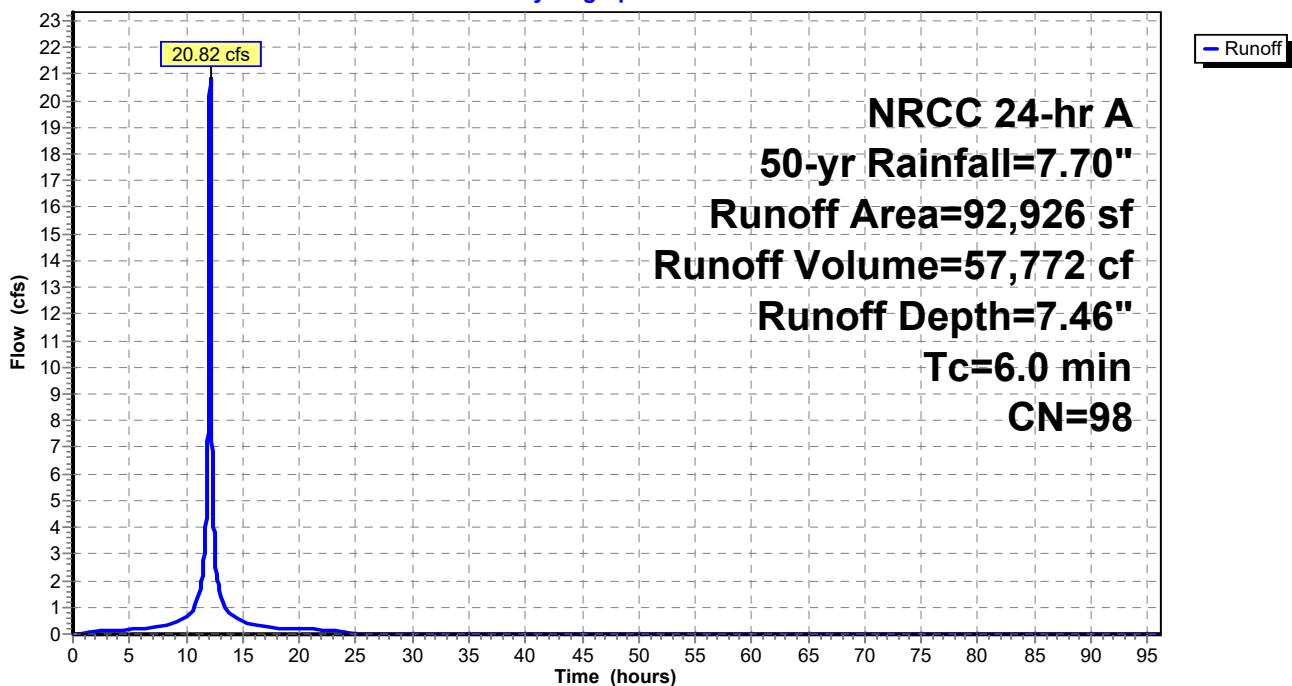
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
92,926	98	Roofs, HSG C
92,926		100.00% Impervious Area

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

Subcatchment 17: Post A5

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Pond 18: DIV-2

Inflow Area = 92,926 sf, 100.00% Impervious, Inflow Depth = 7.46" for 50-yr event
 Inflow = 20.82 cfs @ 12.13 hrs, Volume= 57,772 cf
 Outflow = 20.82 cfs @ 12.13 hrs, Volume= 57,772 cf, Atten= 0%, Lag= 0.0 min
 Primary = 5.36 cfs @ 11.85 hrs, Volume= 40,322 cf
 Secondary = 16.26 cfs @ 12.13 hrs, Volume= 17,450 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 368.73' @ 12.13 hrs

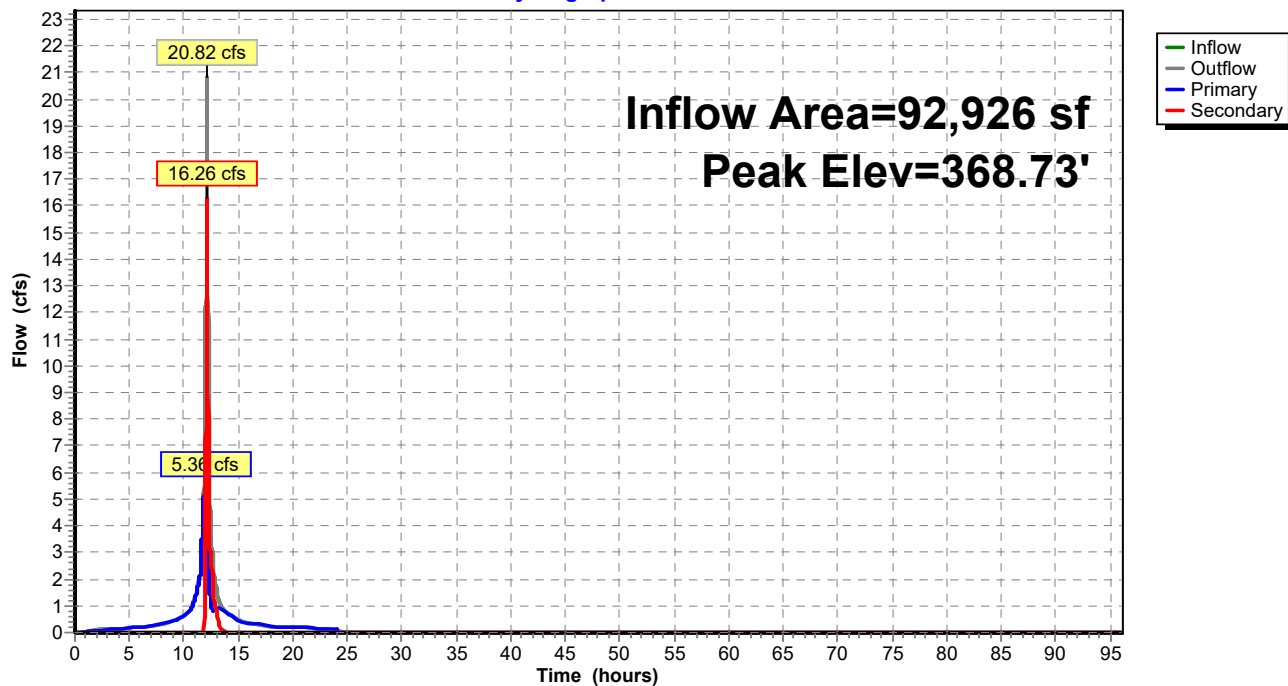
Flood Elev= 371.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	365.00'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 365.00' / 365.00' S= 0.0000 ' S= 0.0000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	366.50'	24.0" Round Culvert L= 550.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 366.50' / 355.00' S= 0.0209 ' S= 0.0209 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	368.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.28 cfs @ 11.85 hrs HW=368.04' TW=366.09' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 5.28 cfs @ 6.72 fps)**Secondary OutFlow** Max=16.25 cfs @ 12.13 hrs HW=368.73' TW=355.53' (Dynamic Tailwater)↑ **2=Culvert** (Passes 16.25 cfs of 16.81 cfs potential flow)↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 16.25 cfs @ 2.77 fps)

Pond 18: DIV-2

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Pond 19: INF-2

Inflow Area = 92,926 sf, 100.00% Impervious, Inflow Depth = 5.21" for 50-yr event
 Inflow = 5.36 cfs @ 11.85 hrs, Volume= 40,322 cf
 Outflow = 0.99 cfs @ 10.94 hrs, Volume= 40,322 cf, Atten= 81%, Lag= 0.0 min
 Discarded = 0.99 cfs @ 10.94 hrs, Volume= 40,322 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 368.17' @ 12.52 hrs Surf.Area= 4,295 sf Storage= 10,517 cf

Plug-Flow detention time= 68.4 min calculated for 40,318 cf (100% of inflow)
 Center-of-Mass det. time= 68.4 min (812.2 - 743.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	364.50'	4,639 cf	41.50'W x 103.50'L x 4.33'H Field A 18,613 cf Overall - 7,016 cf Embedded = 11,596 cf x 40.0% Voids
#2A	365.00'	7,016 cf	Cultec R-360HD x 189 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 189 Chambers in 7 Rows Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf
		11,655 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	364.50'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=0.99 cfs @ 10.94 hrs HW=364.55' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.99 cfs)

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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Pond 19: INF-2 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

27 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 101.50' Row Length +12.0" End Stone x 2 = 103.50' Base Length

7 Rows x 60.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 41.50' Base Width

6.0" Base + 36.0" Chamber Height + 10.0" Cover = 4.33' Field Height

189 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 7 Rows = 7,016.3 cf Chamber Storage

18,612.7 cf Field - 7,016.3 cf Chambers = 11,596.5 cf Stone x 40.0% Voids = 4,638.6 cf Stone Storage

Chamber Storage + Stone Storage = 11,654.9 cf = 0.268 af

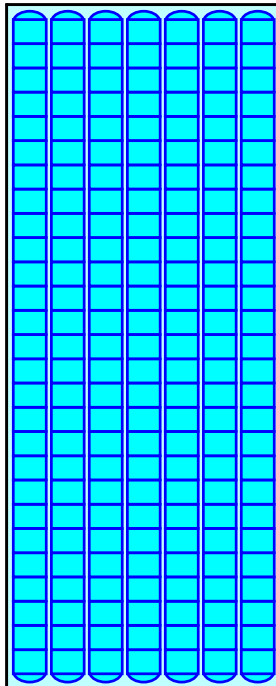
Overall Storage Efficiency = 62.6%

Overall System Size = 103.50' x 41.50' x 4.33'

189 Chambers

689.4 cy Field

429.5 cy Stone



N60 P1 Post-A 3-17-20

Prepared by {enter your company name here}

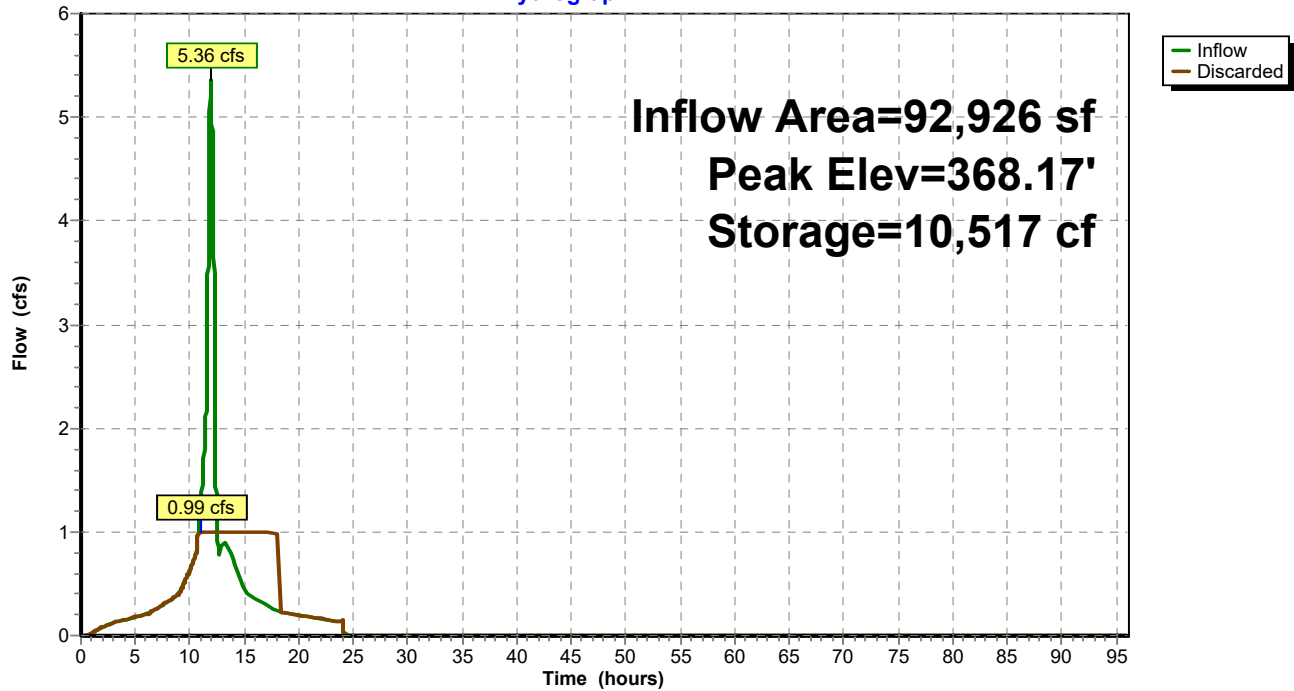
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NRCC 24-hr A 50-yr Rainfall=7.70"

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Pond 19: INF-2

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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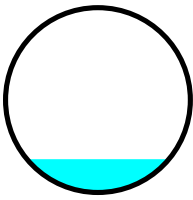
Summary for Reach 20: 36" HDPE Pipe

Inflow = 16.26 cfs @ 12.13 hrs, Volume= 17,450 cf
Outflow = 16.12 cfs @ 12.14 hrs, Volume= 17,450 cf, Atten= 1%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 18.83 fps, Min. Travel Time= 0.7 min
Avg. Velocity= 8.29 fps, Avg. Travel Time= 1.6 min

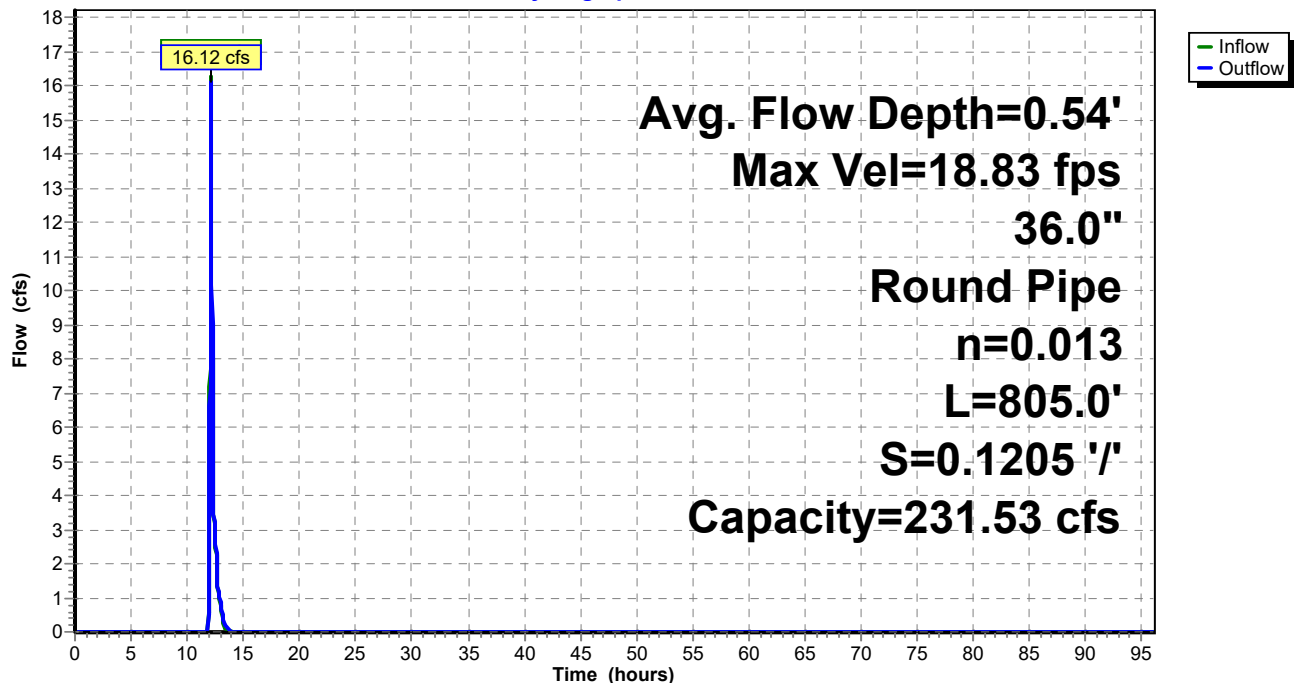
Peak Storage= 689 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.54'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 231.53 cfs

36.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 805.0' Slope= 0.1205 '/
Inlet Invert= 355.00', Outlet Invert= 258.00'



Reach 20: 36" HDPE Pipe

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 21: A6

Runoff = 85.61 cfs @ 12.13 hrs, Volume= 231,504 cf, Depth= 7.22"

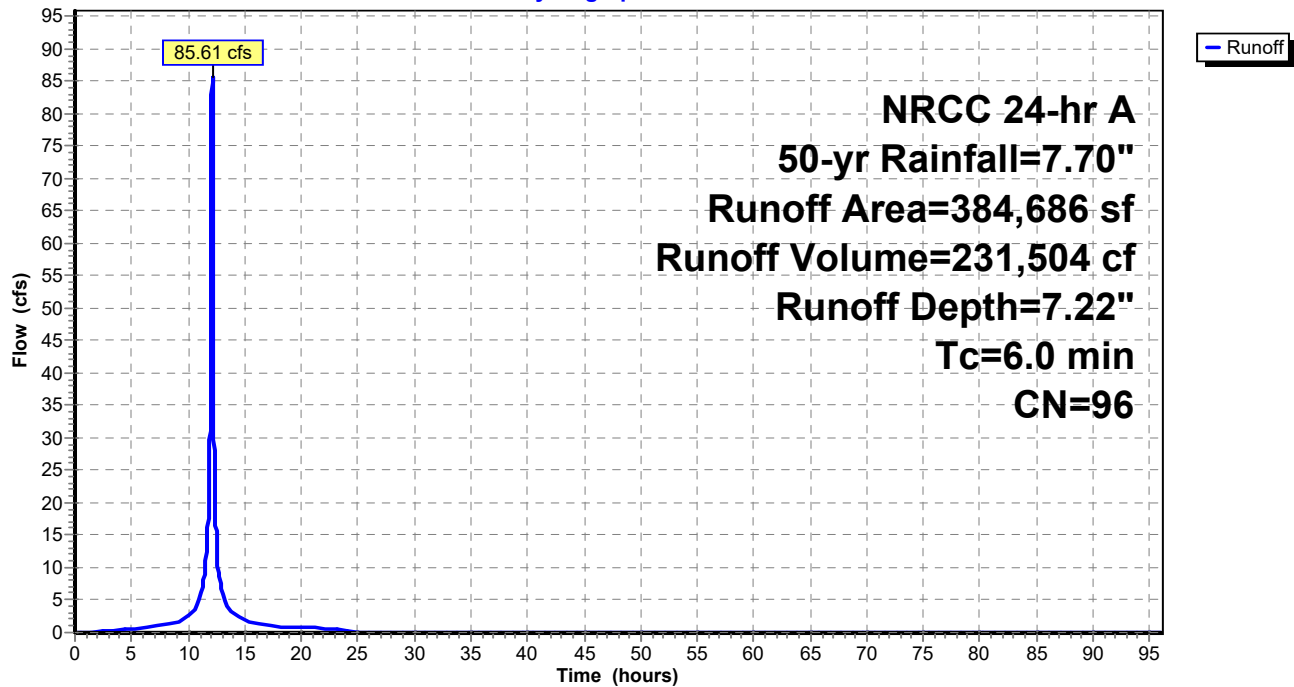
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
332,512	98	Paved parking, HSG C
52,174	86	<50% Grass cover, Poor, HSG C
384,686	96	Weighted Average
52,174		13.56% Pervious Area
332,512		86.44% Impervious Area

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

Subcatchment 21: A6

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

Prepared by {enter your company name here}

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Summary for Subcatchment 22: A7

Runoff = 14.91 cfs @ 12.13 hrs, Volume= 34,442 cf, Depth= 3.98"

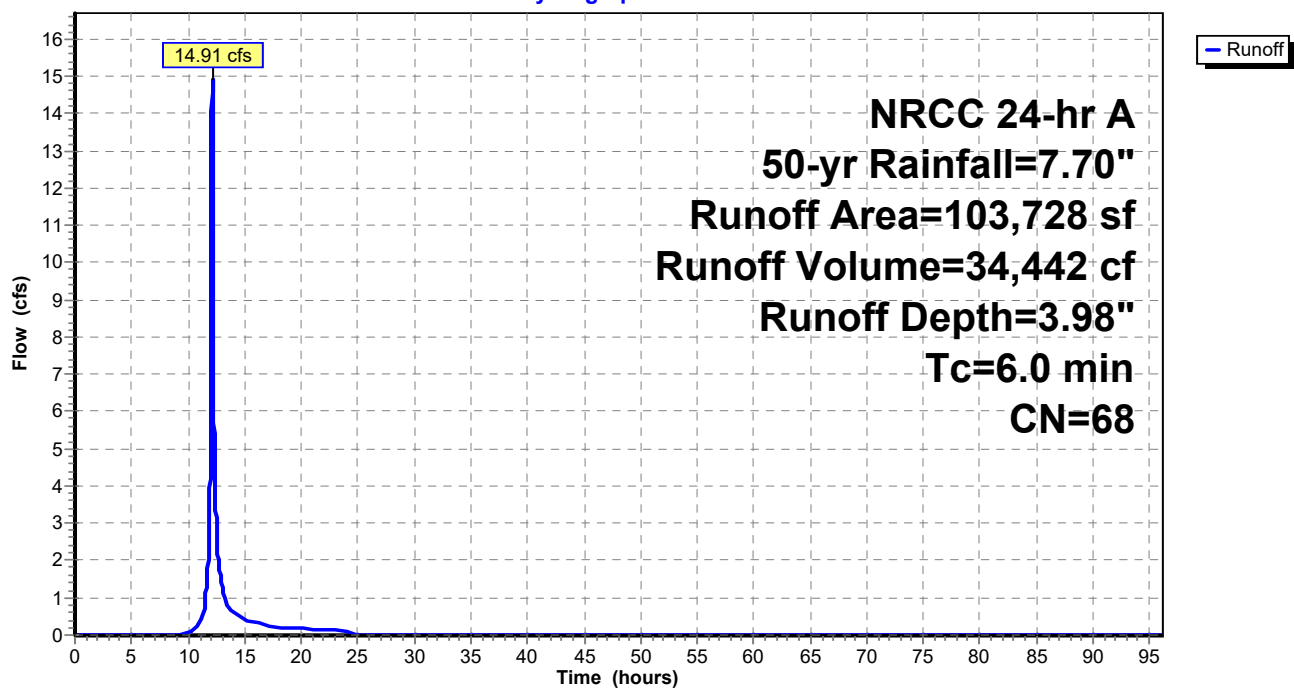
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
35,128	65	Brush, Good, HSG C
68,600	70	Woods, Good, HSG C
103,728	68	Weighted Average
103,728		100.00% Pervious Area

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

Subcatchment 22: A7

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

Prepared by {enter your company name here}

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Summary for Pond 23: Infiltration Basin (SWP-3)

Inflow Area = 488,414 sf, 68.08% Impervious, Inflow Depth = 6.96" for 50-yr event
 Inflow = 116.47 cfs @ 12.13 hrs, Volume= 283,397 cf
 Outflow = 87.88 cfs @ 12.18 hrs, Volume= 283,397 cf, Atten= 25%, Lag= 3.0 min
 Discarded = 6.62 cfs @ 12.18 hrs, Volume= 187,442 cf
 Primary = 81.27 cfs @ 12.18 hrs, Volume= 95,955 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 261.53' @ 12.18 hrs Surf.Area= 19,052 sf Storage= 77,883 cf

Plug-Flow detention time= 52.8 min calculated for 283,397 cf (100% of inflow)
 Center-of-Mass det. time= 52.8 min (812.2 - 759.4)

Volume	Invert	Avail.Storage	Storage Description		
#1	256.00'	87,144 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
256.00	9,450	527.9	0	0	9,450
258.00	12,731	565.7	22,100	22,100	12,917
260.00	16,238	603.5	28,898	50,998	16,623
262.00	19,973	641.3	36,147	87,144	20,569

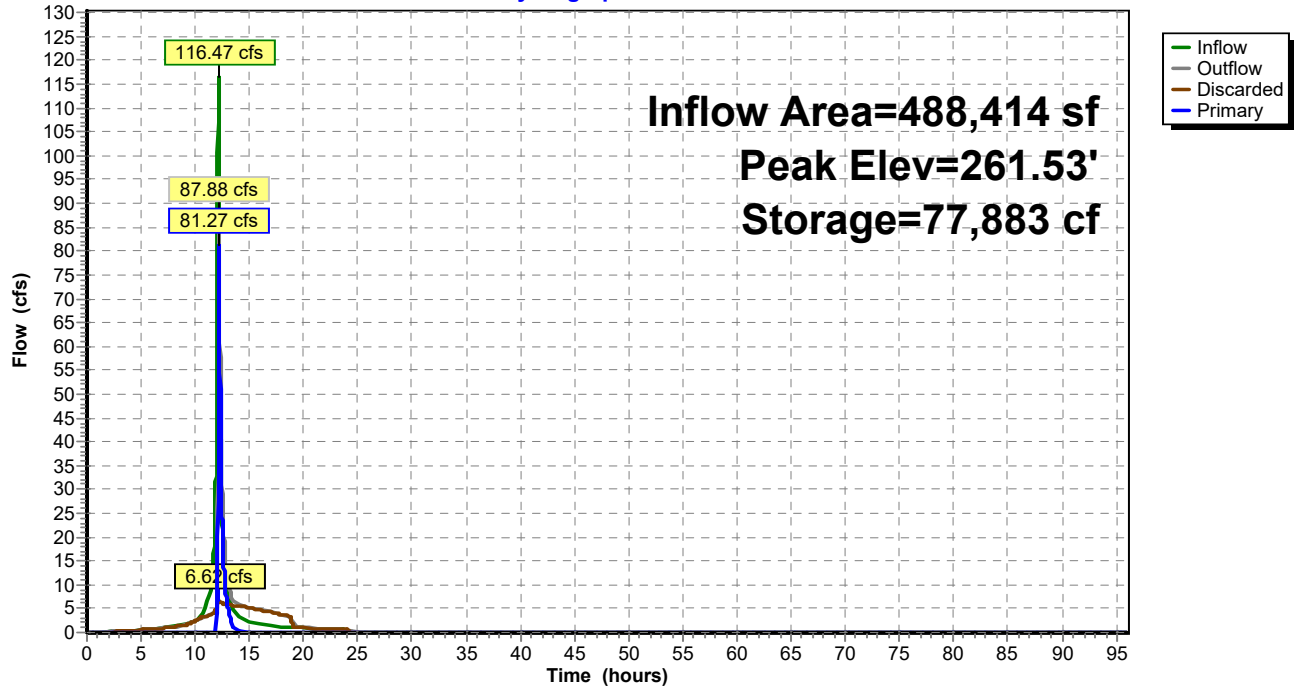
Device	Routing	Invert	Outlet Devices
#1	Primary	254.00'	36.0" Round Culvert X 2.00 L= 95.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 254.00' / 244.00' S= 0.1053 ' S= 0.1053 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	260.00'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	260.00'	3.0' long x 0.5' breadth Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	259.40'	6.0" Vert. Orifice/Grate C= 0.600
#5	Device 1	261.00'	36.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Discarded	256.00'	15.000 in/hr Exfiltration over Surface area Phase-In= 0.10'

Discarded OutFlow Max=6.61 cfs @ 12.18 hrs HW=261.52' (Free Discharge)
 ↳ **6=Exfiltration** (Exfiltration Controls 6.61 cfs)

Primary OutFlow Max=81.18 cfs @ 12.18 hrs HW=261.52' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Passes 81.18 cfs of 167.08 cfs potential flow)
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 25.00 cfs @ 4.10 fps)
 ↳ **3=Broad-Crested Rectangular Weir** (Weir Controls 37.50 cfs @ 4.10 fps)
 ↳ **4=Orifice/Grate** (Orifice Controls 1.29 cfs @ 6.59 fps)
 ↳ **5=Orifice/Grate** (Weir Controls 17.39 cfs @ 2.37 fps)

Pond 23: Infiltration Basin (SWP-3)

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 24: A9

Runoff = 7.49 cfs @ 12.13 hrs, Volume= 20,020 cf, Depth= 7.10"

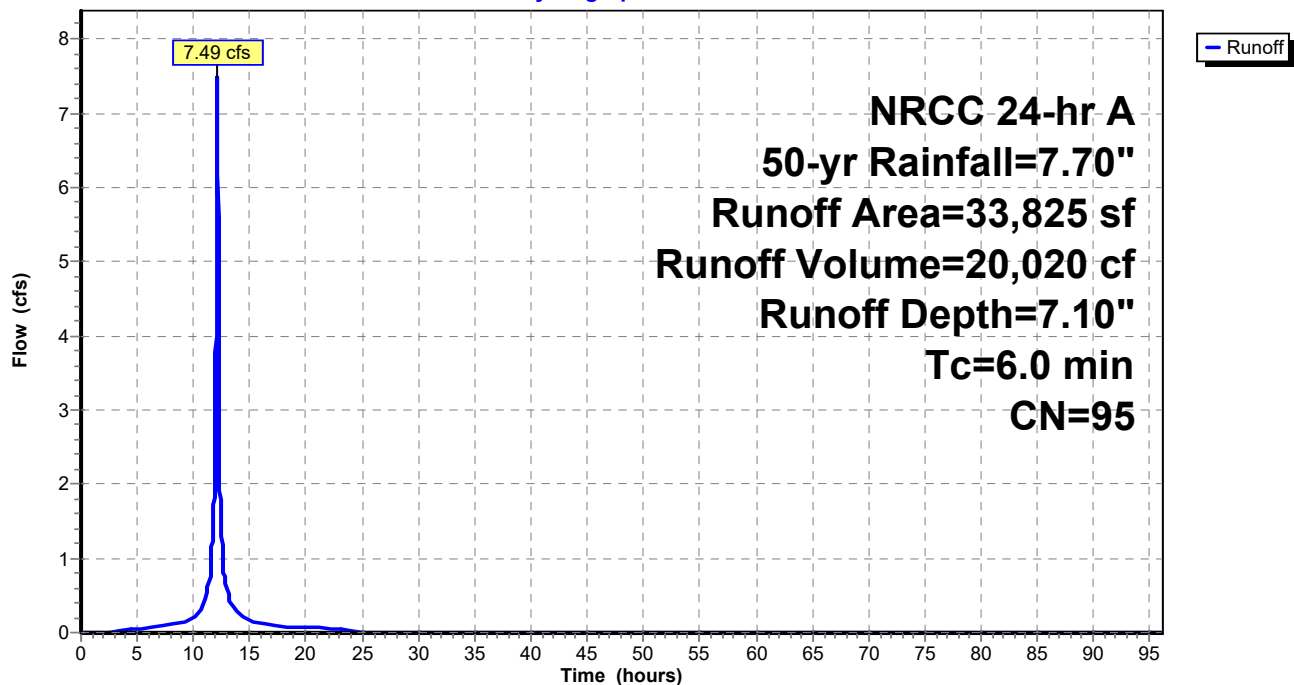
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
29,687	98	Paved parking, HSG C
4,138	74	>75% Grass cover, Good, HSG C
33,825	95	Weighted Average
4,138		12.23% Pervious Area
29,687		87.77% Impervious Area

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

Subcatchment 24: A9

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Pond 25: DIV-4

Inflow Area = 33,825 sf, 87.77% Impervious, Inflow Depth = 7.10" for 50-yr event
 Inflow = 7.49 cfs @ 12.13 hrs, Volume= 20,020 cf
 Outflow = 7.49 cfs @ 12.13 hrs, Volume= 20,020 cf, Atten= 0%, Lag= 0.0 min
 Primary = 5.00 cfs @ 12.05 hrs, Volume= 16,524 cf
 Secondary = 3.33 cfs @ 12.14 hrs, Volume= 3,497 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 352.78' @ 12.14 hrs

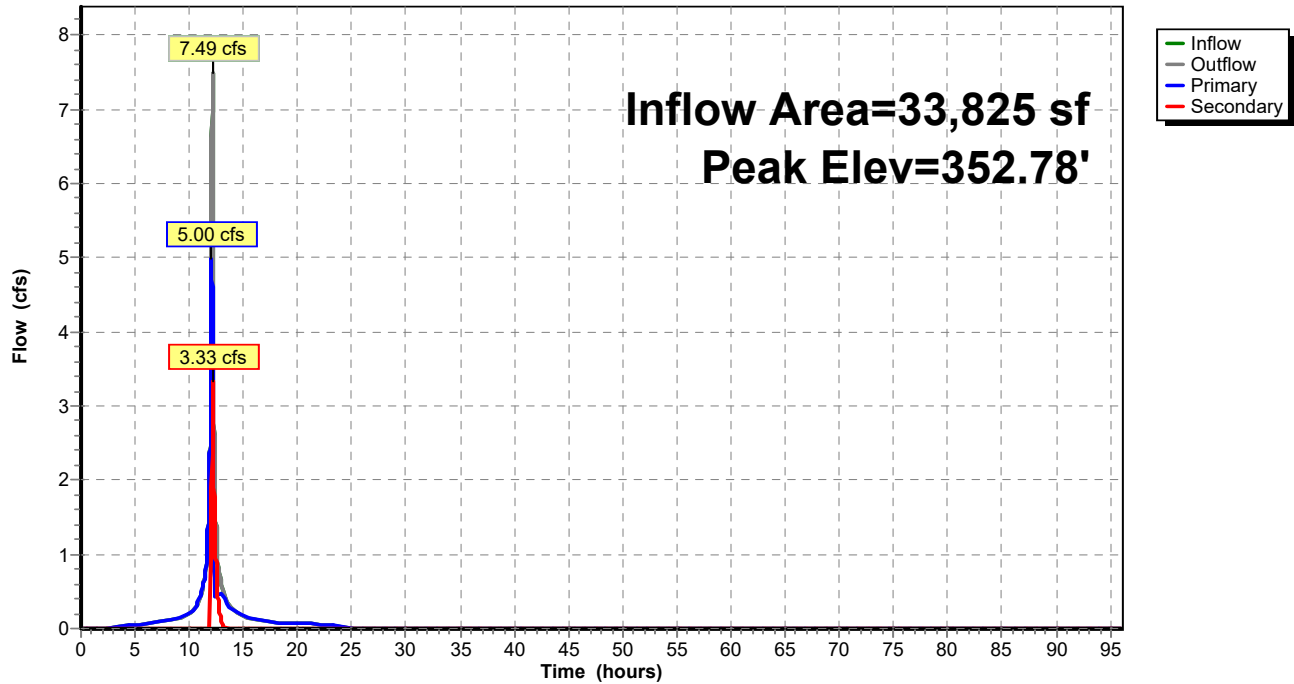
Flood Elev= 355.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	349.50'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 349.50' / 349.50' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	349.50'	18.0" Round Culvert L= 128.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 349.50' / 344.00' S= 0.0430 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	352.50'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.83 cfs @ 12.05 hrs HW=352.54' TW=350.90' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 4.83 cfs @ 6.15 fps)**Secondary OutFlow** Max=3.33 cfs @ 12.14 hrs HW=352.78' TW=0.00' (Dynamic Tailwater)↑**2=Culvert** (Passes 3.33 cfs of 13.53 cfs potential flow)↑**3=Broad-Crested Rectangular Weir** (Weir Controls 3.33 cfs @ 1.50 fps)

Pond 25: DIV-4

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Pond 26: INF-4

Inflow Area = 33,825 sf, 87.77% Impervious, Inflow Depth = 5.86" for 50-yr event
 Inflow = 5.00 cfs @ 12.05 hrs, Volume= 16,524 cf
 Outflow = 0.52 cfs @ 11.30 hrs, Volume= 16,524 cf, Atten= 90%, Lag= 0.0 min
 Discarded = 0.52 cfs @ 11.30 hrs, Volume= 16,524 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 352.68' @ 12.30 hrs Surf.Area= 2,242 sf Storage= 5,213 cf

Plug-Flow detention time= 66.0 min calculated for 16,522 cf (100% of inflow)
 Center-of-Mass det. time= 66.0 min (826.1 - 760.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	349.00'	2,196 cf	30.50'W x 73.50'L x 3.88'H Field A 8,687 cf Overall - 3,196 cf Embedded = 5,490 cf x 40.0% Voids
#2A	349.50'	3,196 cf	Cultec R-330XLHD x 60 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
		5,393 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	349.00'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=0.52 cfs @ 11.30 hrs HW=349.04' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.52 cfs)

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NRCC 24-hr A 50-yr Rainfall=7.70"

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Pond 26: INF-4 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

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

10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length

6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width

6.0" Base + 30.5" Chamber Height + 10.0" Cover = 3.88' Field Height

60 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 3,196.5 cf Chamber Storage

8,686.8 cf Field - 3,196.5 cf Chambers = 5,490.3 cf Stone x 40.0% Voids = 2,196.1 cf Stone Storage

Chamber Storage + Stone Storage = 5,392.6 cf = 0.124 af

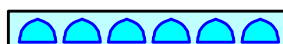
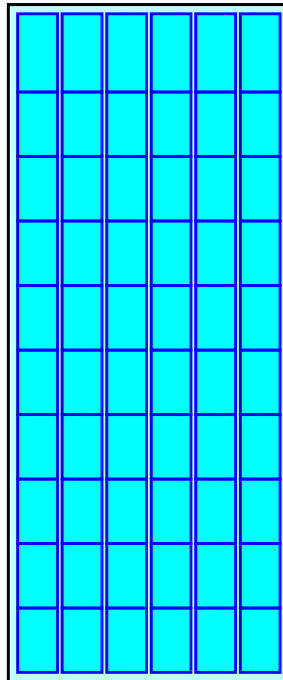
Overall Storage Efficiency = 62.1%

Overall System Size = 73.50' x 30.50' x 3.88'

60 Chambers

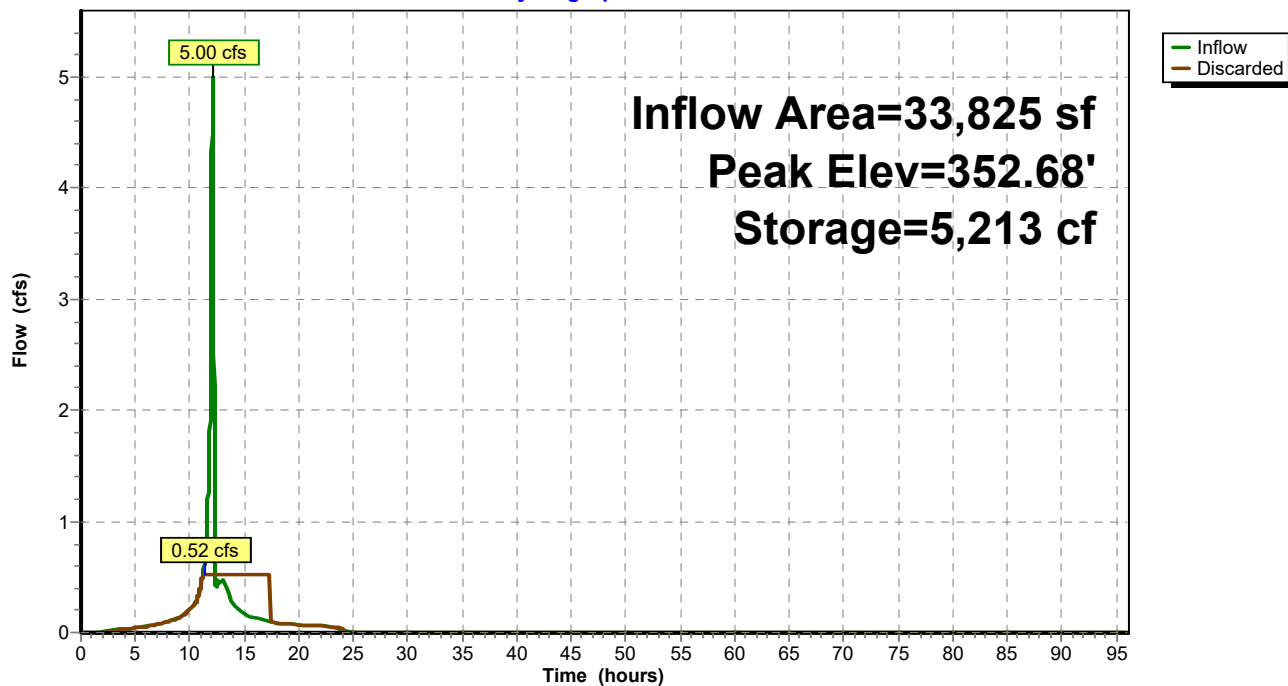
321.7 cy Field

203.3 cy Stone



Pond 26: INF-4

Hydrograph



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NRCC 24-hr A 50-yr Rainfall=7.70"

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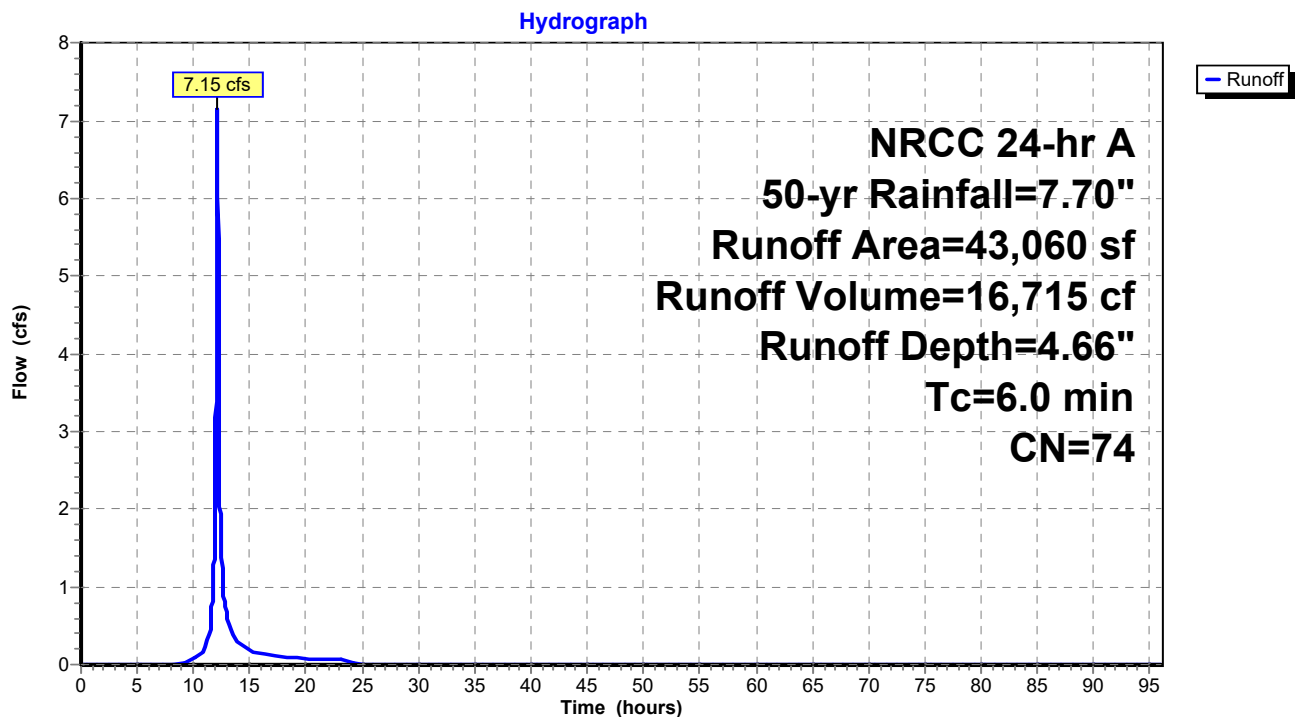
Summary for Subcatchment 27: A10

Runoff = 7.15 cfs @ 12.13 hrs, Volume= 16,715 cf, Depth= 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
16,120	73	Brush, Good, HSG D
19,715	77	Brush, Poor, HSG C
7,225	70	Woods, Good, HSG C
43,060	74	Weighted Average
43,060		100.00% Pervious Area

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

Subcatchment 27: A10

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 28: A10

Runoff = 23.13 cfs @ 12.13 hrs, Volume= 61,832 cf, Depth= 7.10"

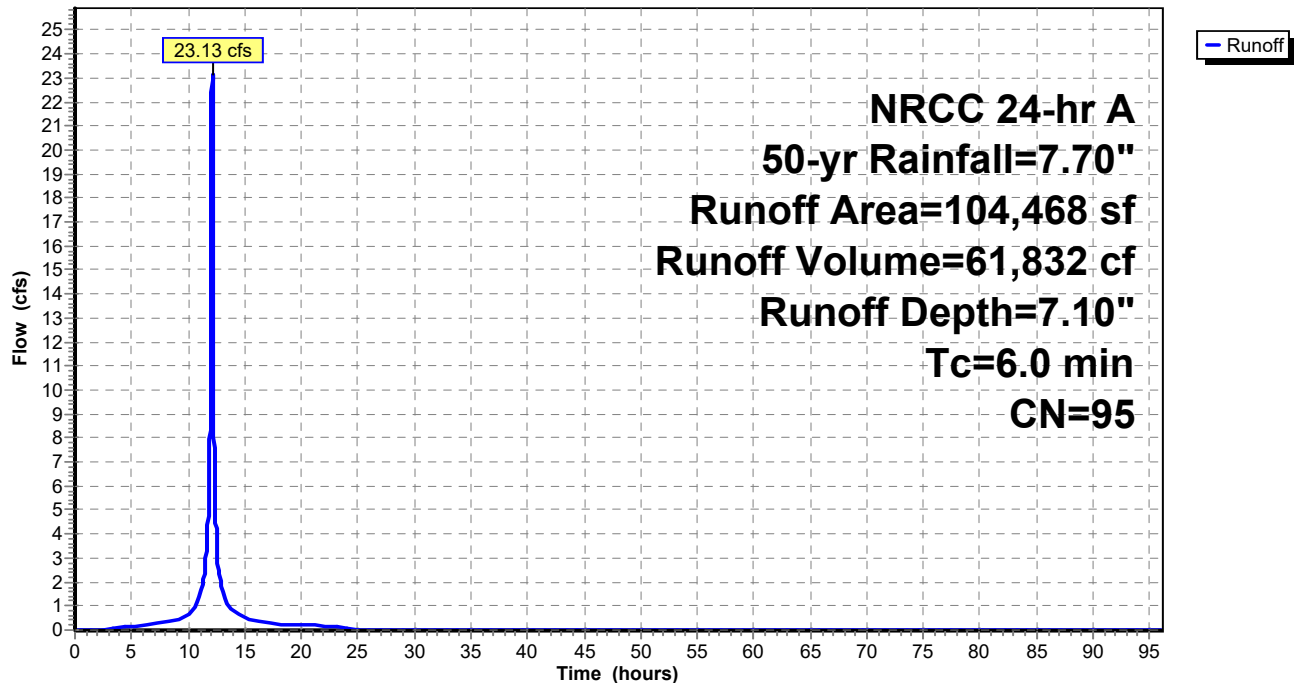
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
91,430	98	Paved parking, HSG C
7,435	74	>75% Grass cover, Good, HSG C
5,603	80	>75% Grass cover, Good, HSG D
104,468	95	Weighted Average
13,038		12.48% Pervious Area
91,430		87.52% Impervious Area

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

Subcatchment 28: A10

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Pond 29: Infiltration Basin (SWP-2)

Inflow Area = 147,528 sf, 61.97% Impervious, Inflow Depth = 6.39" for 50-yr event
 Inflow = 30.28 cfs @ 12.13 hrs, Volume= 78,548 cf
 Outflow = 4.88 cfs @ 12.56 hrs, Volume= 78,548 cf, Atten= 84%, Lag= 26.1 min
 Discarded = 3.10 cfs @ 12.56 hrs, Volume= 70,926 cf
 Primary = 1.78 cfs @ 12.56 hrs, Volume= 7,622 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 320.84' @ 12.56 hrs Surf.Area= 8,928 sf Storage= 30,770 cf

Plug-Flow detention time= 72.5 min calculated for 78,540 cf (100% of inflow)
 Center-of-Mass det. time= 72.5 min (840.1 - 767.6)

Volume	Invert	Avail.Storage	Storage Description
#1	316.00'	41,962 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
316.00	4,026	293.0	0	0	4,026
318.00	5,897	330.7	9,864	9,864	5,998
320.00	7,994	368.3	13,838	23,702	8,204
322.00	10,316	406.0	18,261	41,962	10,652

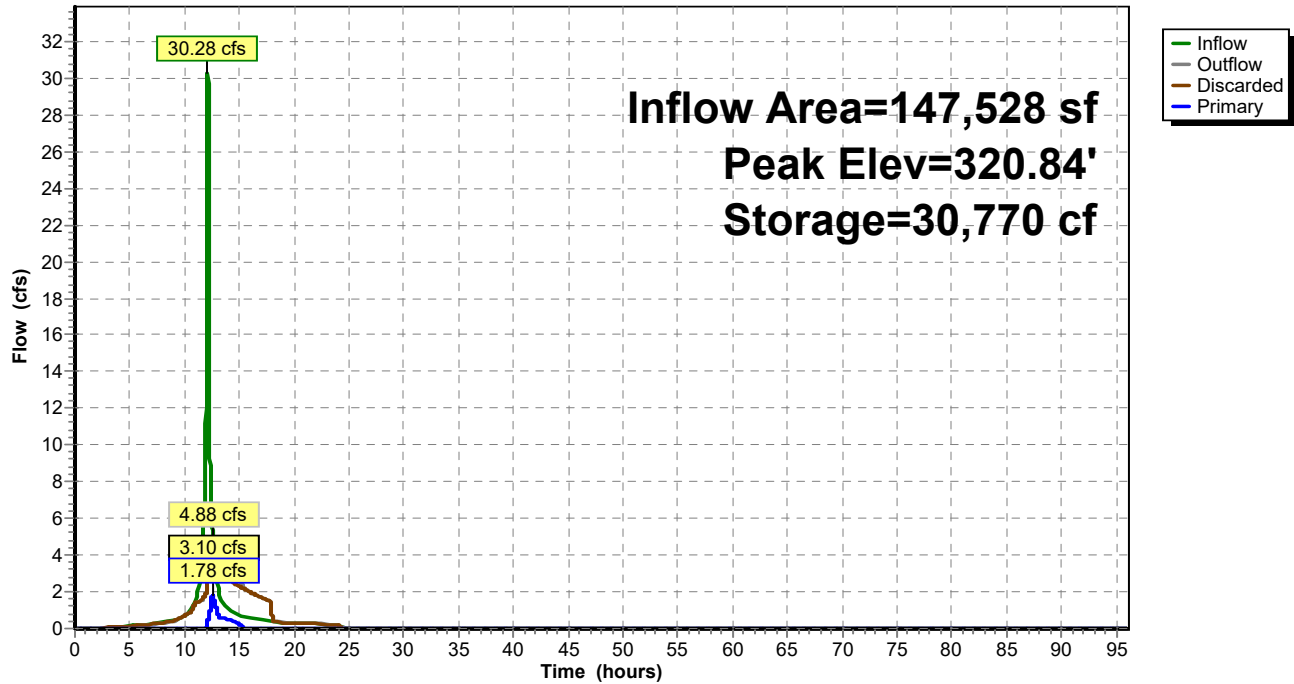
Device	Routing	Invert	Outlet Devices
#1	Primary	310.00'	15.0" Round Culvert L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 310.00' / 304.00' S= 0.1000 ' S= 0.1000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	318.25'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	320.50'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	321.00'	3.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#5	Discarded	316.00'	15.000 in/hr Exfiltration over Surface area Phase-In= 0.10'

Discarded OutFlow Max=3.10 cfs @ 12.56 hrs HW=320.84' (Free Discharge)
 ↳ **5=Exfiltration** (Exfiltration Controls 3.10 cfs)

Primary OutFlow Max=1.77 cfs @ 12.56 hrs HW=320.84' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Passes 1.77 cfs of 18.88 cfs potential flow)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.65 cfs @ 7.49 fps)
 ↳ **3=Broad-Crested Rectangular Weir** (Weir Controls 1.12 cfs @ 1.67 fps)
 ↳ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 29: Infiltration Basin (SWP-2)

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 30: Post A2

Runoff = 27.47 cfs @ 12.26 hrs, Volume= 96,542 cf, Depth= 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
43,743	98	Paved parking, HSG C
107,245	74	>75% Grass cover, Good, HSG C
2,876	61	>75% Grass cover, Good, HSG B
39,583	70	Woods, Good, HSG C
4,283	98	Water Surface, HSG C
33,976	65	Brush, Good, HSG C
231,706	77	Weighted Average
183,680		79.27% Pervious Area
48,026		20.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	215	0.0260	2.60		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	125	0.1000	6.42		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.4	377	0.0750	14.42	17.69	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
17.7	817	Total			

N60 P1 Post-A 3-17-20

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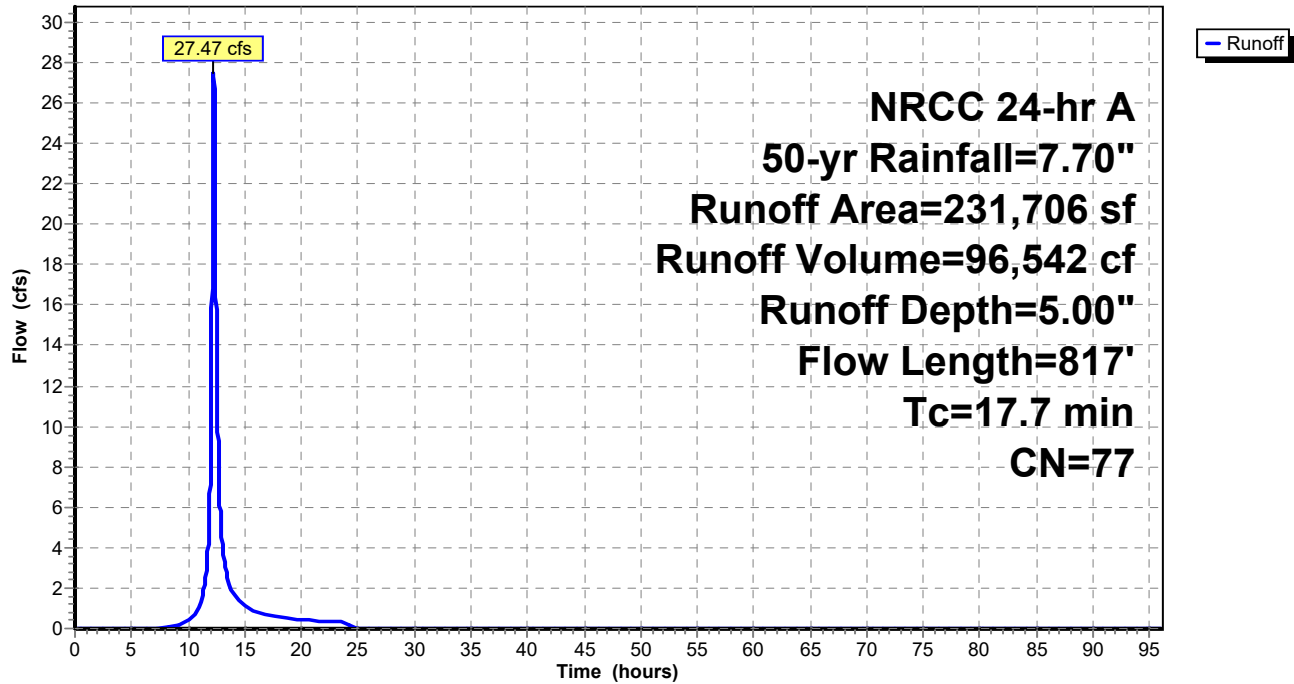
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NRCC 24-hr A 50-yr Rainfall=7.70"

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Subcatchment 30: Post A2

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Pond 31: Pocket Wetland (SWP-1)

Inflow Area = 231,706 sf, 20.73% Impervious, Inflow Depth = 5.00" for 50-yr event
 Inflow = 27.47 cfs @ 12.26 hrs, Volume= 96,542 cf
 Outflow = 14.50 cfs @ 12.50 hrs, Volume= 72,742 cf, Atten= 47%, Lag= 14.1 min
 Primary = 14.50 cfs @ 12.50 hrs, Volume= 72,742 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Starting Elev= 234.50' Surf.Area= 12,504 sf Storage= 7,835 cf
 Peak Elev= 237.96' @ 12.50 hrs Surf.Area= 18,663 sf Storage= 51,483 cf (43,648 cf above start)

Plug-Flow detention time= 709.7 min calculated for 64,907 cf (67% of inflow)
 Center-of-Mass det. time= 548.9 min (1,362.8 - 813.9)

Volume	Invert	Avail.Storage	Storage Description
#1	230.00'	1,811 cf	Forebay (Irregular) Listed below (Recalc)
#2	230.00'	1,976 cf	Micropool (Irregular) Listed below (Recalc)
#3	233.90'	65,123 cf	Marsh & Storage (Irregular) Listed below (Recalc)
		68,911 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	86	34.2	0	0	86
231.00	217	53.2	147	147	225
232.00	406	72.3	307	453	426
233.00	651	91.4	524	977	688
233.90	1,233	129.1	834	1,811	1,357

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	86	34.2	0	0	86
231.00	217	53.2	147	147	225
232.00	406	72.3	307	453	426
233.00	651	91.4	524	977	688
233.90	1,646	155.1	1,000	1,976	1,942

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
233.90	4,232	530.5	0	0	4,232
234.50	9,625	400.9	4,048	4,048	13,842
235.00	10,440	413.5	5,015	9,063	14,683
236.00	12,144	438.8	11,281	20,344	16,451
237.00	13,950	464.0	13,037	33,381	18,317
238.00	15,856	489.2	14,893	48,273	20,287
239.00	17,864	514.5	16,850	65,123	22,369

Device	Routing	Invert	Outlet Devices
#1	Primary	232.00'	21.0" Round Culvert L= 74.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 232.00' / 231.00' S= 0.0135 ' / ' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 2.41 sf

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#2	Device 1	234.50'	1.1" Vert. Orifice/Grate	C= 0.600
#3	Device 1	237.50'	36.0" x 48.0" Horiz. Orifice/Grate	C= 0.600

Limited to weir flow at low heads

Primary OutFlow Max=14.50 cfs @ 12.50 hrs HW=237.96' TW=0.00' (Dynamic Tailwater)

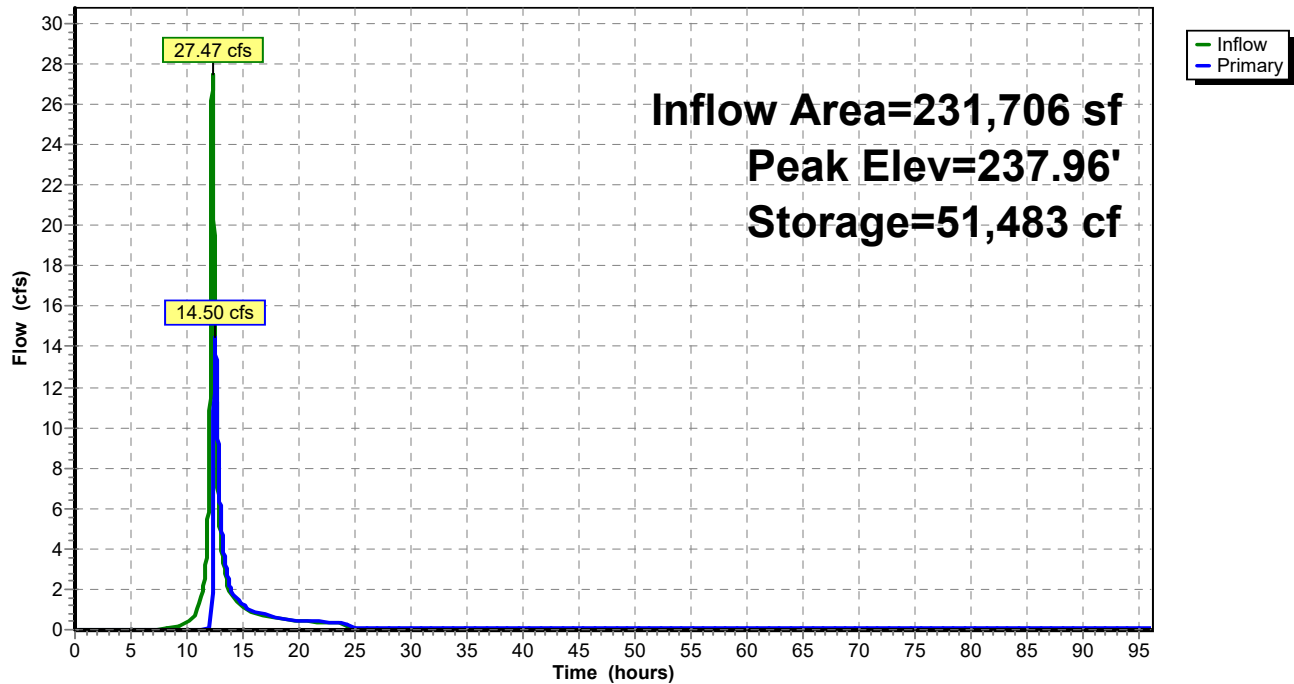
1=Culvert (Passes 14.50 cfs of 18.67 cfs potential flow)

2=Orifice/Grate (Orifice Controls 0.06 cfs @ 8.90 fps)

3=Orifice/Grate (Weir Controls 14.44 cfs @ 2.23 fps)

Pond 31: Pocket Wetland (SWP-1)

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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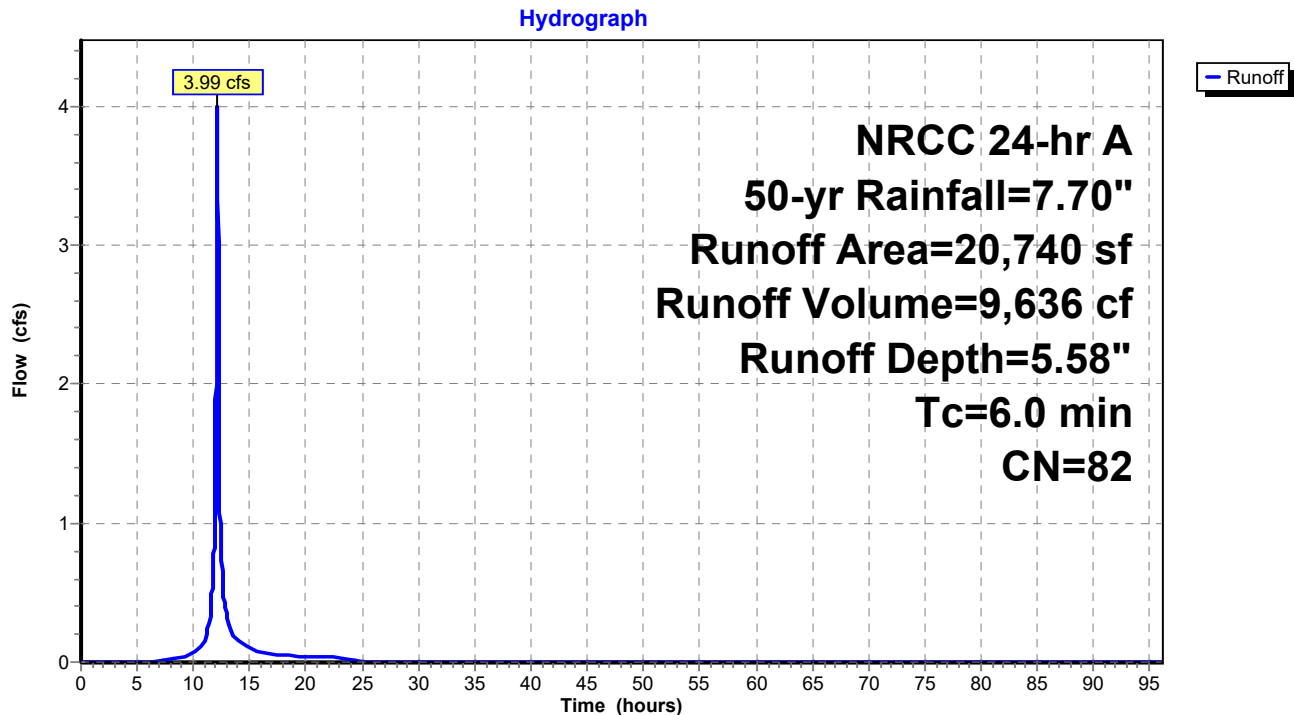
Summary for Subcatchment 32: Post A1

Runoff = 3.99 cfs @ 12.13 hrs, Volume= 9,636 cf, Depth= 5.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
7,304	98	Paved parking, HSG C
10,356	74	>75% Grass cover, Good, HSG C
3,080	70	Woods, Good, HSG C
20,740	82	Weighted Average
13,436		64.78% Pervious Area
7,304		35.22% Impervious Area

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

Subcatchment 32: Post A1

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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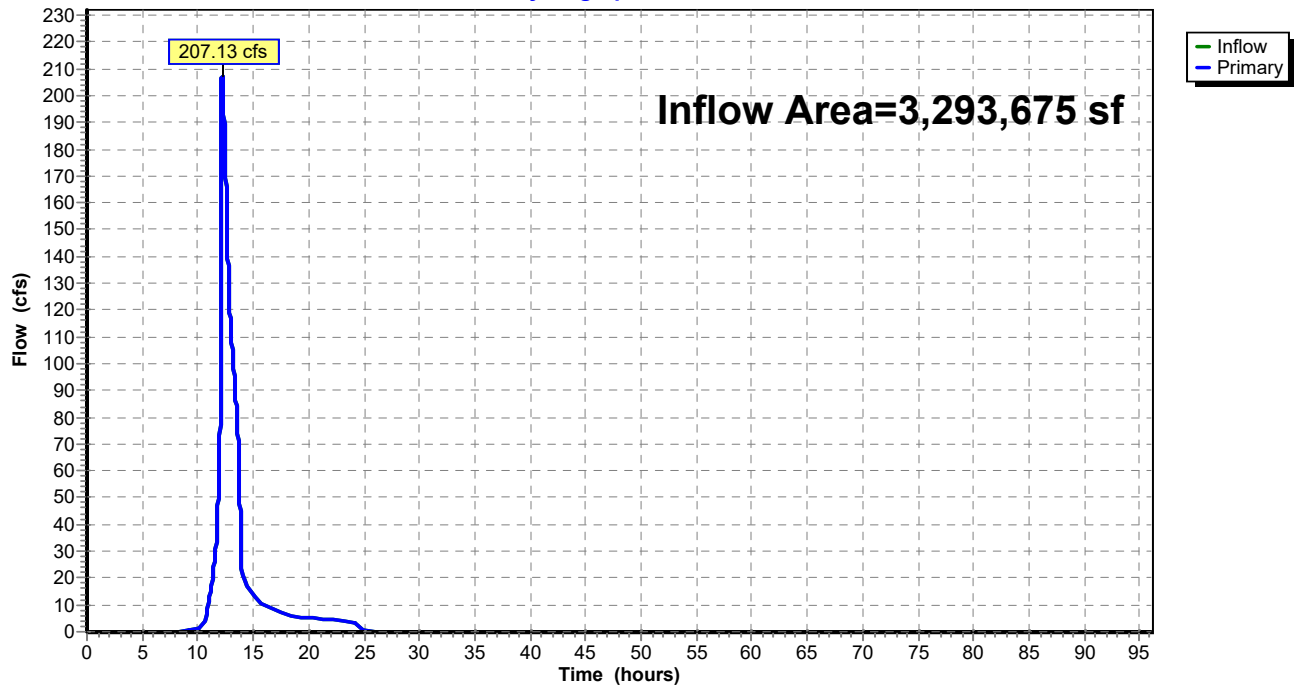
Summary for Link 33: Design Point A

Inflow Area = 3,293,675 sf, 35.25% Impervious, Inflow Depth > 4.51" for 50-yr event
Inflow = 207.13 cfs @ 12.19 hrs, Volume= 1,237,978 cf
Primary = 207.13 cfs @ 12.19 hrs, Volume= 1,237,978 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 33: Design Point A

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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 8: Post A0 OffsiteRunoff Area=1,115,060 sf 57.87% Impervious Runoff Depth=7.97"
Flow Length=1,018' Tc=12.5 min CN=90 Runoff=227.61 cfs 740,519 cf**Pond 9: Offsite Pond A**Peak Elev=365.20' Storage=188,028 cf Inflow=227.61 cfs 740,519 cf
Outflow=183.31 cfs 689,324 cf**Subcatchment 10: Post A4**Runoff Area=164,583 sf 10.25% Impervious Runoff Depth=6.24"
Flow Length=340' Tc=20.5 min CN=76 Runoff=22.58 cfs 85,616 cf**Reach 11: 24" Culvert Pipe**Avg. Flow Depth=1.13' Max Vel=12.36 fps Inflow=22.58 cfs 85,616 cf
24.0" Round Pipe n=0.013 L=112.0' S=0.0268 '/' Capacity=37.02 cfs Outflow=22.57 cfs 85,616 cf**Subcatchment 12: Post A8**Runoff Area=403,480 sf 2.55% Impervious Runoff Depth=5.87"
Flow Length=320' Tc=21.4 min CN=73 Runoff=51.21 cfs 197,321 cf**Pond 12A: Existing Wetland A**Peak Elev=331.11' Storage=149,813 cf Inflow=256.21 cfs 972,261 cf
36.0" Round Culvert n=0.013 L=168.0' S=0.0655 '/' Outflow=99.89 cfs 972,261 cf**Subcatchment 12B: Post A11**Runoff Area=722,164 sf 1.29% Impervious Runoff Depth=5.49"
Flow Length=475' Tc=19.8 min CN=70 Runoff=89.96 cfs 330,623 cf**Reach 13: Existing Stream A**Avg. Flow Depth=1.96' Max Vel=11.38 fps Inflow=178.28 cfs 1,302,884 cf
n=0.040 L=1,360.0' S=0.0721 '/' Capacity=291.69 cfs Outflow=177.20 cfs 1,302,884 cf**Subcatchment 14: Post A3**Runoff Area=106,378 sf 85.91% Impervious Runoff Depth=8.58"
Tc=6.0 min CN=95 Runoff=28.19 cfs 76,036 cf**Pond 15: DIV-1**Peak Elev=328.06' Inflow=28.19 cfs 76,036 cf
Primary=4.81 cfs 45,953 cf Secondary=24.20 cfs 30,083 cf Outflow=28.19 cfs 76,036 cf**Pond 16: INF-1**Peak Elev=327.35' Storage=9,661 cf Inflow=4.81 cfs 45,953 cf
Outflow=1.18 cfs 45,953 cf**Subcatchment 17: Post A5**Runoff Area=92,926 sf 100.00% Impervious Runoff Depth=8.94"
Tc=6.0 min CN=98 Runoff=24.84 cfs 69,226 cf**Pond 18: DIV-2**Peak Elev=369.27' Inflow=24.84 cfs 69,226 cf
Primary=5.16 cfs 44,464 cf Secondary=20.11 cfs 24,762 cf Outflow=24.84 cfs 69,226 cf**Pond 19: INF-2**Peak Elev=368.33' Storage=10,798 cf Inflow=5.16 cfs 44,464 cf
Outflow=0.99 cfs 44,464 cf**Reach 20: 36" HDPE Pipe**Avg. Flow Depth=0.60' Max Vel=20.06 fps Inflow=20.11 cfs 24,762 cf
36.0" Round Pipe n=0.013 L=805.0' S=0.1205 '/' Capacity=231.53 cfs Outflow=19.99 cfs 24,762 cf**Subcatchment 21: A6**Runoff Area=384,686 sf 86.44% Impervious Runoff Depth=8.70"
Tc=6.0 min CN=96 Runoff=102.32 cfs 278,841 cf

N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Subcatchment22: A7Runoff Area=103,728 sf 0.00% Impervious Runoff Depth=5.24"
Tc=6.0 min CN=68 Runoff=19.50 cfs 45,327 cf**Pond 23: Infiltration Basin (SWP-3)**Peak Elev=261.81' Storage=83,389 cf Inflow=141.66 cfs 348,930 cf
Discarded=6.81 cfs 208,177 cf Primary=115.63 cfs 140,753 cf Outflow=122.44 cfs 348,930 cf**Subcatchment24: A9**Runoff Area=33,825 sf 87.77% Impervious Runoff Depth=8.58"
Tc=6.0 min CN=95 Runoff=8.97 cfs 24,177 cf**Pond 25: DIV-4**Peak Elev=352.90' Inflow=8.97 cfs 24,177 cf
Primary=4.80 cfs 18,214 cf Secondary=5.82 cfs 5,963 cf Outflow=8.97 cfs 24,177 cf**Pond 26: INF-4**Peak Elev=352.79' Storage=5,316 cf Inflow=4.80 cfs 18,214 cf
Outflow=0.52 cfs 18,214 cf**Subcatchment27: A10**Runoff Area=43,060 sf 0.00% Impervious Runoff Depth=5.99"
Tc=6.0 min CN=74 Runoff=9.10 cfs 21,506 cf**Subcatchment28: A10**Runoff Area=104,468 sf 87.52% Impervious Runoff Depth=8.58"
Tc=6.0 min CN=95 Runoff=27.69 cfs 74,671 cf**Pond 29: Infiltration Basin (SWP-2)**Peak Elev=321.30' Storage=35,020 cf Inflow=36.78 cfs 96,177 cf
Discarded=3.29 cfs 79,081 cf Primary=6.81 cfs 17,096 cf Outflow=10.10 cfs 96,177 cf**Subcatchment30: Post A2**Runoff Area=231,706 sf 20.73% Impervious Runoff Depth=6.37"
Flow Length=817' Tc=17.7 min CN=77 Runoff=34.72 cfs 122,935 cf**Pond 31: Pocket Wetland (SWP-1)**Peak Elev=238.33' Storage=57,319 cf Inflow=34.72 cfs 122,935 cf
Outflow=19.30 cfs 99,124 cf**Subcatchment32: Post A1**Runoff Area=20,740 sf 35.22% Impervious Runoff Depth=6.99"
Tc=6.0 min CN=82 Runoff=4.94 cfs 12,075 cf**Link 33: Design Point A**Inflow=268.04 cfs 1,607,979 cf
Primary=268.04 cfs 1,607,979 cf**Total Runoff Area = 3,526,804 sf Runoff Volume = 2,078,874 cf Average Runoff Depth = 7.07"**
61.01% Pervious = 2,151,703 sf 38.99% Impervious = 1,375,101 sf

N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 8: Post A0 Offsite

Runoff = 227.61 cfs @ 12.20 hrs, Volume= 740,519 cf, Depth= 7.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
645,334	98	Paved parking, HSG C
443,611	80	>75% Grass cover, Good, HSG D
23,572	74	>75% Grass cover, Good, HSG C
2,543	61	>75% Grass cover, Good, HSG B
1,115,060	90	Weighted Average
469,726		42.13% Pervious Area
645,334		57.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	100	0.0150	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.50"
0.6	148	0.0574	3.86		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	30	0.0200	2.87		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.2	740	0.0270	10.25	32.22	Pipe Channel, 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.015 Concrete sewer w/manholes & inlets
12.5	1,018	Total			

N60 P1 Post-A 3-17-20

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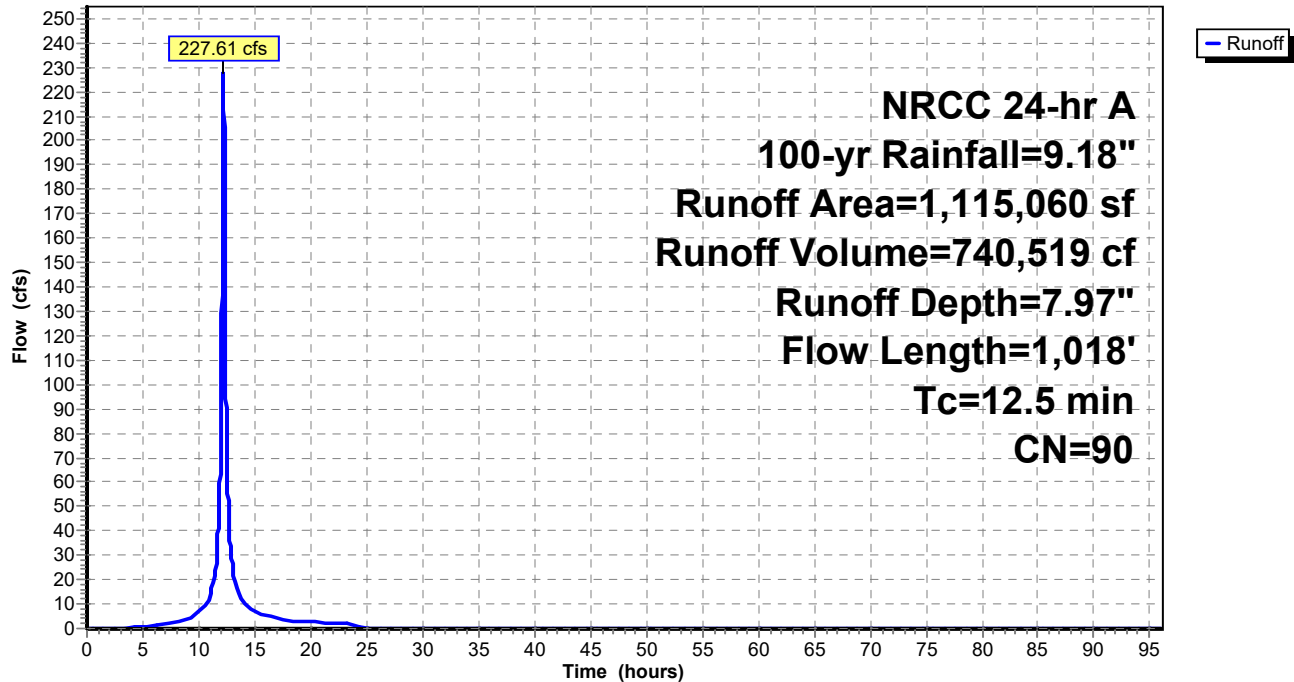
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NRCC 24-hr A 100-yr Rainfall=9.18"

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Subcatchment 8: Post A0 Offsite

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 9: Offsite Pond A

Inflow Area = 1,115,060 sf, 57.87% Impervious, Inflow Depth = 7.97" for 100-yr event
 Inflow = 227.61 cfs @ 12.20 hrs, Volume= 740,519 cf
 Outflow = 183.31 cfs @ 12.28 hrs, Volume= 689,324 cf, Atten= 19%, Lag= 4.8 min
 Primary = 183.31 cfs @ 12.28 hrs, Volume= 689,324 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 365.20' @ 12.28 hrs Surf.Area= 38,352 sf Storage= 188,028 cf

Plug-Flow detention time= 74.7 min calculated for 689,324 cf (93% of inflow)
 Center-of-Mass det. time= 38.3 min (813.6 - 775.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	357.00'	221,816 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
357.00	14,633	679.0	0	0	14,633
358.00	16,652	698.0	15,632	15,632	16,826
359.00	17,534	715.0	17,091	32,723	18,864
360.00	19,427	745.0	18,472	51,195	22,425
362.00	24,453	804.0	43,784	94,979	29,861
364.00	28,701	854.0	53,097	148,076	36,663
365.00	36,602	901.0	32,572	180,648	43,285
366.00	45,910	1,262.0	41,168	221,816	105,432

Device	Routing	Invert	Outlet Devices
#1	Primary	357.00'	30.0" Round Culvert L= 125.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 357.00' / 351.00' S= 0.0480 ' S= 0.0480 ' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 4.91 sf
#2	Device 1	360.00'	36.0" x 48.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads
#3	Primary	364.75'	150.0' long x 36.0' 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=183.09 cfs @ 12.28 hrs HW=365.20' TW=328.56' (Dynamic Tailwater)

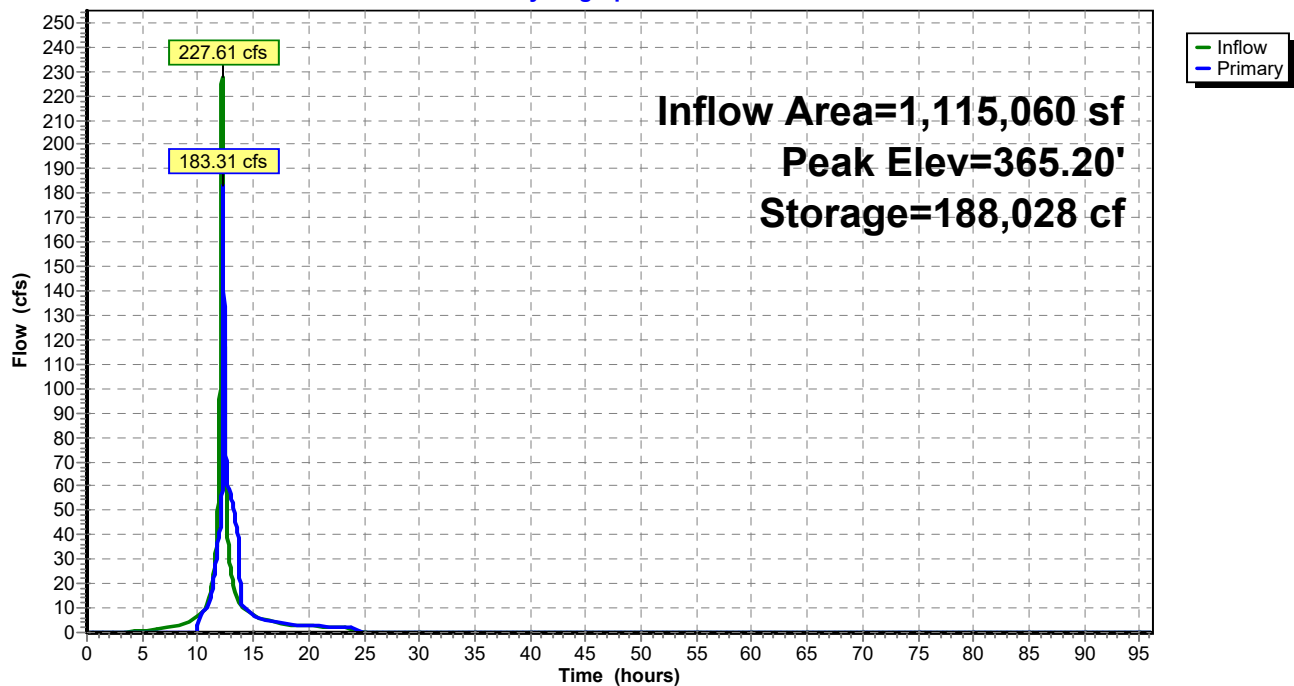
1=Culvert (Inlet Controls 62.29 cfs @ 12.69 fps)

2=Orifice/Grate (Passes 62.29 cfs of 263.43 cfs potential flow)

3=Broad-Crested Rectangular Weir (Weir Controls 120.80 cfs @ 1.80 fps)

Pond 9: Offsite Pond A

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 10: Post A4

Runoff = 22.58 cfs @ 12.30 hrs, Volume= 85,616 cf, Depth= 6.24"

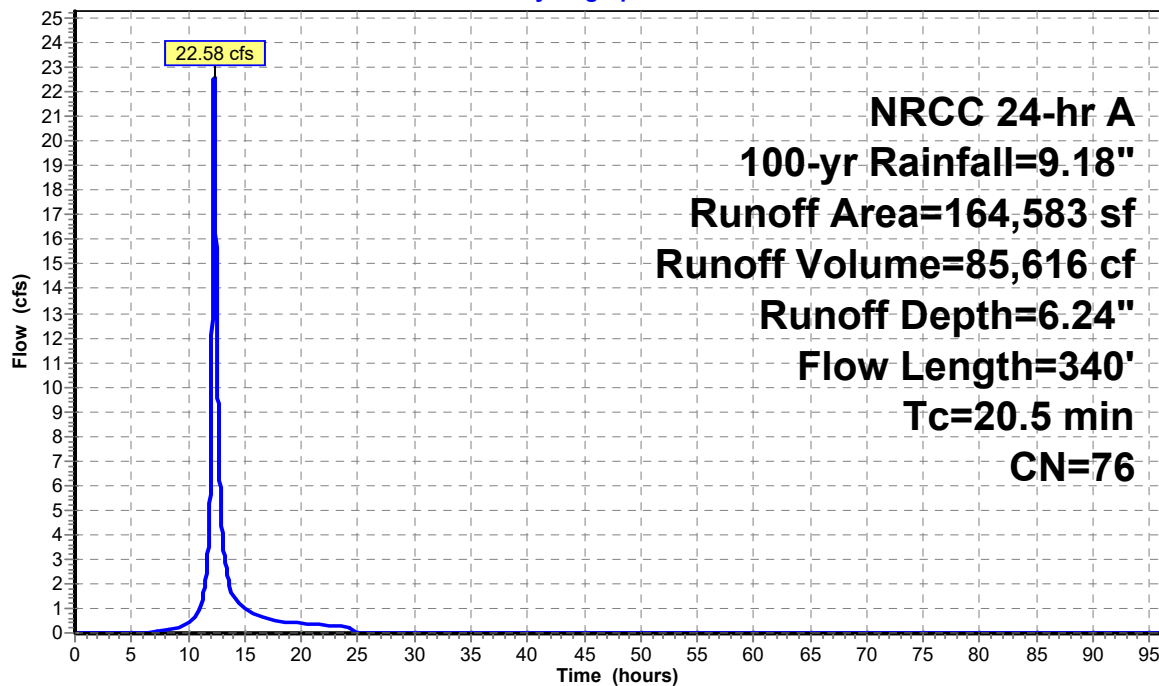
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
15,990	74	>75% Grass cover, Good, HSG C
65,271	70	Woods, Good, HSG C
66,457	77	Woods, Good, HSG D
16,865	98	Water Surface, HSG D
164,583	76	Weighted Average
147,718		89.75% Pervious Area
16,865		10.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.7	240	0.0208	2.32		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
20.5	340	Total			

Subcatchment 10: Post A4

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 100-yr Rainfall=9.18"

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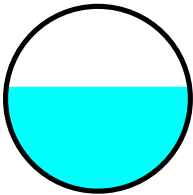
Summary for Reach 11: 24" Culvert Pipe

Inflow Area = 164,583 sf, 10.25% Impervious, Inflow Depth = 6.24" for 100-yr event
Inflow = 22.58 cfs @ 12.30 hrs, Volume= 85,616 cf
Outflow = 22.57 cfs @ 12.30 hrs, Volume= 85,616 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 12.36 fps, Min. Travel Time= 0.2 min
Avg. Velocity= 4.31 fps, Avg. Travel Time= 0.4 min

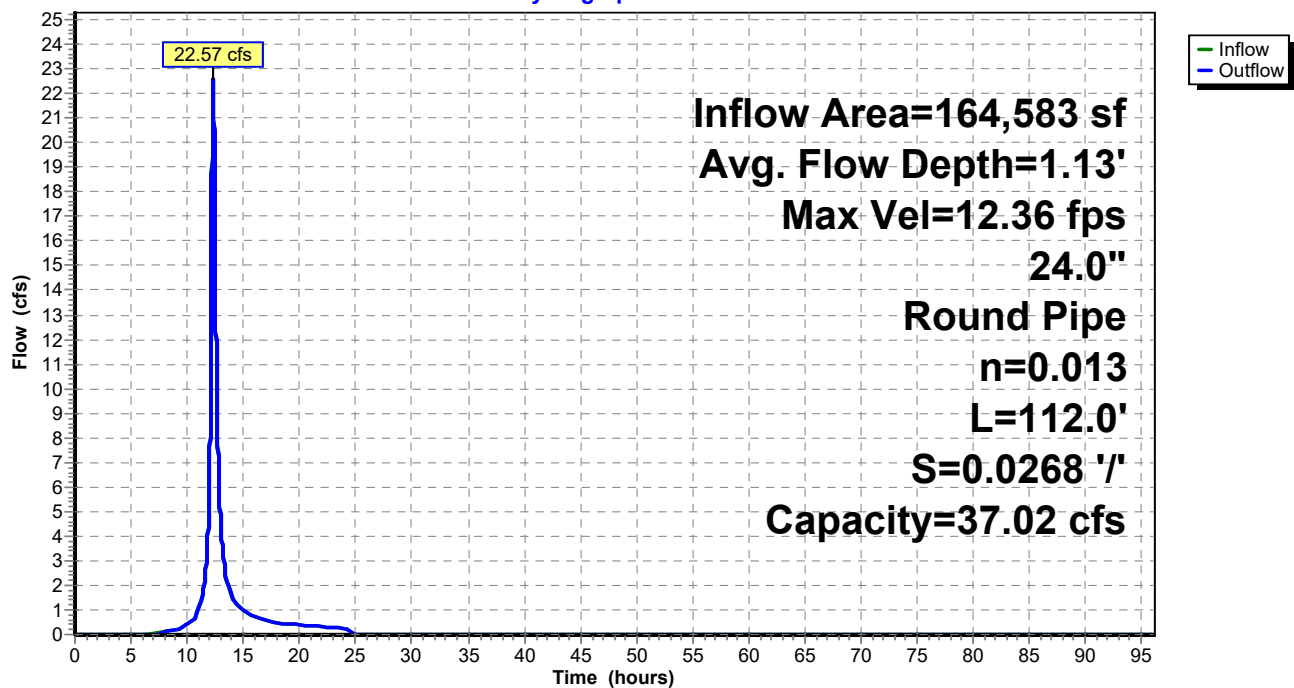
Peak Storage= 204 cf @ 12.30 hrs
Average Depth at Peak Storage= 1.13'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 37.02 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 112.0' Slope= 0.0268 '/
Inlet Invert= 349.00', Outlet Invert= 346.00'



Reach 11: 24" Culvert Pipe

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 12: Post A8

Runoff = 51.21 cfs @ 12.31 hrs, Volume= 197,321 cf, Depth= 5.87"

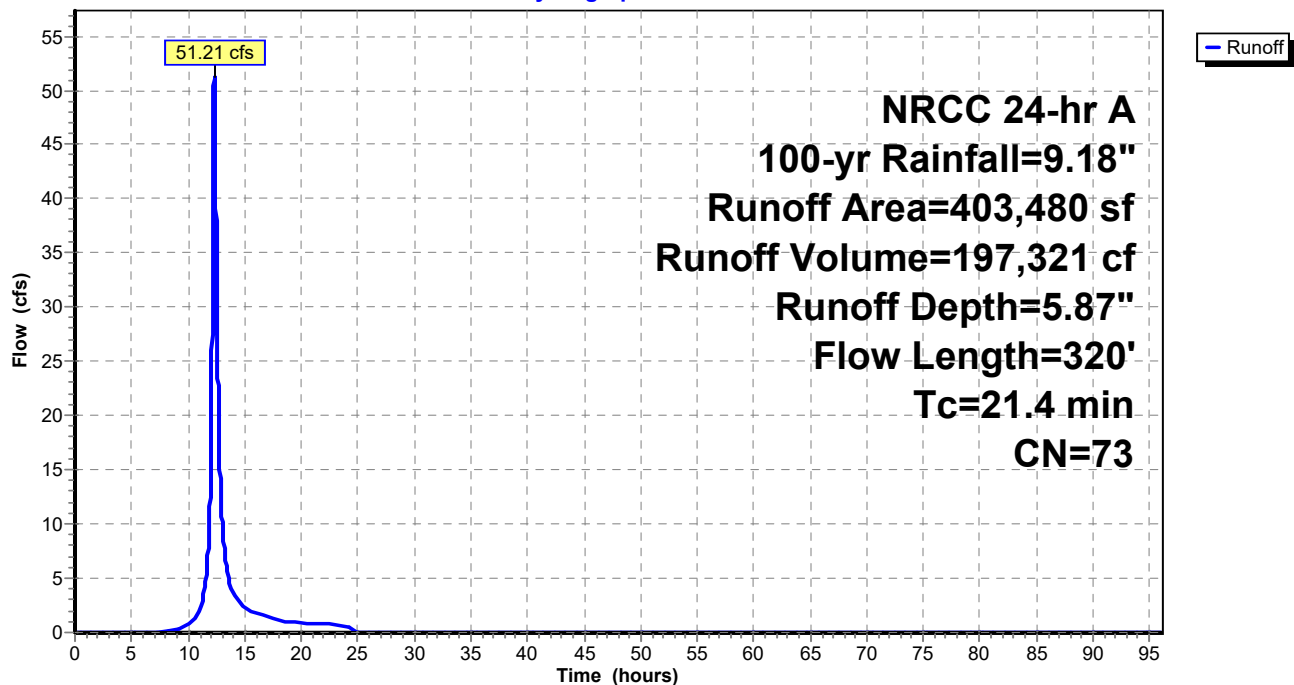
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
278,057	70	Woods, Good, HSG C
108,143	77	Woods, Good, HSG D
10,280	98	Paved parking, HSG D
6,532	74	>75% Grass cover, Good, HSG C
468	80	>75% Grass cover, Good, HSG D
403,480	73	Weighted Average
393,200		97.45% Pervious Area
10,280		2.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	100	0.0200	0.08		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
0.9	220	0.0636	4.06		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
21.4	320	Total			

Subcatchment 12: Post A8

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 12A: Existing Wetland A

Inflow Area = 1,683,123 sf, 39.95% Impervious, Inflow Depth = 6.93" for 100-yr event
 Inflow = 256.21 cfs @ 12.28 hrs, Volume= 972,261 cf
 Outflow = 99.89 cfs @ 12.60 hrs, Volume= 972,261 cf, Atten= 61%, Lag= 19.3 min
 Primary = 99.89 cfs @ 12.60 hrs, Volume= 972,261 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 331.11' @ 12.60 hrs Surf.Area= 42,189 sf Storage= 149,813 cf

Plug-Flow detention time= 11.2 min calculated for 972,160 cf (100% of inflow)
 Center-of-Mass det. time= 11.2 min (825.7 - 814.5)

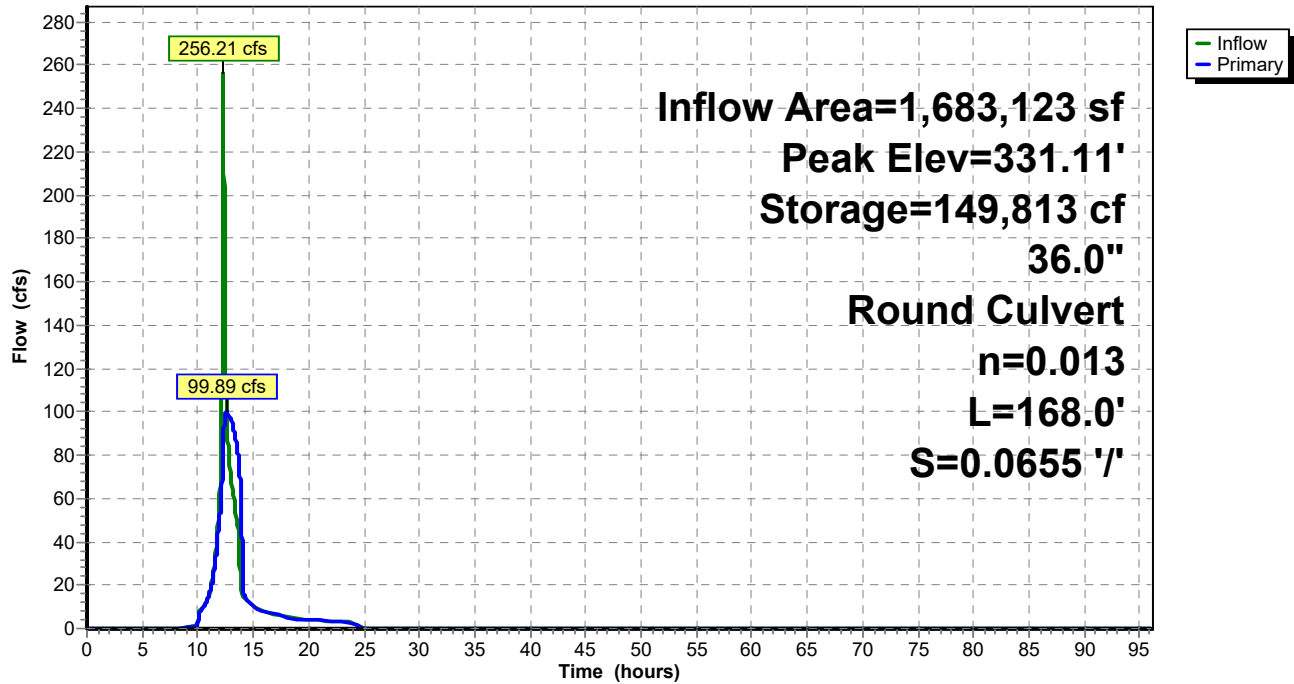
Volume	Invert	Avail.Storage	Storage Description		
#1	321.00'	190,307 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
321.00	124	53.2	0	0	124
322.00	1,084	175.8	525	525	2,361
324.00	4,913	341.5	5,536	6,061	9,202
326.00	11,332	638.2	15,804	21,866	32,354
328.00	20,583	804.3	31,458	53,324	51,475
330.00	34,086	1,075.5	54,104	107,428	92,087
332.00	49,257	1,268.5	82,879	190,307	128,164

Device	Routing	Invert	Outlet Devices
#1	Primary	321.00'	36.0" Round Culvert L= 168.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 321.00' / 310.00' S= 0.0655 ' S Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=99.89 cfs @ 12.60 hrs HW=331.11' TW=313.77' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 99.89 cfs @ 14.13 fps)

Pond 12A: Existing Wetland A

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 12B: Post A11

Runoff = 89.96 cfs @ 12.29 hrs, Volume= 330,623 cf, Depth= 5.49"

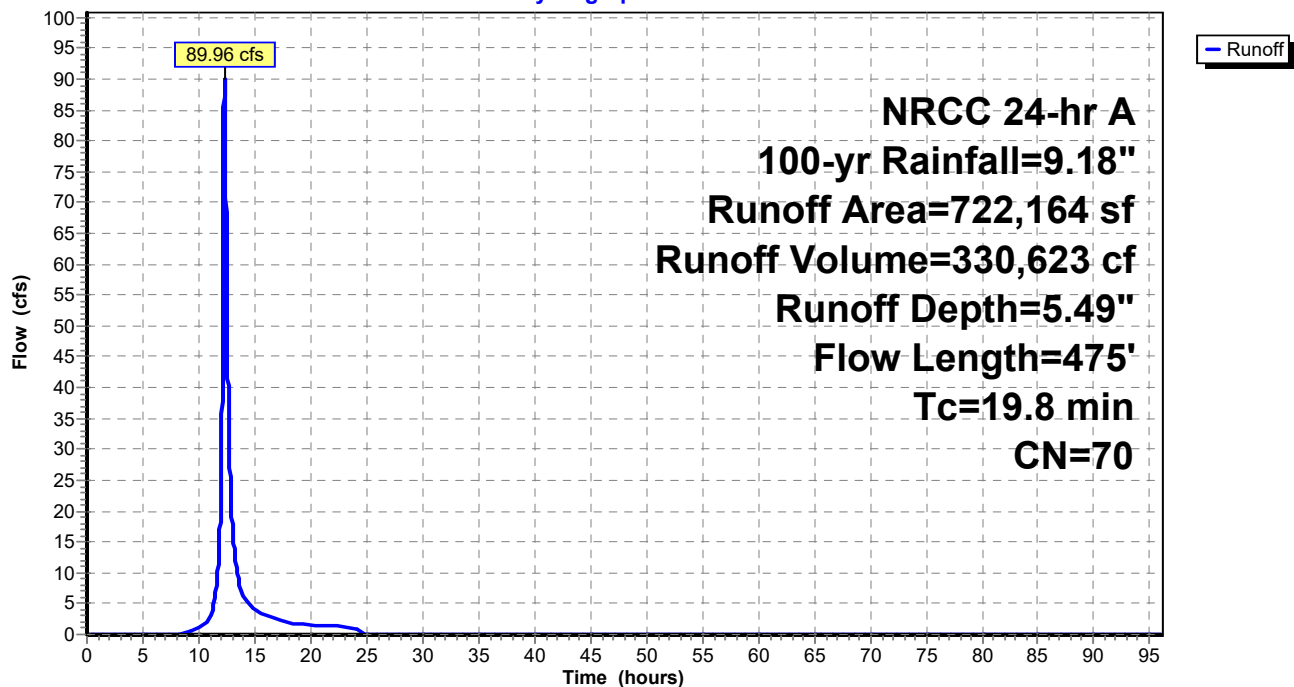
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
17,361	55	Woods, Good, HSG B
681,082	70	Woods, Good, HSG C
11,683	77	Woods, Good, HSG D
9,345	98	Paved parking, HSG C
2,693	74	>75% Grass cover, Good, HSG C
722,164	70	Weighted Average
712,819		98.71% Pervious Area
9,345		1.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.8	100	0.0250	0.09		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.0	375	0.1400	6.02		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
19.8	475	Total			

Subcatchment 12B: Post A11

Hydrograph



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NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Reach 13: Existing Stream A

Inflow Area = 2,405,287 sf, 28.35% Impervious, Inflow Depth = 6.50" for 100-yr event
Inflow = 178.28 cfs @ 12.33 hrs, Volume= 1,302,884 cf
Outflow = 177.20 cfs @ 12.35 hrs, Volume= 1,302,884 cf, Atten= 1%, Lag= 1.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 11.38 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 3.17 fps, Avg. Travel Time= 7.2 min

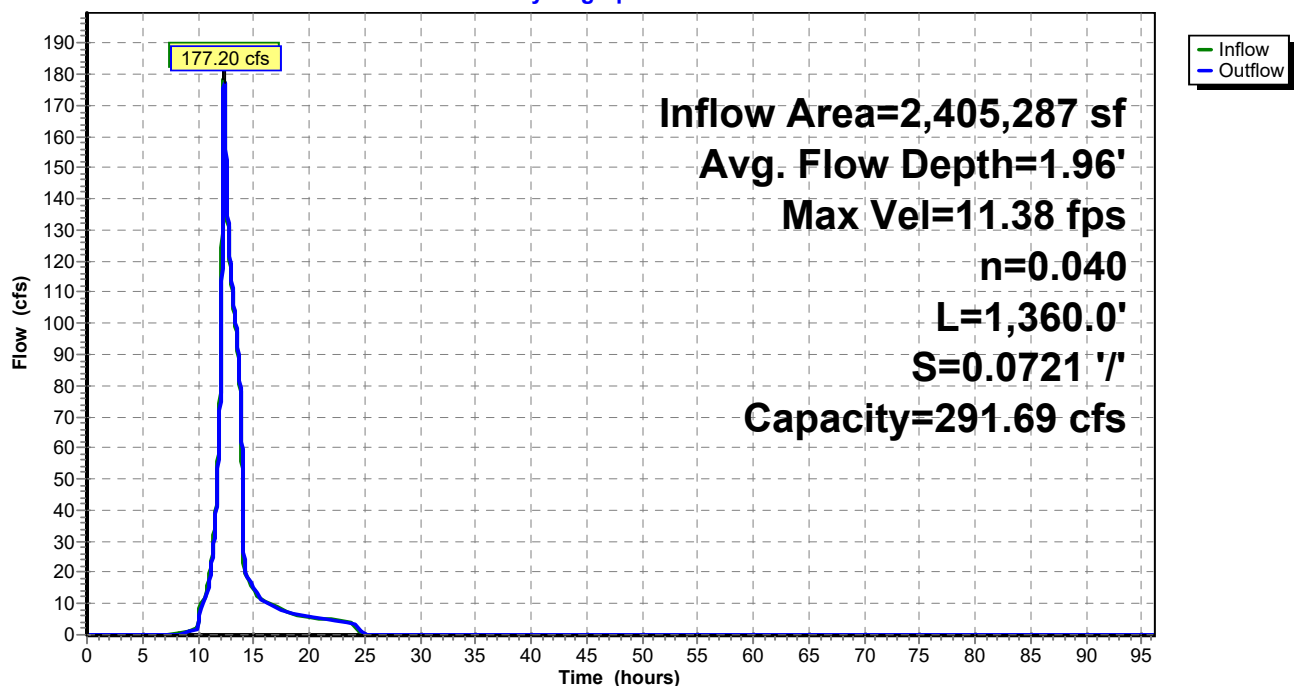
Peak Storage= 21,185 cf @ 12.35 hrs
Average Depth at Peak Storage= 1.96'
Bank-Full Depth= 2.50' Flow Area= 22.5 sf, Capacity= 291.69 cfs

4.00' x 2.50' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 ' ' Top Width= 14.00'
Length= 1,360.0' Slope= 0.0721 ' '
Inlet Invert= 312.00', Outlet Invert= 214.00'



Reach 13: Existing Stream A

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 14: Post A3

Runoff = 28.19 cfs @ 12.13 hrs, Volume= 76,036 cf, Depth= 8.58"

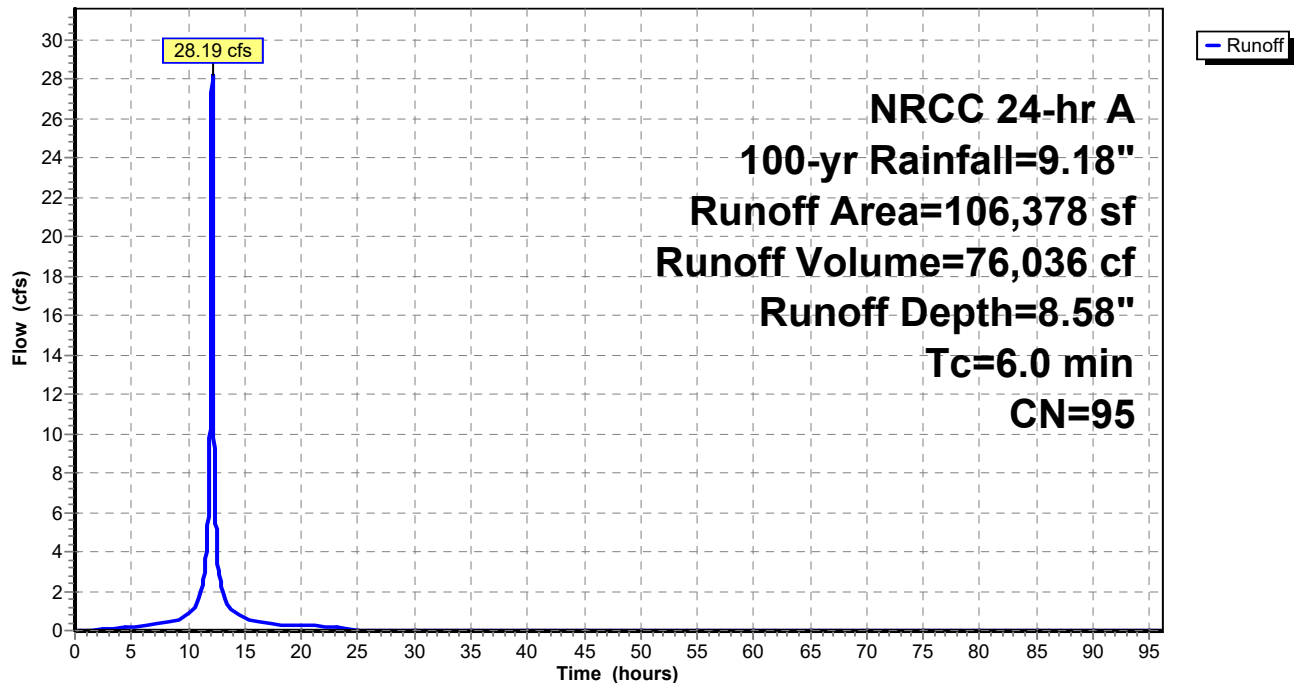
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
91,392	98	Paved parking, HSG C
14,986	74	>75% Grass cover, Good, HSG C
106,378	95	Weighted Average
14,986		14.09% Pervious Area
91,392		85.91% Impervious Area

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

Subcatchment 14: Post A3

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 15: DIV-1

Inflow Area = 106,378 sf, 85.91% Impervious, Inflow Depth = 8.58" for 100-yr event
 Inflow = 28.19 cfs @ 12.13 hrs, Volume= 76,036 cf
 Outflow = 28.19 cfs @ 12.13 hrs, Volume= 76,036 cf, Atten= 0%, Lag= 0.0 min
 Primary = 4.81 cfs @ 11.69 hrs, Volume= 45,953 cf
 Secondary = 24.20 cfs @ 12.13 hrs, Volume= 30,083 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 328.06' @ 12.13 hrs

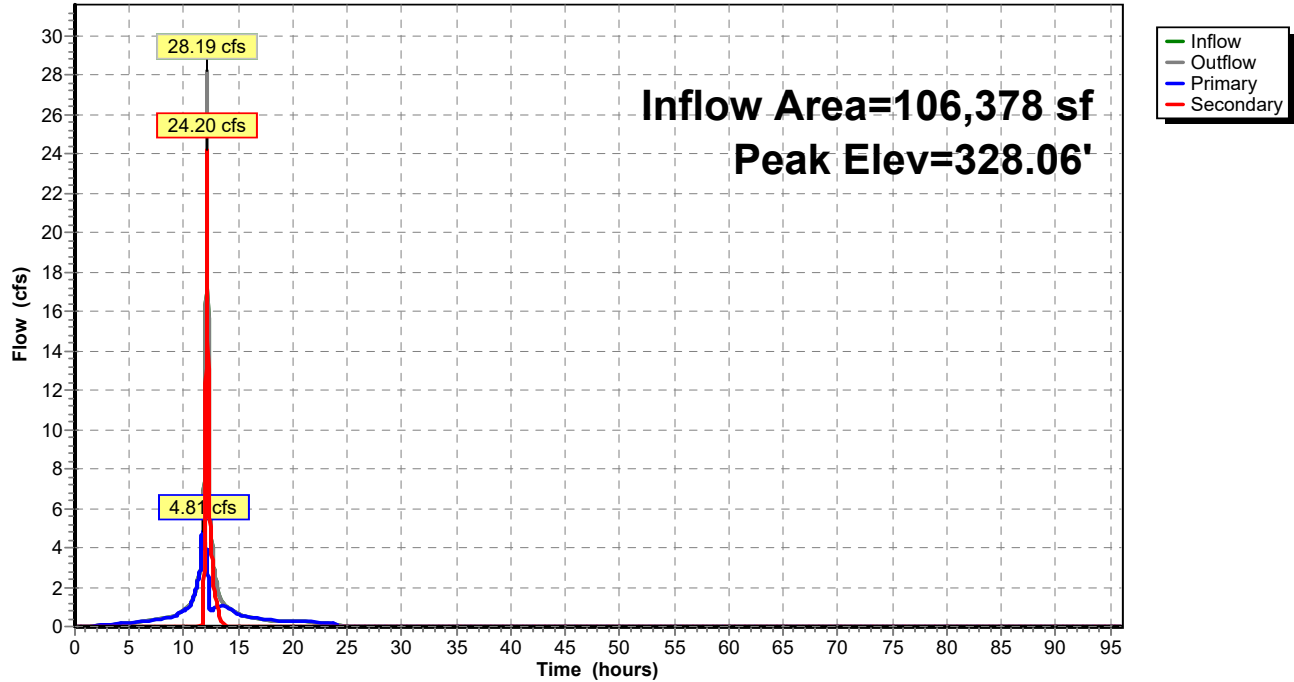
Flood Elev= 330.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	324.50'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 324.50' / 324.50' S= 0.0000 ' S= 0.0000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	324.50'	24.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 324.50' / 320.00' S= 0.0900 ' S= 0.0900 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	327.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.75 cfs @ 11.69 hrs HW=327.00' TW=325.43' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 4.75 cfs @ 6.05 fps)**Secondary OutFlow** Max=24.20 cfs @ 12.13 hrs HW=328.06' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Inlet Controls 24.20 cfs @ 7.70 fps)↑ **3=Broad-Crested Rectangular Weir** (Passes 24.20 cfs of 28.99 cfs potential flow)

Pond 15: DIV-1

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 16: INF-1

Inflow Area = 106,378 sf, 85.91% Impervious, Inflow Depth = 5.18" for 100-yr event
 Inflow = 4.81 cfs @ 11.69 hrs, Volume= 45,953 cf
 Outflow = 1.18 cfs @ 10.83 hrs, Volume= 45,953 cf, Atten= 76%, Lag= 0.0 min
 Discarded = 1.18 cfs @ 10.83 hrs, Volume= 45,953 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 327.35' @ 12.32 hrs Surf.Area= 4,245 sf Storage= 9,661 cf

Plug-Flow detention time= 51.0 min calculated for 45,948 cf (100% of inflow)
 Center-of-Mass det. time= 51.0 min (815.9 - 764.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	324.00'	4,688 cf	36.75'W x 115.50'L x 4.33'H Field A 18,393 cf Overall - 6,674 cf Embedded = 11,720 cf x 40.0% Voids
#2A	324.50'	6,674 cf	Cultec R-360HD x 180 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 180 Chambers in 6 Rows Cap Storage= +6.5 cf x 2 x 6 rows = 77.5 cf
		11,361 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	324.00'	12.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=1.18 cfs @ 10.83 hrs HW=324.05' (Free Discharge)
 ↑**1=Exfiltration** (Exfiltration Controls 1.18 cfs)

N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Pond 16: INF-1 - Chamber Wizard Field A**Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)**

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 6 rows = 77.5 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

30 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 112.50' Row Length +18.0" End Stone x 2 =
115.50' Base Length

6 Rows x 60.0" Wide + 9.0" Spacing x 5 + 18.0" Side Stone x 2 = 36.75' Base Width

6.0" Base + 36.0" Chamber Height + 10.0" Cover = 4.33' Field Height

180 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 6 Rows = 6,673.6 cf Chamber Storage

18,393.4 cf Field - 6,673.6 cf Chambers = 11,719.8 cf Stone x 40.0% Voids = 4,687.9 cf Stone Storage

Chamber Storage + Stone Storage = 11,361.5 cf = 0.261 af

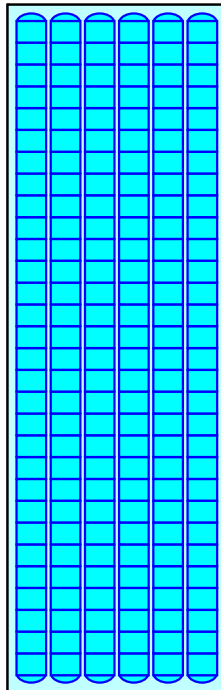
Overall Storage Efficiency = 61.8%

Overall System Size = 115.50' x 36.75' x 4.33'

180 Chambers

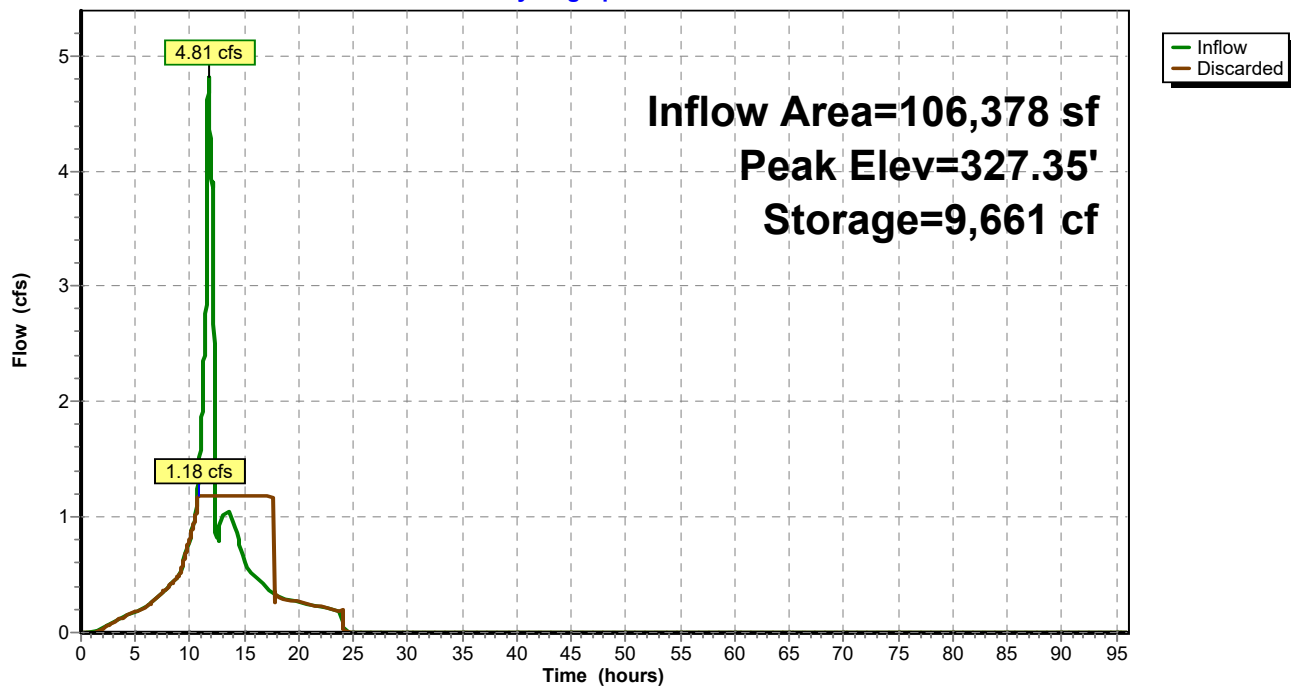
681.2 cy Field

434.1 cy Stone



Pond 16: INF-1

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 17: Post A5

Runoff = 24.84 cfs @ 12.13 hrs, Volume= 69,226 cf, Depth= 8.94"

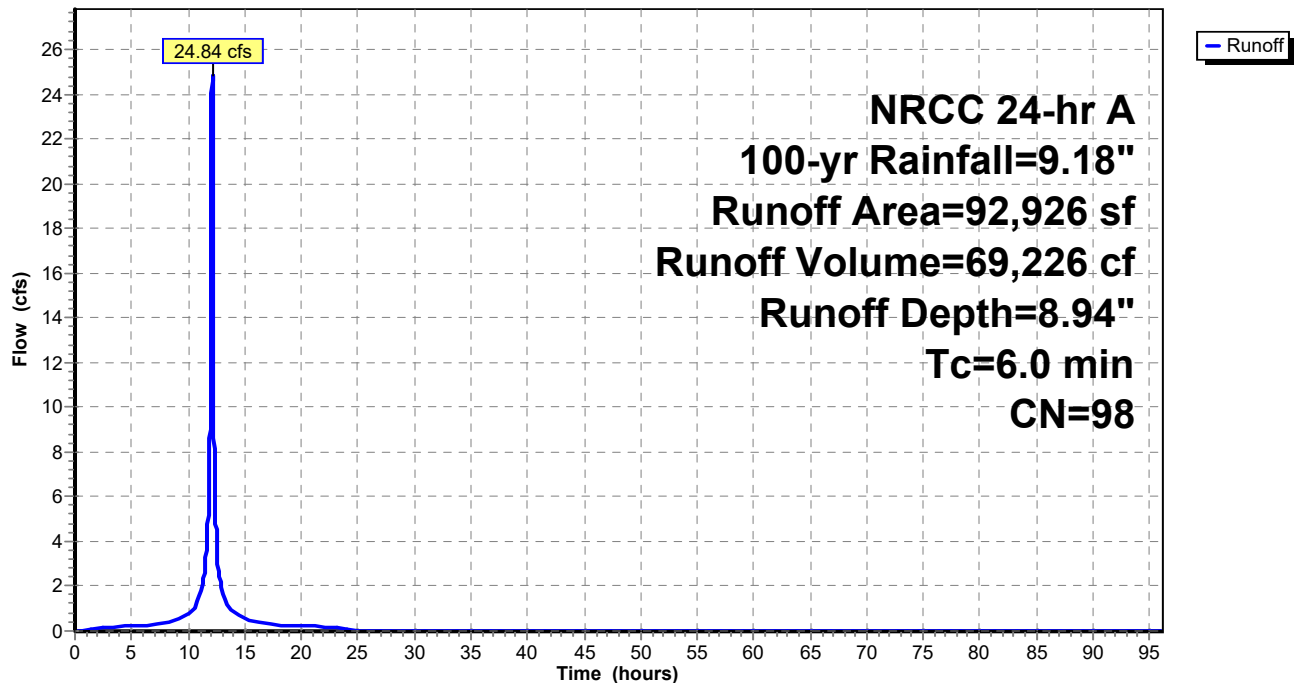
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
92,926	98	Roofs, HSG C
92,926		100.00% Impervious Area

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

Subcatchment 17: Post A5

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 18: DIV-2

Inflow Area = 92,926 sf, 100.00% Impervious, Inflow Depth = 8.94" for 100-yr event
 Inflow = 24.84 cfs @ 12.13 hrs, Volume= 69,226 cf
 Outflow = 24.84 cfs @ 12.13 hrs, Volume= 69,226 cf, Atten= 0%, Lag= 0.0 min
 Primary = 5.16 cfs @ 11.78 hrs, Volume= 44,464 cf
 Secondary = 20.11 cfs @ 12.13 hrs, Volume= 24,762 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 369.27' @ 12.13 hrs

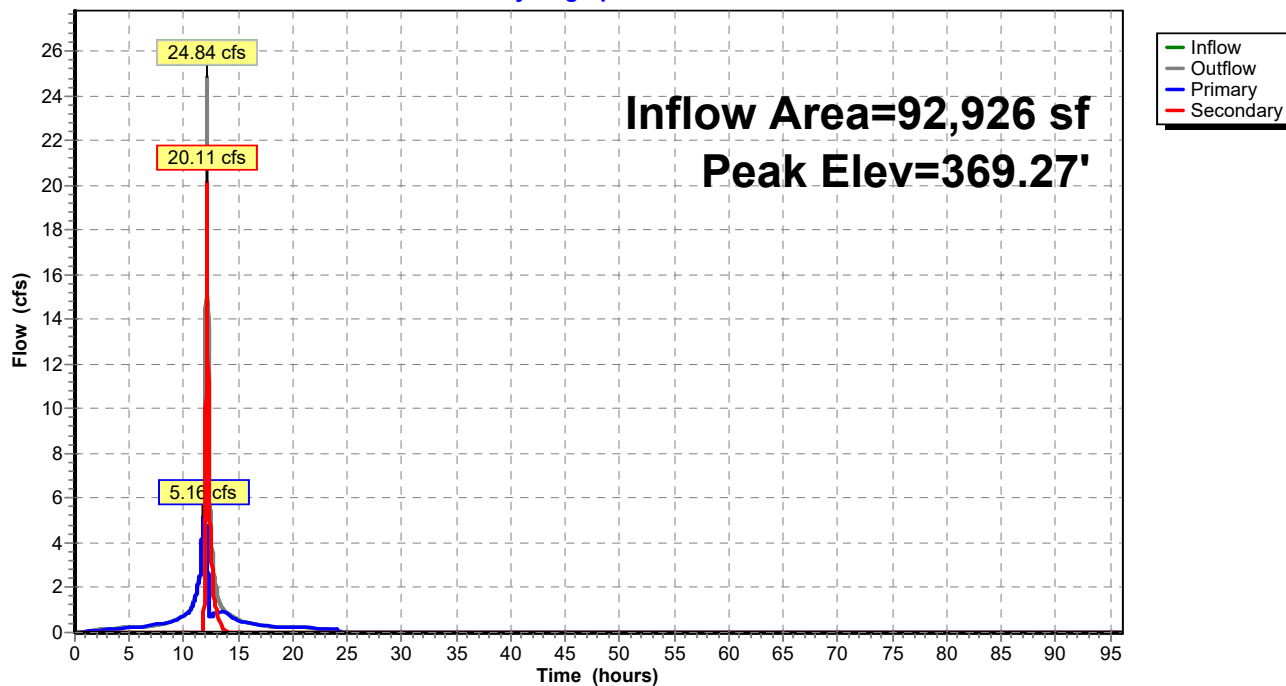
Flood Elev= 371.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	365.00'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 365.00' / 365.00' S= 0.0000 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	366.50'	24.0" Round Culvert L= 550.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 366.50' / 355.00' S= 0.0209 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	368.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.09 cfs @ 11.78 hrs HW=368.04' TW=366.23' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 5.09 cfs @ 6.48 fps)**Secondary OutFlow** Max=20.10 cfs @ 12.13 hrs HW=369.27' TW=355.59' (Dynamic Tailwater)↑ **2=Culvert** (Inlet Controls 20.10 cfs @ 6.40 fps)↑ **3=Broad-Crested Rectangular Weir** (Passes 20.10 cfs of 37.84 cfs potential flow)

Pond 18: DIV-2

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 19: INF-2

Inflow Area = 92,926 sf, 100.00% Impervious, Inflow Depth = 5.74" for 100-yr event
 Inflow = 5.16 cfs @ 11.78 hrs, Volume= 44,464 cf
 Outflow = 0.99 cfs @ 10.76 hrs, Volume= 44,464 cf, Atten= 81%, Lag= 0.0 min
 Discarded = 0.99 cfs @ 10.76 hrs, Volume= 44,464 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 368.33' @ 12.33 hrs Surf.Area= 4,295 sf Storage= 10,798 cf

Plug-Flow detention time= 69.9 min calculated for 44,459 cf (100% of inflow)
 Center-of-Mass det. time= 69.9 min (811.1 - 741.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	364.50'	4,639 cf	41.50'W x 103.50'L x 4.33'H Field A 18,613 cf Overall - 7,016 cf Embedded = 11,596 cf x 40.0% Voids
#2A	365.00'	7,016 cf	Cultec R-360HD x 189 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 189 Chambers in 7 Rows Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf
		11,655 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	364.50'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=0.99 cfs @ 10.76 hrs HW=364.55' (Free Discharge)↑ **1=Exfiltration** (Exfiltration Controls 0.99 cfs)

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 100-yr Rainfall=9.18"

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Pond 19: INF-2 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

27 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 101.50' Row Length +12.0" End Stone x 2 = 103.50' Base Length

7 Rows x 60.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 41.50' Base Width

6.0" Base + 36.0" Chamber Height + 10.0" Cover = 4.33' Field Height

189 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 7 Rows = 7,016.3 cf Chamber Storage

18,612.7 cf Field - 7,016.3 cf Chambers = 11,596.5 cf Stone x 40.0% Voids = 4,638.6 cf Stone Storage

Chamber Storage + Stone Storage = 11,654.9 cf = 0.268 af

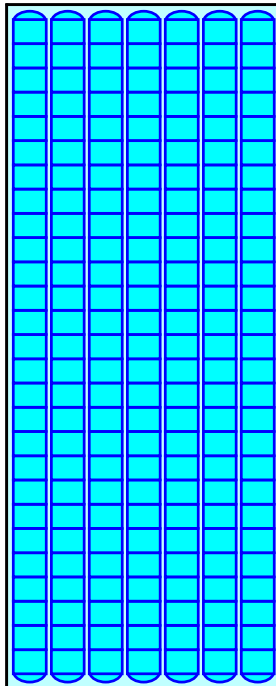
Overall Storage Efficiency = 62.6%

Overall System Size = 103.50' x 41.50' x 4.33'

189 Chambers

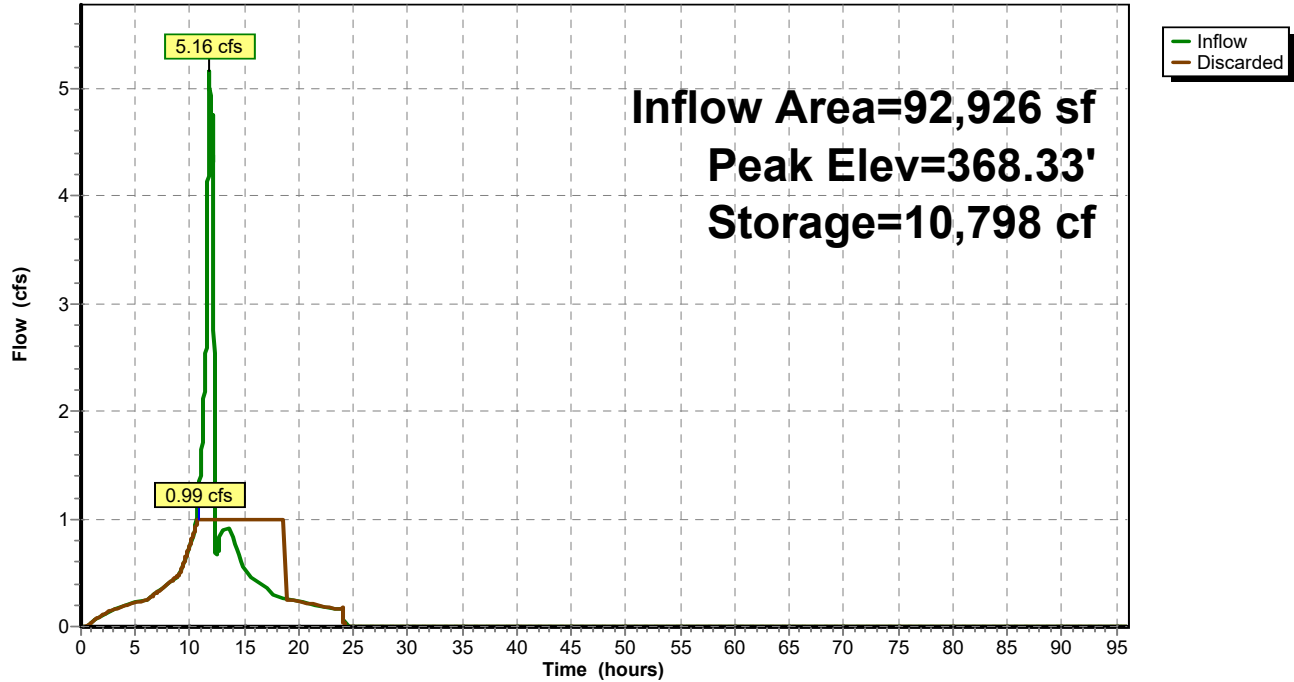
689.4 cy Field

429.5 cy Stone



Pond 19: INF-2

Hydrograph



N60 P1 Post-A 3-17-20

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NRCC 24-hr A 100-yr Rainfall=9.18"

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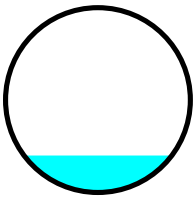
Summary for Reach 20: 36" HDPE Pipe

Inflow = 20.11 cfs @ 12.13 hrs, Volume= 24,762 cf
Outflow = 19.99 cfs @ 12.14 hrs, Volume= 24,762 cf, Atten= 1%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 20.06 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 8.86 fps, Avg. Travel Time= 1.5 min

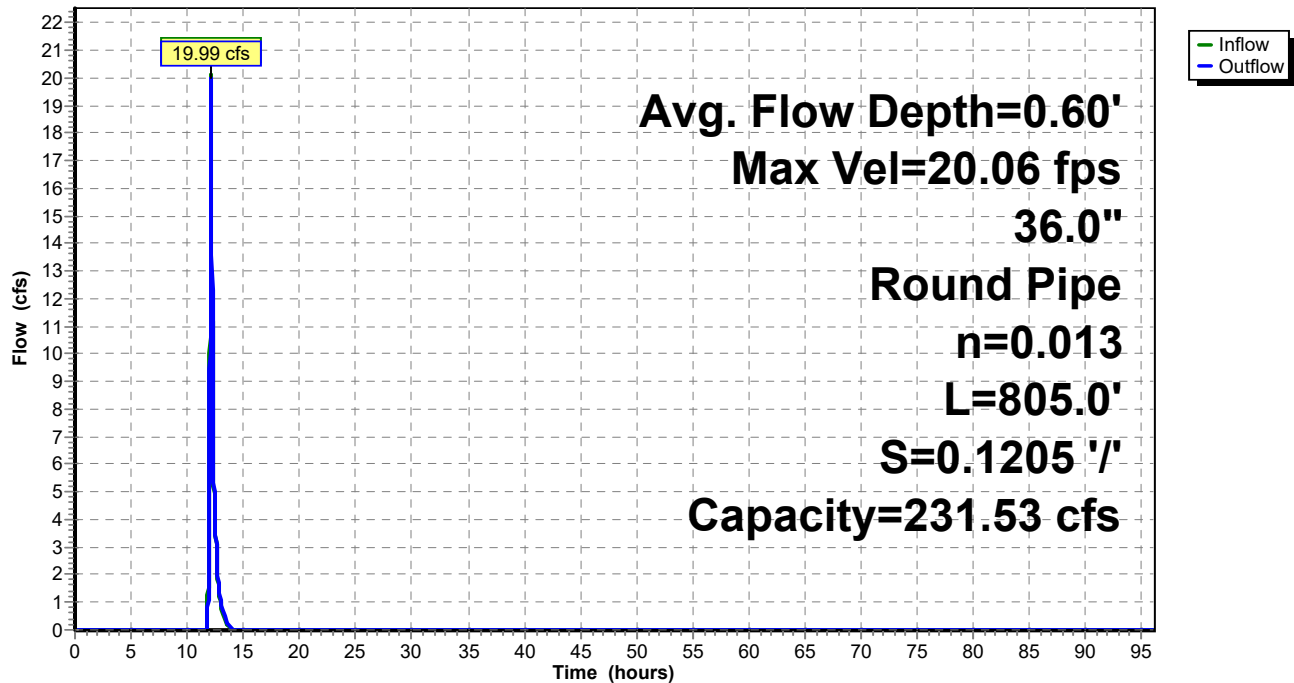
Peak Storage= 802 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.60'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 231.53 cfs

36.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 805.0' Slope= 0.1205 '/'
Inlet Invert= 355.00', Outlet Invert= 258.00'



Reach 20: 36" HDPE Pipe

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 21: A6

Runoff = 102.32 cfs @ 12.13 hrs, Volume= 278,841 cf, Depth= 8.70"

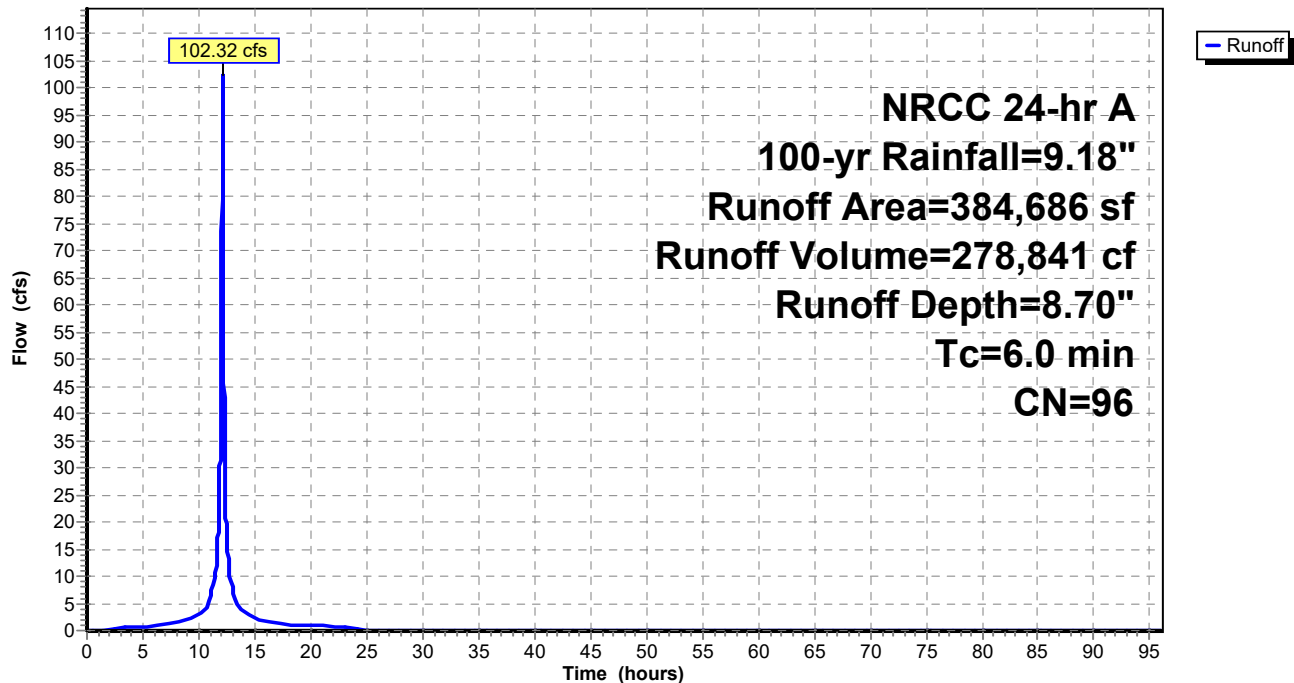
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
332,512	98	Paved parking, HSG C
52,174	86	<50% Grass cover, Poor, HSG C
384,686	96	Weighted Average
52,174		13.56% Pervious Area
332,512		86.44% Impervious Area

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

Subcatchment 21: A6

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 22: A7

Runoff = 19.50 cfs @ 12.13 hrs, Volume= 45,327 cf, Depth= 5.24"

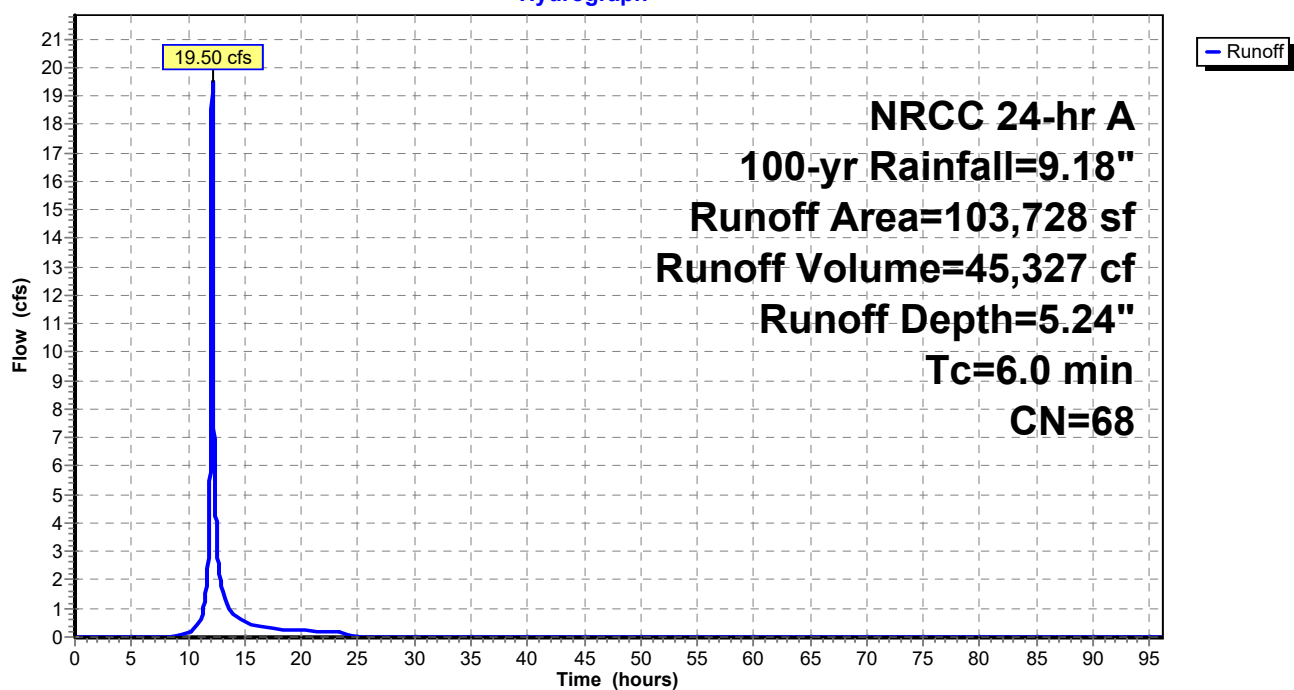
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
35,128	65	Brush, Good, HSG C
68,600	70	Woods, Good, HSG C
103,728	68	Weighted Average
103,728		100.00% Pervious Area

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

Subcatchment 22: A7

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 23: Infiltration Basin (SWP-3)

Inflow Area = 488,414 sf, 68.08% Impervious, Inflow Depth = 8.57" for 100-yr event
 Inflow = 141.66 cfs @ 12.13 hrs, Volume= 348,930 cf
 Outflow = 122.44 cfs @ 12.17 hrs, Volume= 348,930 cf, Atten= 14%, Lag= 2.1 min
 Discarded = 6.81 cfs @ 12.17 hrs, Volume= 208,177 cf
 Primary = 115.63 cfs @ 12.17 hrs, Volume= 140,753 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 261.81' @ 12.17 hrs Surf.Area= 19,602 sf Storage= 83,389 cf

Plug-Flow detention time= 48.6 min calculated for 348,930 cf (100% of inflow)
 Center-of-Mass det. time= 48.6 min (805.1 - 756.6)

Volume	Invert	Avail.Storage	Storage Description		
#1	256.00'	87,144 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
256.00	9,450	527.9	0	0	9,450
258.00	12,731	565.7	22,100	22,100	12,917
260.00	16,238	603.5	28,898	50,998	16,623
262.00	19,973	641.3	36,147	87,144	20,569

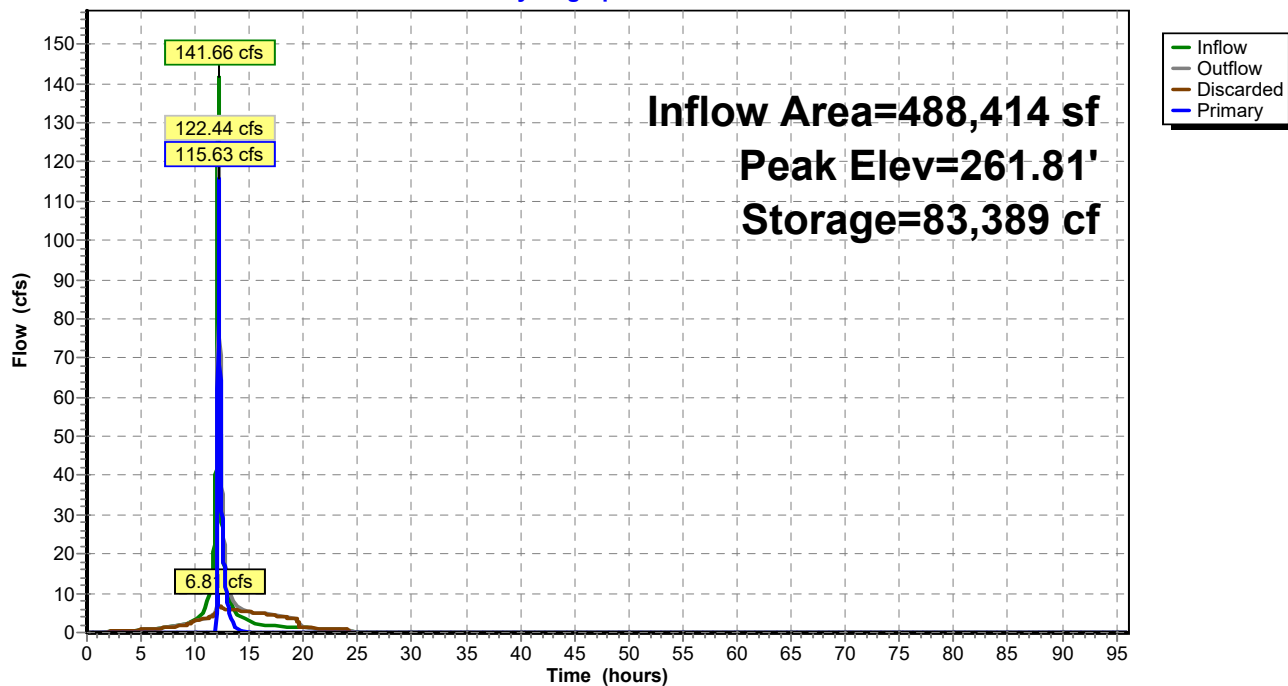
Device	Routing	Invert	Outlet Devices
#1	Primary	254.00'	36.0" Round Culvert X 2.00 L= 95.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 254.00' / 244.00' S= 0.1053 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	260.00'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#3	Device 1	260.00'	3.0' long x 0.5' breadth Broad-Crested Rectangular Weir X 2.00 Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	259.40'	6.0" Vert. Orifice/Grate C= 0.600
#5	Device 1	261.00'	36.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Discarded	256.00'	15.000 in/hr Exfiltration over Surface area Phase-In= 0.10'

Discarded OutFlow Max=6.80 cfs @ 12.17 hrs HW=261.81' (Free Discharge)
 ↳ **6=Exfiltration** (Exfiltration Controls 6.80 cfs)

Primary OutFlow Max=115.38 cfs @ 12.17 hrs HW=261.81' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Passes 115.38 cfs of 170.97 cfs potential flow)
 ↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 32.29 cfs @ 4.46 fps)
 ↳ **3=Broad-Crested Rectangular Weir** (Weir Controls 48.44 cfs @ 4.46 fps)
 ↳ **4=Orifice/Grate** (Orifice Controls 1.39 cfs @ 7.07 fps)
 ↳ **5=Orifice/Grate** (Weir Controls 33.26 cfs @ 2.94 fps)

Pond 23: Infiltration Basin (SWP-3)

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 24: A9

Runoff = 8.97 cfs @ 12.13 hrs, Volume= 24,177 cf, Depth= 8.58"

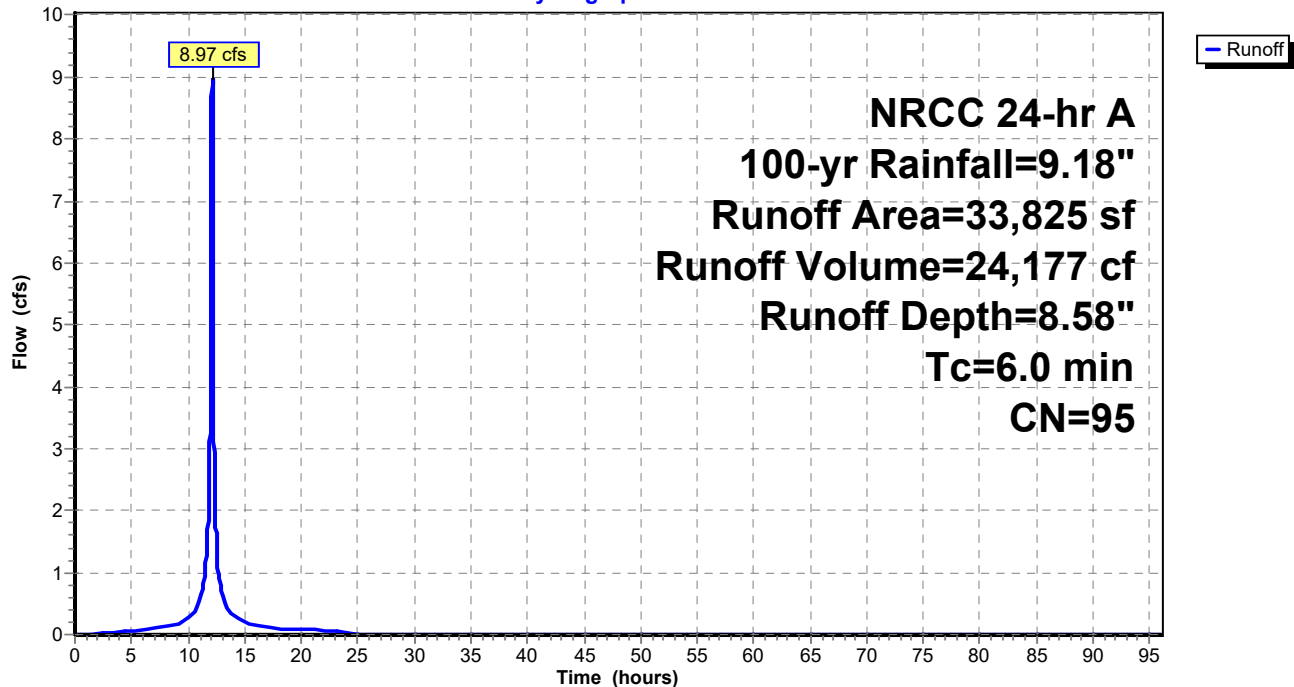
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
29,687	98	Paved parking, HSG C
4,138	74	>75% Grass cover, Good, HSG C
33,825	95	Weighted Average
4,138		12.23% Pervious Area
29,687		87.77% Impervious Area

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

Subcatchment 24: A9

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 25: DIV-4

Inflow Area = 33,825 sf, 87.77% Impervious, Inflow Depth = 8.58" for 100-yr event
 Inflow = 8.97 cfs @ 12.13 hrs, Volume= 24,177 cf
 Outflow = 8.97 cfs @ 12.13 hrs, Volume= 24,177 cf, Atten= 0%, Lag= 0.0 min
 Primary = 4.80 cfs @ 12.01 hrs, Volume= 18,214 cf
 Secondary = 5.82 cfs @ 12.14 hrs, Volume= 5,963 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 352.90' @ 12.14 hrs

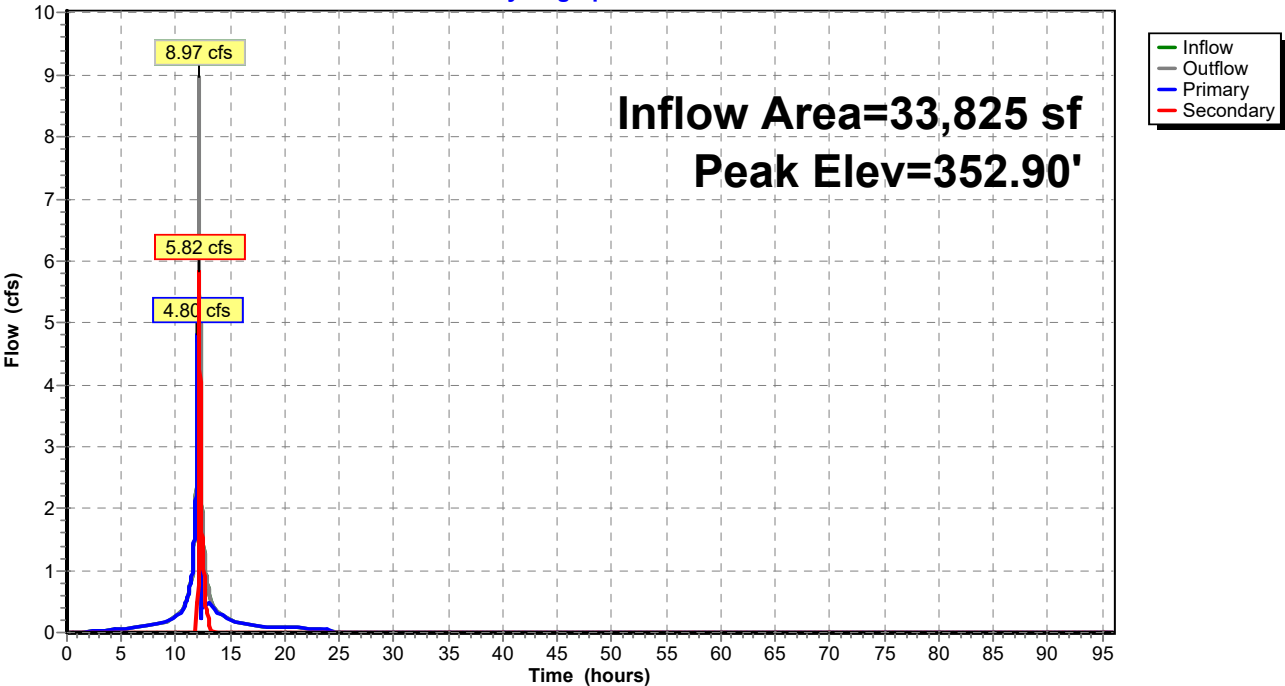
Flood Elev= 355.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	349.50'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 349.50' / 349.50' S= 0.0000 ' S= 0.0000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	349.50'	18.0" Round Culvert L= 128.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 349.50' / 344.00' S= 0.0430 ' S= 0.0430 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	352.50'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=4.66 cfs @ 12.01 hrs HW=352.50' TW=350.99' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 4.66 cfs @ 5.93 fps)**Secondary OutFlow** Max=5.80 cfs @ 12.14 hrs HW=352.90' TW=0.00' (Dynamic Tailwater)↑ **2=Culvert** (Passes 5.80 cfs of 13.84 cfs potential flow)↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 5.80 cfs @ 1.83 fps)

Pond 25: DIV-4

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 26: INF-4

Inflow Area = 33,825 sf, 87.77% Impervious, Inflow Depth = 6.46" for 100-yr event
 Inflow = 4.80 cfs @ 12.01 hrs, Volume= 18,214 cf
 Outflow = 0.52 cfs @ 11.15 hrs, Volume= 18,214 cf, Atten= 89%, Lag= 0.0 min
 Discarded = 0.52 cfs @ 11.15 hrs, Volume= 18,214 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 352.79' @ 12.23 hrs Surf.Area= 2,242 sf Storage= 5,316 cf

Plug-Flow detention time= 66.4 min calculated for 18,213 cf (100% of inflow)
 Center-of-Mass det. time= 66.4 min (824.4 - 758.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	349.00'	2,196 cf	30.50'W x 73.50'L x 3.88'H Field A 8,687 cf Overall - 3,196 cf Embedded = 5,490 cf x 40.0% Voids
#2A	349.50'	3,196 cf	Cultec R-330XLHD x 60 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 6 rows
		5,393 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	349.00'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.01'

Discarded OutFlow Max=0.52 cfs @ 11.15 hrs HW=349.04' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.52 cfs)

N60 P1 Post-A 3-17-20

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NRCC 24-hr A 100-yr Rainfall=9.18"

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Pond 26: INF-4 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 6 rows

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

10 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 71.50' Row Length +12.0" End Stone x 2 = 73.50' Base Length

6 Rows x 52.0" Wide + 6.0" Spacing x 5 + 12.0" Side Stone x 2 = 30.50' Base Width

6.0" Base + 30.5" Chamber Height + 10.0" Cover = 3.88' Field Height

60 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 6 Rows = 3,196.5 cf Chamber Storage

8,686.8 cf Field - 3,196.5 cf Chambers = 5,490.3 cf Stone x 40.0% Voids = 2,196.1 cf Stone Storage

Chamber Storage + Stone Storage = 5,392.6 cf = 0.124 af

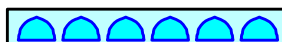
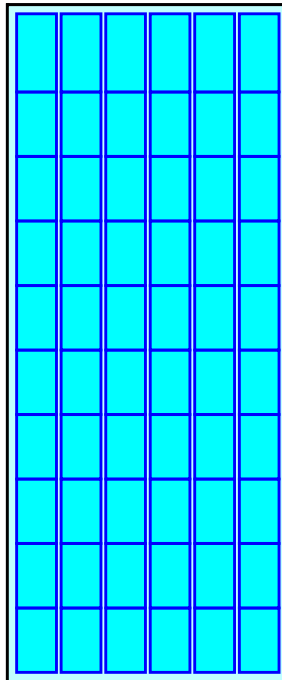
Overall Storage Efficiency = 62.1%

Overall System Size = 73.50' x 30.50' x 3.88'

60 Chambers

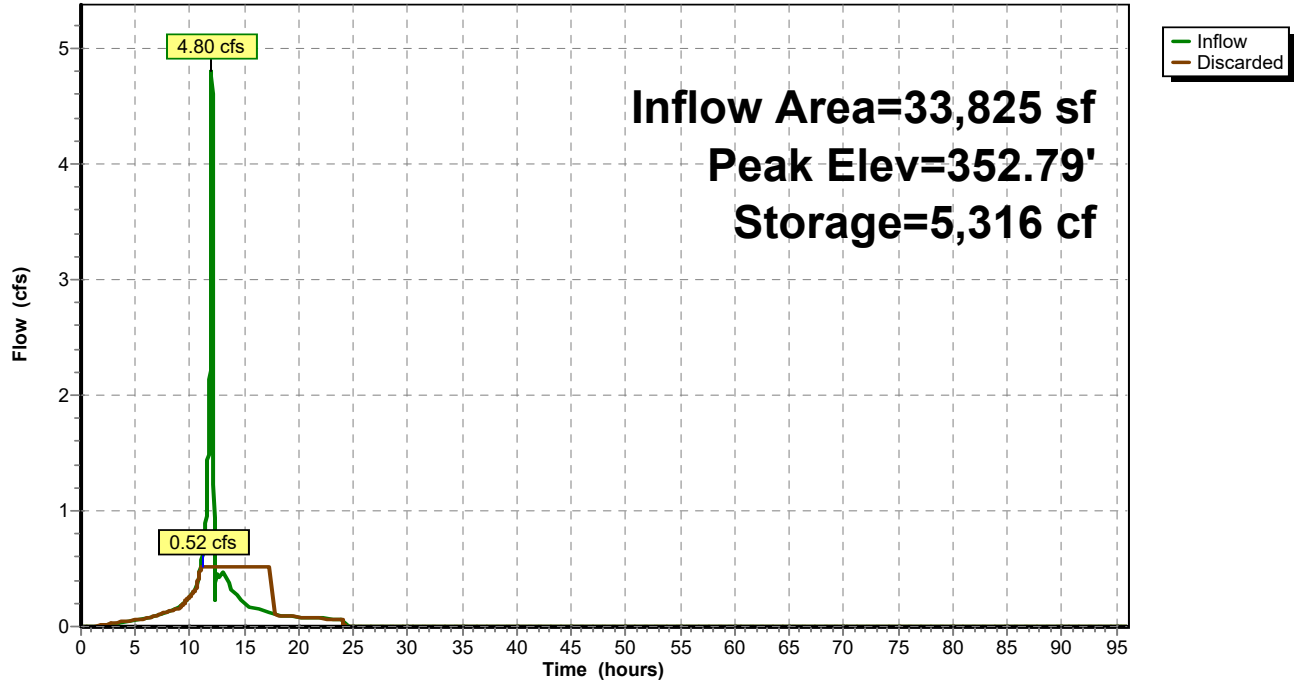
321.7 cy Field

203.3 cy Stone



Pond 26: INF-4

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 27: A10

Runoff = 9.10 cfs @ 12.13 hrs, Volume= 21,506 cf, Depth= 5.99"

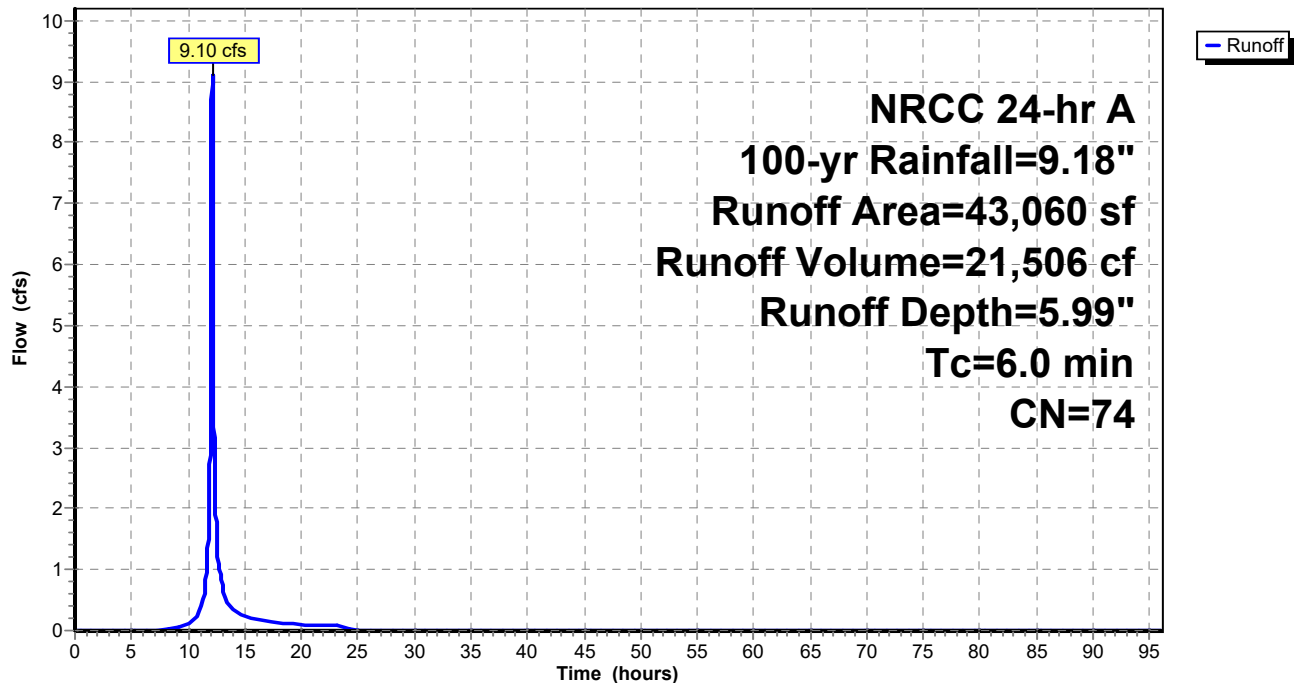
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
16,120	73	Brush, Good, HSG D
19,715	77	Brush, Poor, HSG C
7,225	70	Woods, Good, HSG C
43,060	74	Weighted Average
43,060		100.00% Pervious Area

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

Subcatchment 27: A10

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 28: A10

Runoff = 27.69 cfs @ 12.13 hrs, Volume= 74,671 cf, Depth= 8.58"

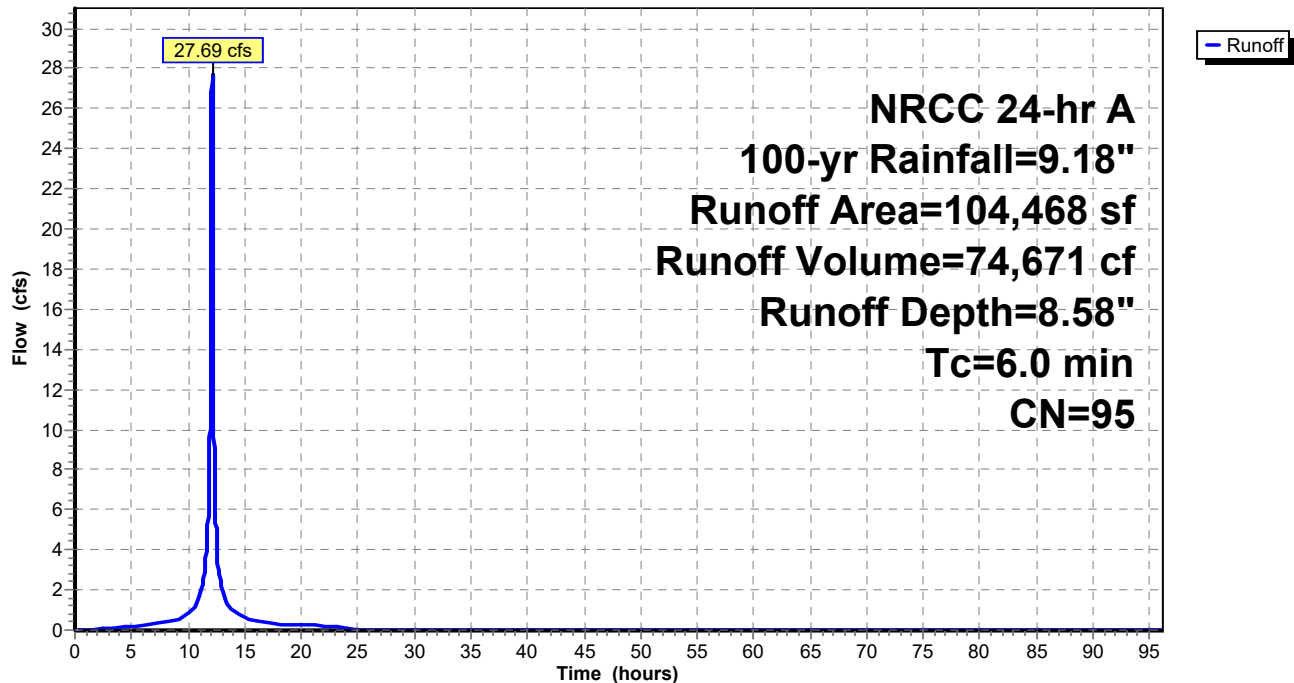
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
91,430	98	Paved parking, HSG C
7,435	74	>75% Grass cover, Good, HSG C
5,603	80	>75% Grass cover, Good, HSG D
104,468	95	Weighted Average
13,038		12.48% Pervious Area
91,430		87.52% Impervious Area

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

Subcatchment 28: A10

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 29: Infiltration Basin (SWP-2)

Inflow Area = 147,528 sf, 61.97% Impervious, Inflow Depth = 7.82" for 100-yr event
 Inflow = 36.78 cfs @ 12.13 hrs, Volume= 96,177 cf
 Outflow = 10.10 cfs @ 12.34 hrs, Volume= 96,177 cf, Atten= 73%, Lag= 12.7 min
 Discarded = 3.29 cfs @ 12.34 hrs, Volume= 79,081 cf
 Primary = 6.81 cfs @ 12.34 hrs, Volume= 17,096 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 321.30' @ 12.34 hrs Surf.Area= 9,467 sf Storage= 35,020 cf

Plug-Flow detention time= 68.2 min calculated for 96,167 cf (100% of inflow)
 Center-of-Mass det. time= 68.1 min (832.4 - 764.2)

Volume	Invert	Avail.Storage	Storage Description
#1	316.00'	41,962 cf	Custom Stage Data (Irregular) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
316.00	4,026	293.0	0	0	4,026
318.00	5,897	330.7	9,864	9,864	5,998
320.00	7,994	368.3	13,838	23,702	8,204
322.00	10,316	406.0	18,261	41,962	10,652

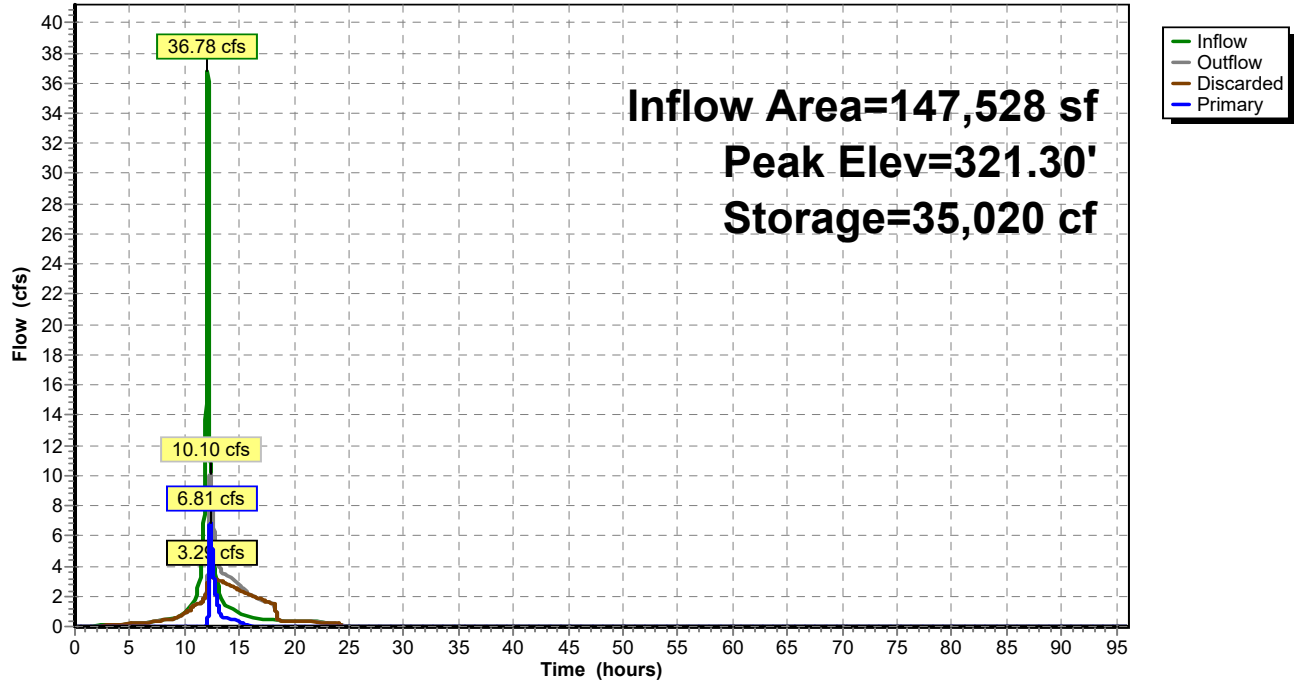
Device	Routing	Invert	Outlet Devices
#1	Primary	310.00'	15.0" Round Culvert L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 310.00' / 304.00' S= 0.1000 ' S= 0.1000 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	318.25'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	320.50'	2.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 1	321.00'	3.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#5	Discarded	316.00'	15.000 in/hr Exfiltration over Surface area Phase-In= 0.10'

Discarded OutFlow Max=3.29 cfs @ 12.34 hrs HW=321.30' (Free Discharge)
 ↳ **5=Exfiltration** (Exfiltration Controls 3.29 cfs)

Primary OutFlow Max=6.81 cfs @ 12.34 hrs HW=321.30' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Culvert** (Passes 6.81 cfs of 19.30 cfs potential flow)
 ↳ **2=Orifice/Grate** (Orifice Controls 0.71 cfs @ 8.17 fps)
 ↳ **3=Broad-Crested Rectangular Weir** (Weir Controls 4.70 cfs @ 2.95 fps)
 ↳ **4=Broad-Crested Rectangular Weir** (Weir Controls 1.39 cfs @ 1.56 fps)

Pond 29: Infiltration Basin (SWP-2)

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 30: Post A2

Runoff = 34.72 cfs @ 12.26 hrs, Volume= 122,935 cf, Depth= 6.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
43,743	98	Paved parking, HSG C
107,245	74	>75% Grass cover, Good, HSG C
2,876	61	>75% Grass cover, Good, HSG B
39,583	70	Woods, Good, HSG C
4,283	98	Water Surface, HSG C
33,976	65	Brush, Good, HSG C
231,706	77	Weighted Average
183,680		79.27% Pervious Area
48,026		20.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.6	100	0.0400	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.4	215	0.0260	2.60		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.3	125	0.1000	6.42		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.4	377	0.0750	14.42	17.69	Pipe Channel, 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
17.7	817	Total			

N60 P1 Post-A 3-17-20

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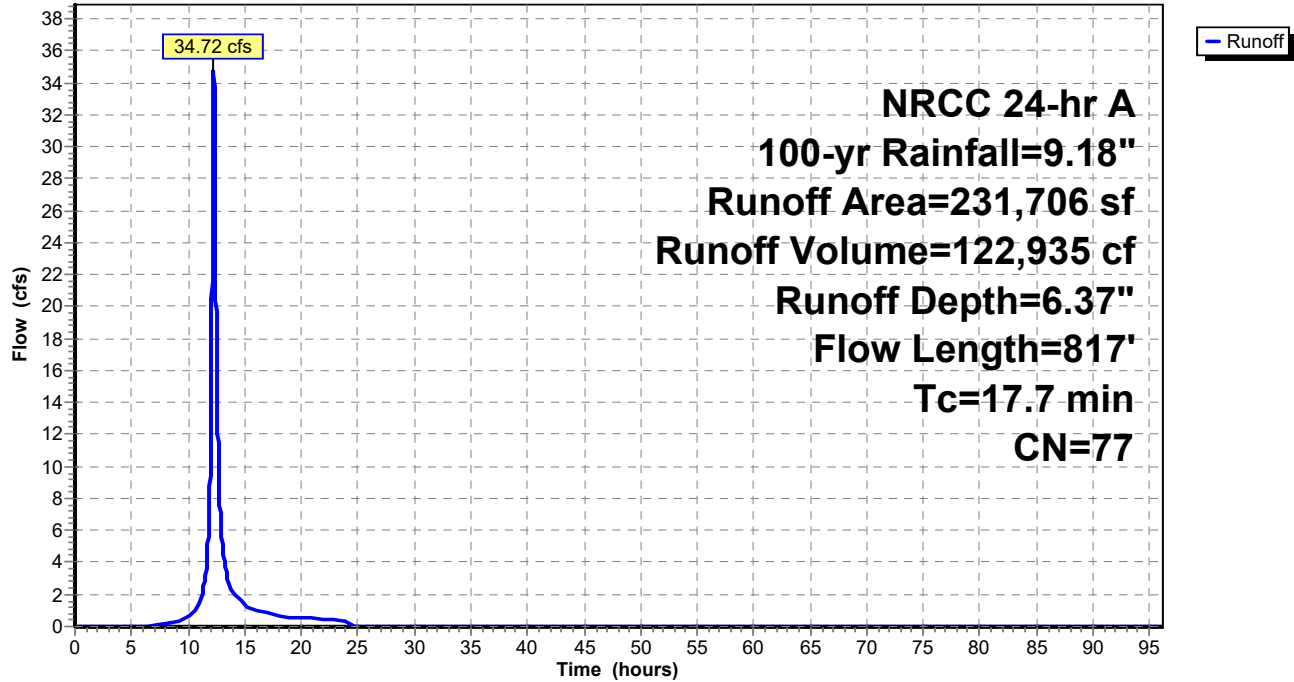
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NRCC 24-hr A 100-yr Rainfall=9.18"

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Subcatchment 30: Post A2

Hydrograph



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 31: Pocket Wetland (SWP-1)

Inflow Area = 231,706 sf, 20.73% Impervious, Inflow Depth = 6.37" for 100-yr event
 Inflow = 34.72 cfs @ 12.26 hrs, Volume= 122,935 cf
 Outflow = 19.30 cfs @ 12.48 hrs, Volume= 99,124 cf, Atten= 44%, Lag= 13.0 min
 Primary = 19.30 cfs @ 12.48 hrs, Volume= 99,124 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Starting Elev= 234.50' Surf.Area= 12,504 sf Storage= 7,835 cf
 Peak Elev= 238.33' @ 12.48 hrs Surf.Area= 19,375 sf Storage= 57,319 cf (49,484 cf above start)

Plug-Flow detention time= 529.1 min calculated for 91,279 cf (74% of inflow)
 Center-of-Mass det. time= 409.9 min (1,218.0 - 808.1)

Volume	Invert	Avail.Storage	Storage Description
#1	230.00'	1,811 cf	Forebay (Irregular) Listed below (Recalc)
#2	230.00'	1,976 cf	Micropool (Irregular) Listed below (Recalc)
#3	233.90'	65,123 cf	Marsh & Storage (Irregular) Listed below (Recalc)
		68,911 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	86	34.2	0	0	86
231.00	217	53.2	147	147	225
232.00	406	72.3	307	453	426
233.00	651	91.4	524	977	688
233.90	1,233	129.1	834	1,811	1,357

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	86	34.2	0	0	86
231.00	217	53.2	147	147	225
232.00	406	72.3	307	453	426
233.00	651	91.4	524	977	688
233.90	1,646	155.1	1,000	1,976	1,942

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
233.90	4,232	530.5	0	0	4,232
234.50	9,625	400.9	4,048	4,048	13,842
235.00	10,440	413.5	5,015	9,063	14,683
236.00	12,144	438.8	11,281	20,344	16,451
237.00	13,950	464.0	13,037	33,381	18,317
238.00	15,856	489.2	14,893	48,273	20,287
239.00	17,864	514.5	16,850	65,123	22,369

Device	Routing	Invert	Outlet Devices
#1	Primary	232.00'	21.0" Round Culvert L= 74.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 232.00' / 231.00' S= 0.0135 ' / ' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 2.41 sf

N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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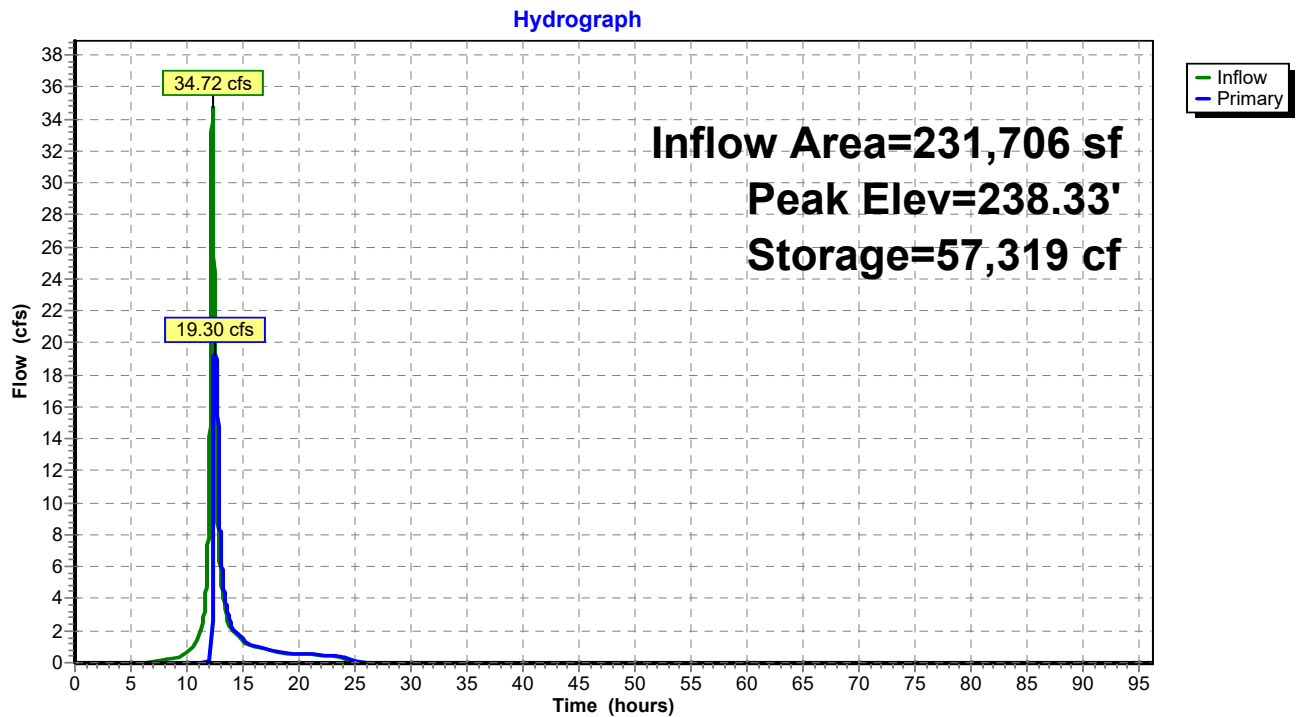
#2	Device 1	234.50'	1.1" Vert. Orifice/Grate	C= 0.600
#3	Device 1	237.50'	36.0" x 48.0" Horiz. Orifice/Grate	C= 0.600

Limited to weir flow at low heads

Primary OutFlow Max=19.30 cfs @ 12.48 hrs HW=238.32' TW=0.00' (Dynamic Tailwater)

1=Culvert (Barrel Controls 19.30 cfs @ 8.02 fps)
2=Orifice/Grate (Passes < 0.06 cfs potential flow)
3=Orifice/Grate (Passes < 34.30 cfs potential flow)

Pond 31: Pocket Wetland (SWP-1)



N60 P1 Post-A 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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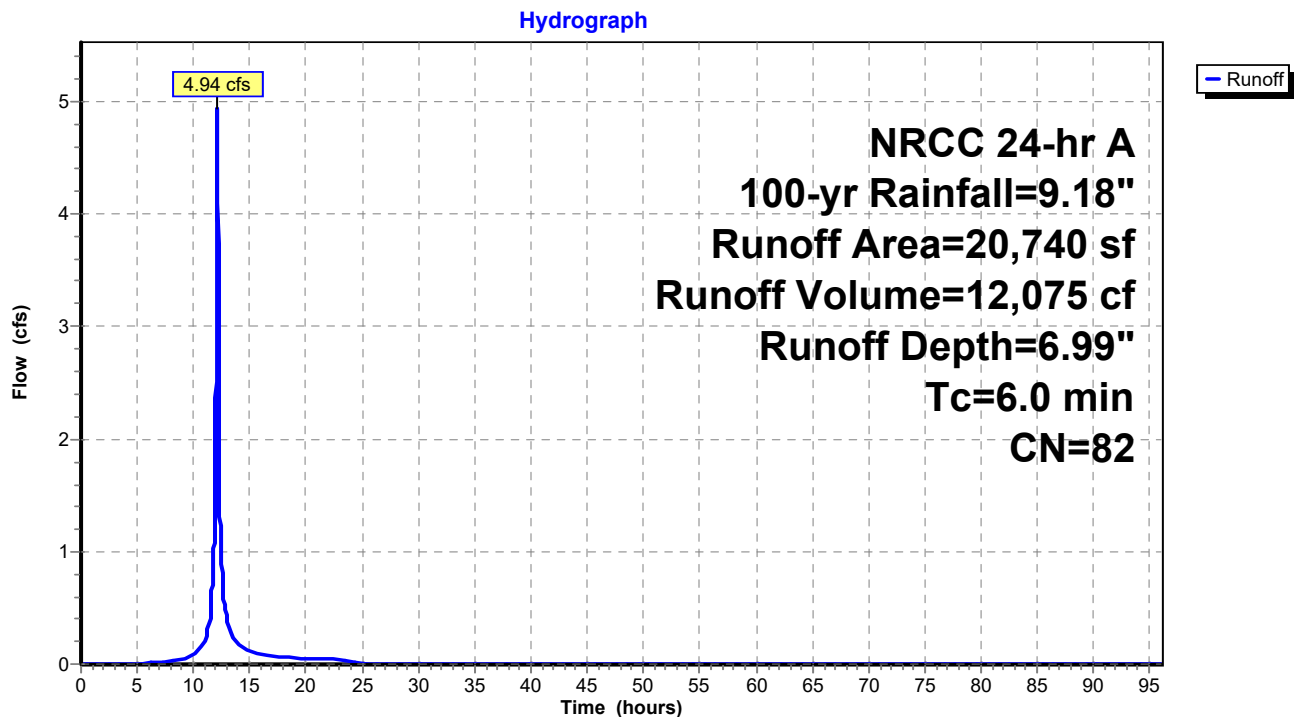
Summary for Subcatchment 32: Post A1

Runoff = 4.94 cfs @ 12.13 hrs, Volume= 12,075 cf, Depth= 6.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
7,304	98	Paved parking, HSG C
10,356	74	>75% Grass cover, Good, HSG C
3,080	70	Woods, Good, HSG C
20,740	82	Weighted Average
13,436		64.78% Pervious Area
7,304		35.22% Impervious Area

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

Subcatchment 32: Post A1

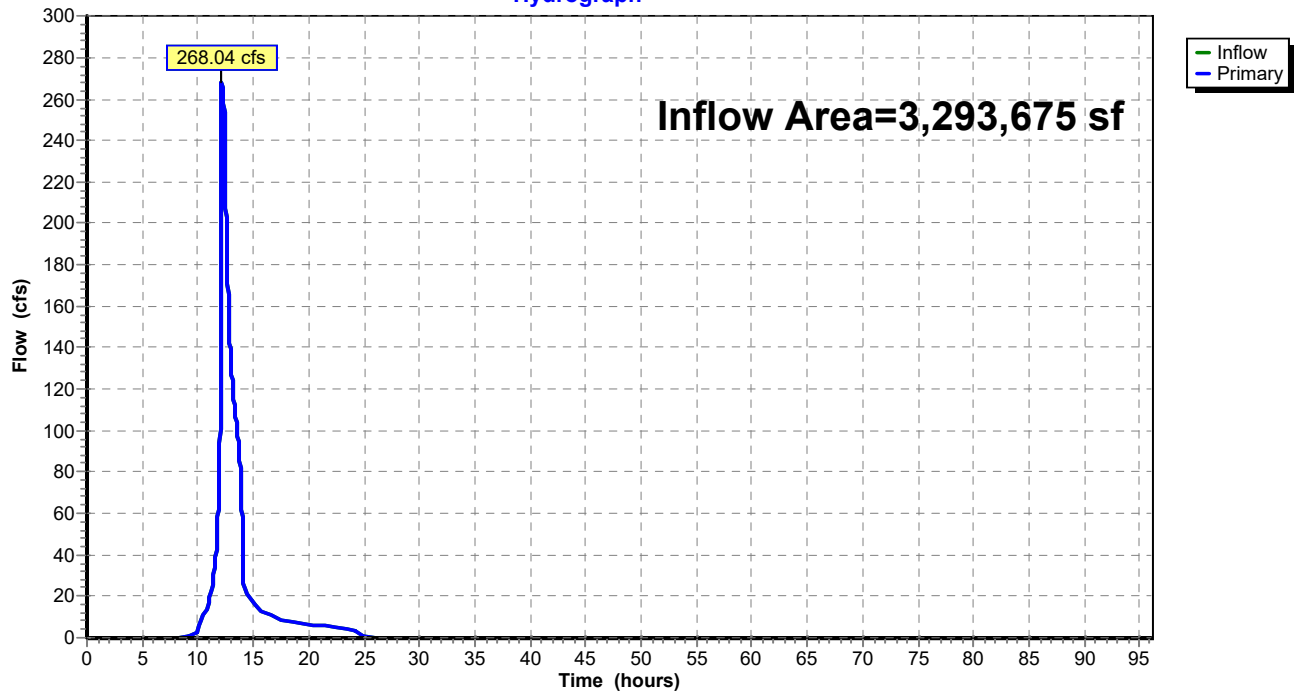
Summary for Link 33: Design Point A

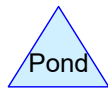
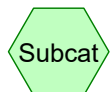
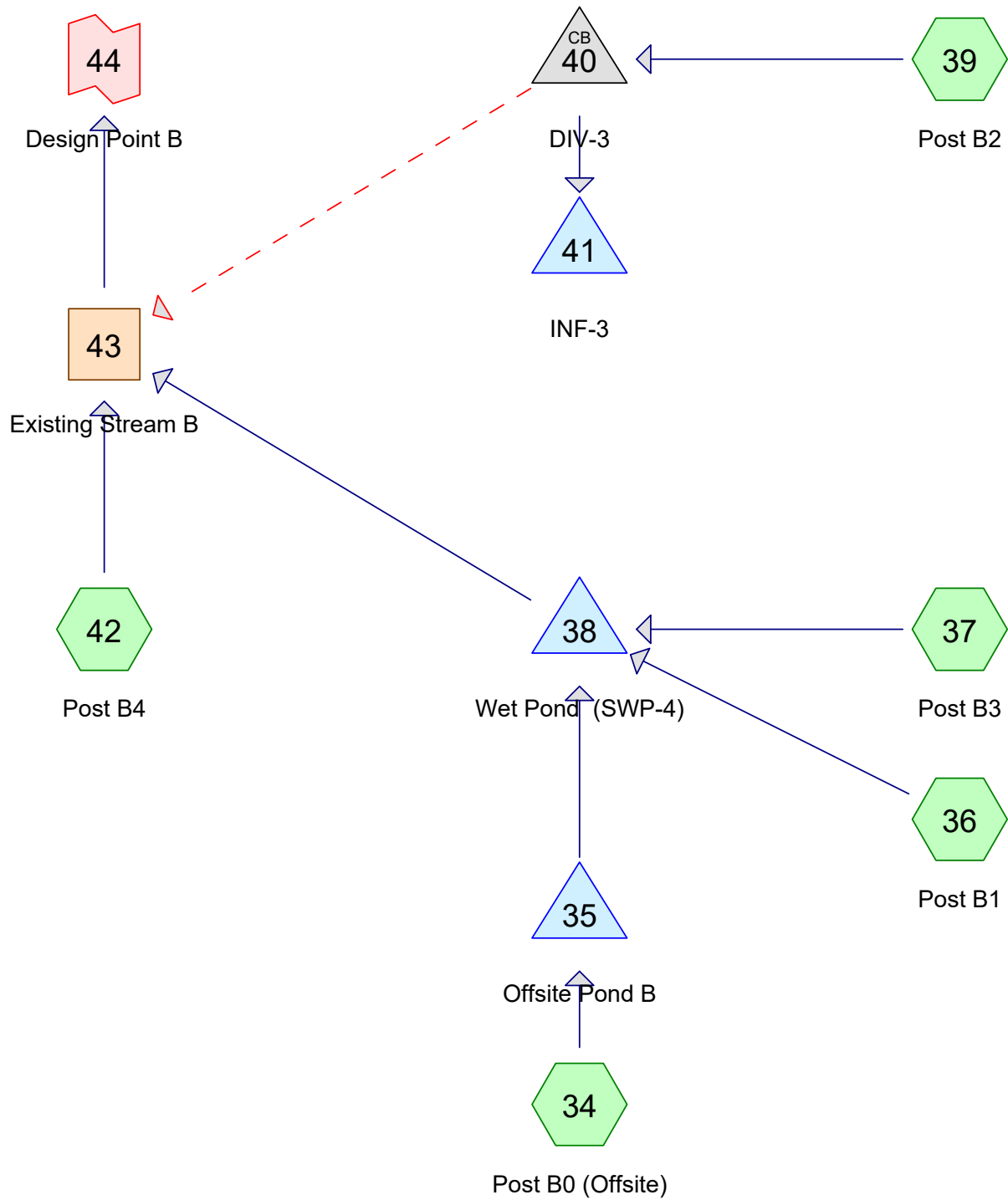
Inflow Area = 3,293,675 sf, 35.25% Impervious, Inflow Depth > 5.86" for 100-yr event
 Inflow = 268.04 cfs @ 12.18 hrs, Volume= 1,607,979 cf
 Primary = 268.04 cfs @ 12.18 hrs, Volume= 1,607,979 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 33: Design Point A

Hydrograph





N60 P1 Post-B 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment34: Post B0 (Offsite) Runoff Area=1,510,771 sf 32.24% Impervious Runoff Depth=1.35"
Flow Length=1,871' Tc=32.3 min CN=84 Runoff=35.54 cfs 169,374 cf

Pond 35: Offsite Pond B Peak Elev=383.46' Storage=75,292 cf Inflow=35.54 cfs 169,374 cf
36.0" Round Culvert n=0.025 L=158.0' S=0.0127 ' Outflow=10.77 cfs 168,126 cf

Subcatchment36: Post B1 Runoff Area=110,105 sf 49.74% Impervious Runoff Depth=1.28"
Tc=6.0 min CN=83 Runoff=5.10 cfs 11,740 cf

Subcatchment37: Post B3 Runoff Area=127,555 sf 34.71% Impervious Runoff Depth=0.98"
Tc=6.0 min CN=78 Runoff=4.48 cfs 10,436 cf

Pond 38: Wet Pond (SWP-4) Peak Elev=377.30' Storage=197,033 cf Inflow=11.57 cfs 190,302 cf
Outflow=7.92 cfs 175,735 cf

Subcatchment39: Post B2 Runoff Area=133,020 sf 50.44% Impervious Runoff Depth=1.41"
Tc=6.0 min CN=85 Runoff=6.79 cfs 15,669 cf

Pond 40: DIV-3 Peak Elev=381.10' Inflow=6.79 cfs 15,669 cf
Primary=6.10 cfs 15,560 cf Secondary=0.69 cfs 108 cf Outflow=6.79 cfs 15,669 cf

Pond 41: INF-3 Peak Elev=378.87' Storage=4,606 cf Inflow=6.10 cfs 15,560 cf
Outflow=1.13 cfs 15,560 cf

Subcatchment42: Post B4 Runoff Area=879,847 sf 0.00% Impervious Runoff Depth=0.60"
Flow Length=675' Tc=15.1 min CN=70 Runoff=11.68 cfs 44,049 cf

Reach 43: Existing Stream B Avg. Flow Depth=0.44' Max Vel=5.06 fps Inflow=11.75 cfs 219,892 cf
n=0.040 L=1,360.0' S=0.0721 ' Capacity=291.69 cfs Outflow=10.91 cfs 219,740 cf

Link 44: Design Point B Inflow=10.91 cfs 219,740 cf
Primary=10.91 cfs 219,740 cf

Total Runoff Area = 2,761,298 sf Runoff Volume = 251,268 cf Average Runoff Depth = 1.09"
76.34% Pervious = 2,108,111 sf 23.66% Impervious = 653,187 sf

N60 P1 Post-B 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 34: Post B0 (Offsite)

Runoff = 35.54 cfs @ 12.46 hrs, Volume= 169,374 cf, Depth= 1.35"

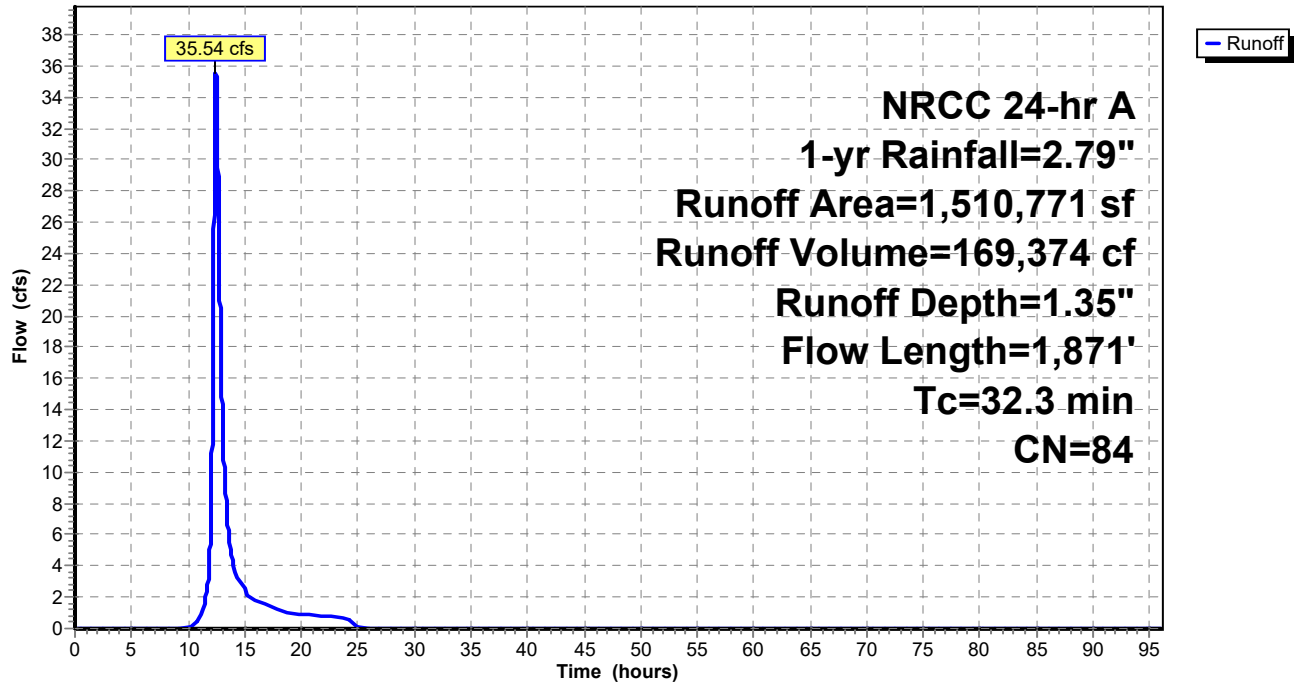
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
487,056	98	Paved parking, HSG C
497,987	77	Woods, Good, HSG D
134,328	70	Woods, Good, HSG C
375,457	80	>75% Grass cover, Good, HSG D
15,943	74	>75% Grass cover, Good, HSG C
1,510,771	84	Weighted Average
1,023,715		67.76% Pervious Area
487,056		32.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.0300	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	848	0.0085	1.48		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	856	0.0093	2.78	3.06	Trap/Vee/Rect Channel Flow, Bot.W=3.00' D=0.33' Z= 1.0 '/' Top.W=3.66' n= 0.022 Earth, clean & straight
0.2	67	0.0150	6.66	64.08	Pipe Channel, 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.025 Corrugated metal
32.3	1,871	Total			

Subcatchment 34: Post B0 (Offsite)

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Pond 35: Offsite Pond B

Inflow Area = 1,510,771 sf, 32.24% Impervious, Inflow Depth = 1.35" for 1-yr event
 Inflow = 35.54 cfs @ 12.46 hrs, Volume= 169,374 cf
 Outflow = 10.77 cfs @ 13.17 hrs, Volume= 168,126 cf, Atten= 70%, Lag= 42.8 min
 Primary = 10.77 cfs @ 13.17 hrs, Volume= 168,126 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 383.46' @ 13.17 hrs Surf.Area= 68,005 sf Storage= 75,292 cf

Plug-Flow detention time= 205.3 min calculated for 168,126 cf (99% of inflow)
 Center-of-Mass det. time= 200.8 min (1,049.1 - 848.2)

Volume	Invert	Avail.Storage	Storage Description
#1	382.00'	610,998 cf	Custom Stage Data (Irregular) Listed below (Recalc)

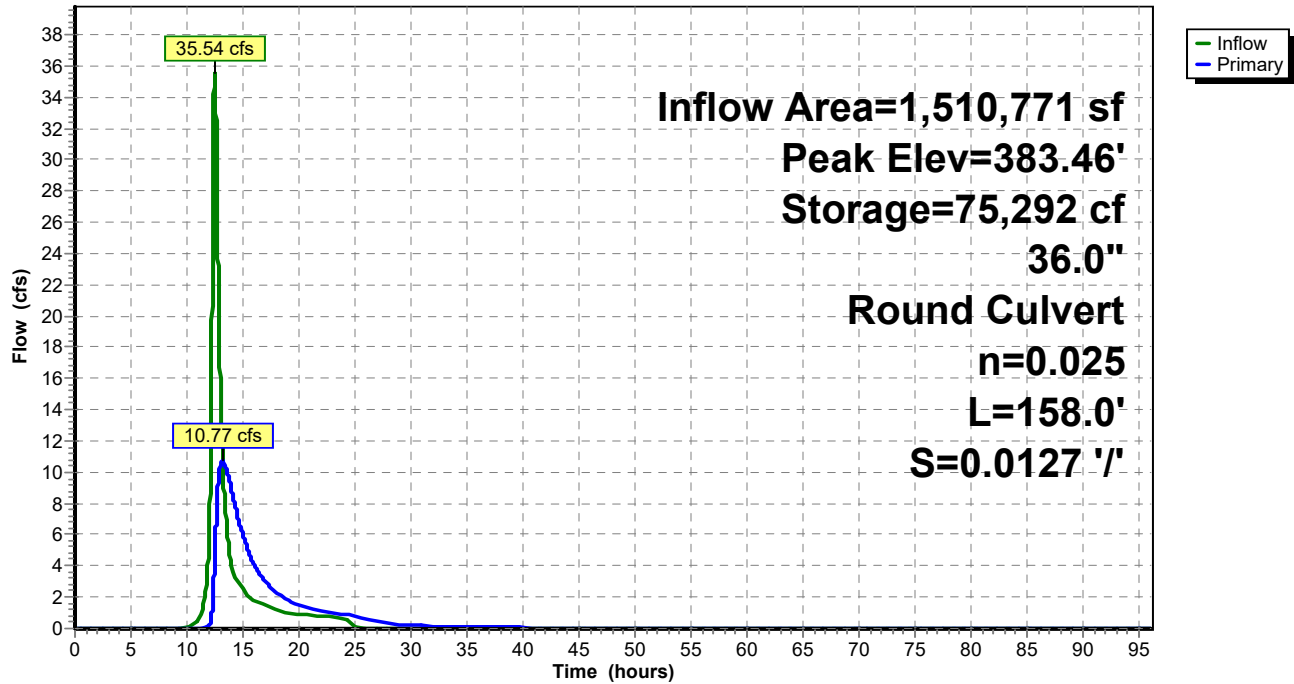
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
382.00	36,540	1,177.0	0	0	36,540
384.00	81,987	1,579.0	115,507	115,507	124,748
386.00	96,790	1,622.0	178,572	294,080	136,159
388.00	108,795	1,657.0	205,468	499,548	145,863
389.00	114,127	1,679.0	111,450	610,998	151,937

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	36.0" Round Culvert L= 158.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.00' S= 0.0127 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 7.07 sf

Primary OutFlow Max=10.77 cfs @ 13.17 hrs HW=383.46' TW=376.84' (Dynamic Tailwater)
 ↑**1=Culvert** (Barrel Controls 10.77 cfs @ 4.60 fps)

Pond 35: Offsite Pond B

Hydrograph



N60 P1 Post-B 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 36: Post B1

Runoff = 5.10 cfs @ 12.13 hrs, Volume= 11,740 cf, Depth= 1.28"

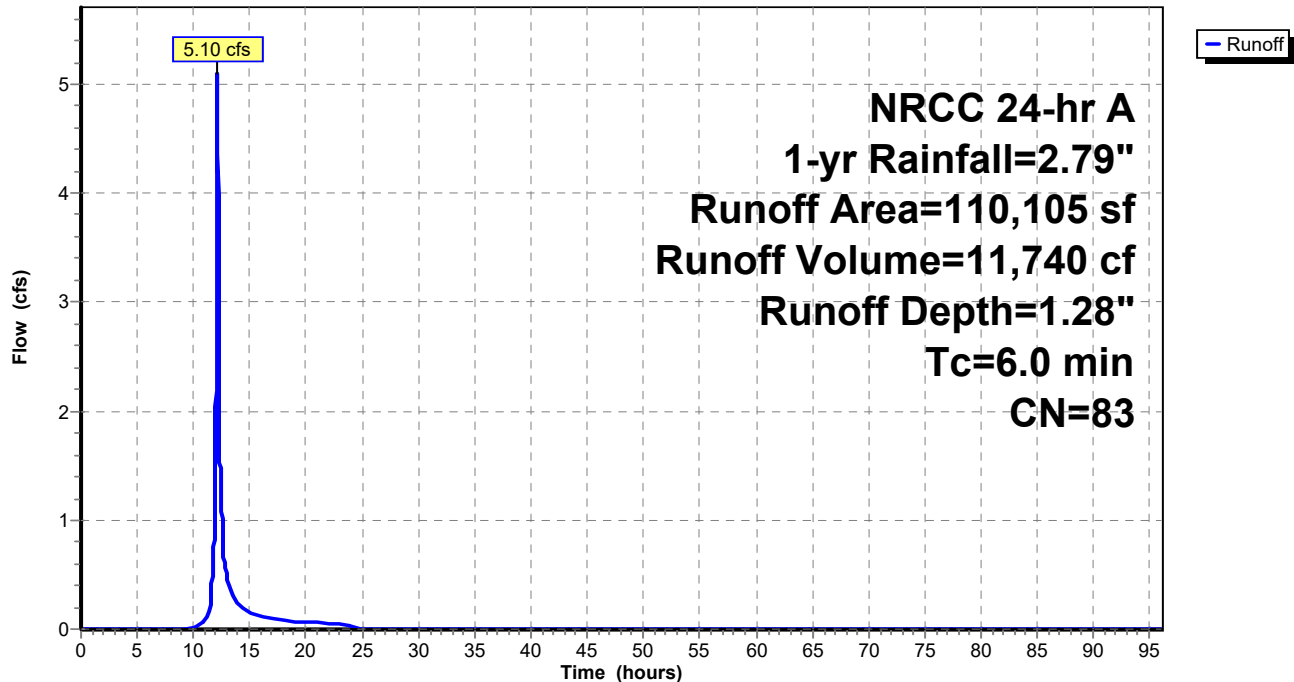
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
29,570	98	Paved parking, HSG C
38,521	74	>75% Grass cover, Good, HSG C
4,537	61	>75% Grass cover, Good, HSG B
12,282	55	Woods, Good, HSG B
25,195	98	Roofs, HSG C
110,105	83	Weighted Average
55,340		50.26% Pervious Area
54,765		49.74% Impervious Area

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

Subcatchment 36: Post B1

Hydrograph



N60 P1 Post-B 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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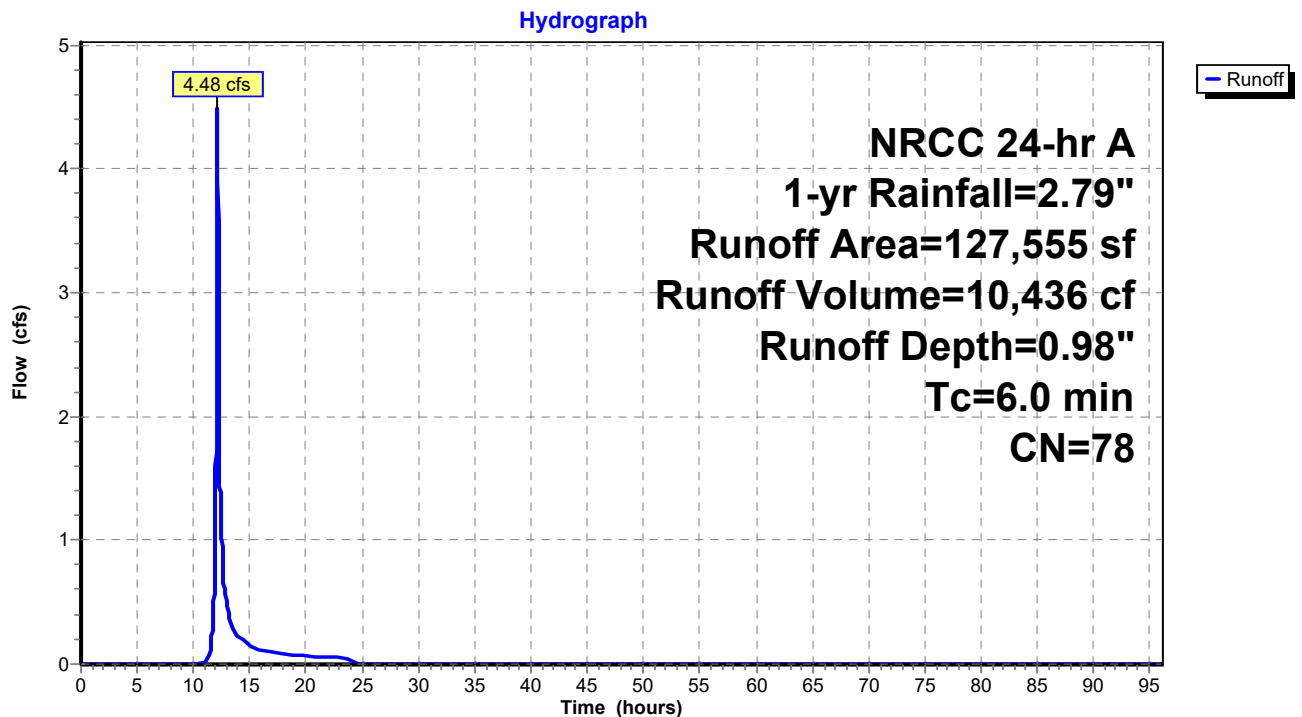
Summary for Subcatchment 37: Post B3

Runoff = 4.48 cfs @ 12.14 hrs, Volume= 10,436 cf, Depth= 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
44,276	98	Water Surface, HSG C
22,184	74	>75% Grass cover, Good, HSG C
61,095	65	Brush, Good, HSG C
127,555	78	Weighted Average
83,279		65.29% Pervious Area
44,276		34.71% Impervious Area

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

Subcatchment 37: Post B3

N60 P1 Post-B 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Pond 38: Wet Pond (SWP-4)

Inflow Area = 1,748,431 sf, 33.52% Impervious, Inflow Depth > 1.31" for 1-yr event
 Inflow = 11.57 cfs @ 13.07 hrs, Volume= 190,302 cf
 Outflow = 7.92 cfs @ 14.38 hrs, Volume= 175,735 cf, Atten= 32%, Lag= 78.7 min
 Primary = 7.92 cfs @ 14.38 hrs, Volume= 175,735 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Starting Elev= 376.00' Surf.Area= 88,186 sf Storage= 134,213 cf
 Peak Elev= 377.30' @ 14.38 hrs Surf.Area= 94,992 sf Storage= 197,033 cf (62,820 cf above start)

Plug-Flow detention time= 2,724.6 min calculated for 41,518 cf (22% of inflow)
 Center-of-Mass det. time= 612.4 min (1,636.4 - 1,024.0)

Volume	Invert	Avail.Storage	Storage Description
#1	372.00'	7,914 cf	Forebay (Irregular) Listed below (Recalc)
#2	372.00'	121,847 cf	Permanent Pool (Irregular) Listed below (Recalc)
#3	375.90'	259,334 cf	Additional Storage (Irregular) Listed below (Recalc)
		389,094 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
372.00	885	114.0	0	0	885
373.00	1,392	139.2	1,129	1,129	1,408
374.00	1,998	164.4	1,686	2,815	2,036
375.00	2,707	189.5	2,344	5,158	2,764
375.90	3,430	212.2	2,755	7,914	3,512

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
372.00	22,804	1,051.3	0	0	22,804
373.00	27,060	1,076.5	24,902	24,902	27,202
374.00	31,416	1,101.7	29,211	54,113	31,703
375.00	35,874	1,127.0	33,620	87,733	36,327
375.90	39,971	1,149.7	34,114	121,847	40,565

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
375.90	44,276	1,380.7	0	0	44,276
377.00	50,030	1,294.2	51,836	51,836	62,747
378.00	55,257	1,319.4	52,622	104,458	68,149
379.00	60,586	1,344.7	57,901	162,359	73,675
380.00	66,015	1,370.0	63,281	225,640	79,307
380.50	68,768	1,382.6	33,693	259,334	82,151

Device	Routing	Invert	Outlet Devices
#1	Primary	372.00'	24.0" Round Culvert L= 227.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 372.00' / 347.00' S= 0.1101 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	376.00'	3.0" Vert. Orifice/Grate C= 0.600

N60 P1 Post-B 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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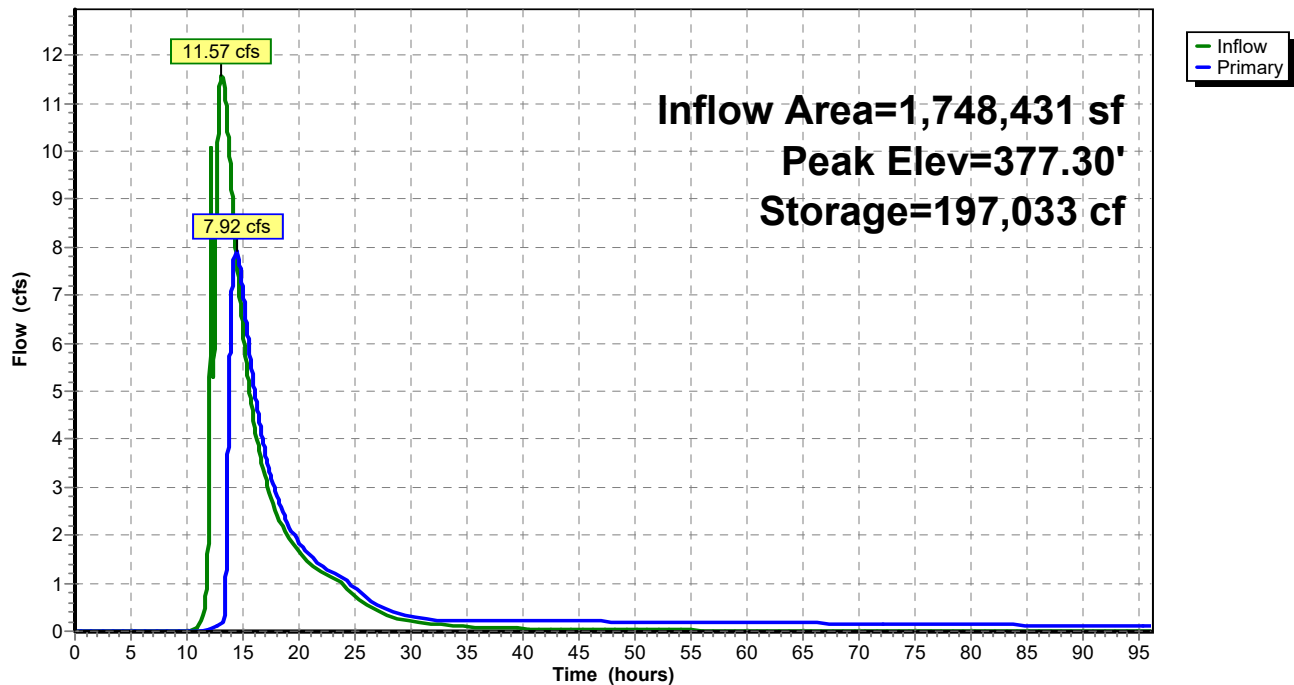
#3 Device 1 377.00' **36.0" x 48.0" Horiz. Orifice/Grate** C= 0.600
Limited to weir flow at low heads

Primary OutFlow Max=7.92 cfs @ 14.38 hrs HW=377.30' TW=312.39' (Dynamic Tailwater)

- 1=Culvert (Passes 7.92 cfs of 31.38 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.26 cfs @ 5.23 fps)
- 3=Orifice/Grate (Weir Controls 7.67 cfs @ 1.80 fps)

Pond 38: Wet Pond (SWP-4)

Hydrograph



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Summary for Subcatchment 39: Post B2

Runoff = 6.79 cfs @ 12.13 hrs, Volume= 15,669 cf, Depth= 1.41"

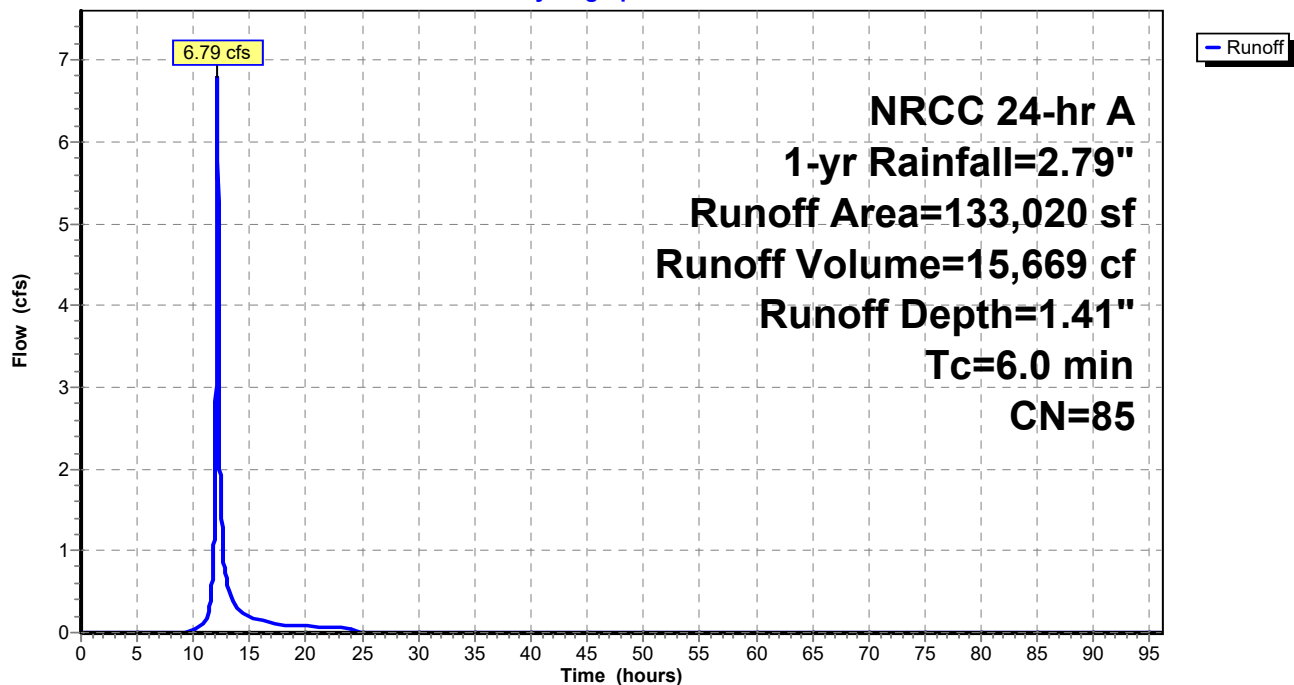
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
67,090	98	Paved parking, HSG C
40,460	74	>75% Grass cover, Good, HSG C
7,690	61	>75% Grass cover, Good, HSG B
17,780	70	Woods, Good, HSG C
133,020	85	Weighted Average
65,930		49.56% Pervious Area
67,090		50.44% Impervious Area

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

Subcatchment 39: Post B2

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Pond 40: DIV-3

Inflow Area = 133,020 sf, 50.44% Impervious, Inflow Depth = 1.41" for 1-yr event
 Inflow = 6.79 cfs @ 12.13 hrs, Volume= 15,669 cf
 Outflow = 6.79 cfs @ 12.13 hrs, Volume= 15,669 cf, Atten= 0%, Lag= 0.0 min
 Primary = 6.10 cfs @ 12.13 hrs, Volume= 15,560 cf
 Secondary = 0.69 cfs @ 12.13 hrs, Volume= 108 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 381.10' @ 12.13 hrs

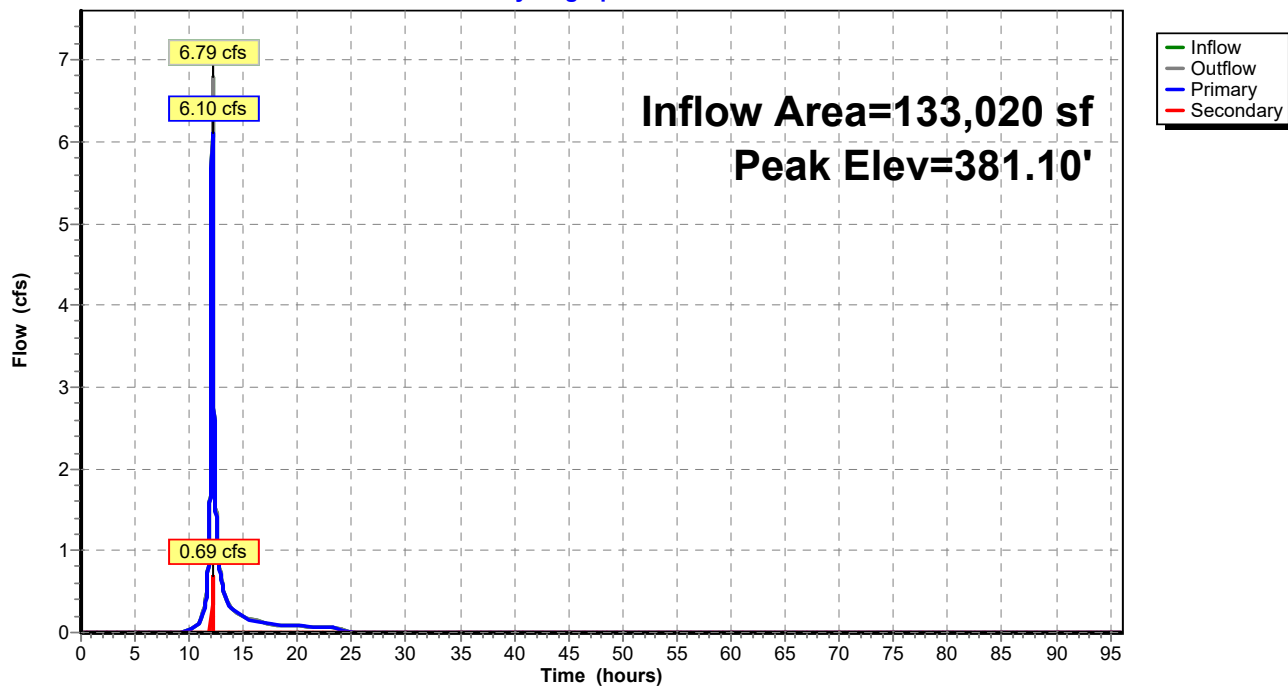
Flood Elev= 386.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	378.00'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 378.00' / 378.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	378.00'	24.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 378.00' / 377.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	381.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=6.09 cfs @ 12.13 hrs HW=381.10' TW=378.32' (Dynamic Tailwater)↑**1=Culvert** (Inlet Controls 6.09 cfs @ 7.76 fps)**Secondary OutFlow** Max=0.68 cfs @ 12.13 hrs HW=381.10' TW=312.21' (Dynamic Tailwater)↑**2=Culvert** (Passes 0.68 cfs of 21.90 cfs potential flow)↑**3=Broad-Crested Rectangular Weir** (Weir Controls 0.68 cfs @ 0.87 fps)

Pond 40: DIV-3

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Pond 41: INF-3

Inflow Area = 133,020 sf, 50.44% Impervious, Inflow Depth = 1.40" for 1-yr event
 Inflow = 6.10 cfs @ 12.13 hrs, Volume= 15,560 cf
 Outflow = 1.13 cfs @ 11.90 hrs, Volume= 15,560 cf, Atten= 81%, Lag= 0.0 min
 Discarded = 1.13 cfs @ 11.90 hrs, Volume= 15,560 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 378.87' @ 12.58 hrs Surf.Area= 4,883 sf Storage= 4,606 cf

Plug-Flow detention time= 28.4 min calculated for 15,559 cf (100% of inflow)
 Center-of-Mass det. time= 28.4 min (849.8 - 821.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	377.50'	4,711 cf	45.00'W x 108.50'L x 3.88'H Field A 18,920 cf Overall - 7,142 cf Embedded = 11,778 cf x 40.0% Voids
#2A	378.00'	7,142 cf	Cultec R-330XLHD x 135 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 9 rows
		11,853 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	377.50'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.10'

Discarded OutFlow Max=1.13 cfs @ 11.90 hrs HW=377.62' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 1.13 cfs)

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Pond 41: INF-3 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 9 rows

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

15 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 106.50' Row Length +12.0" End Stone x 2 = 108.50' Base Length

9 Rows x 52.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 45.00' Base Width

6.0" Base + 30.5" Chamber Height + 10.0" Cover = 3.88' Field Height

135 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 9 Rows = 7,141.8 cf Chamber Storage

18,919.7 cf Field - 7,141.8 cf Chambers = 11,777.9 cf Stone x 40.0% Voids = 4,711.2 cf Stone Storage

Chamber Storage + Stone Storage = 11,852.9 cf = 0.272 af

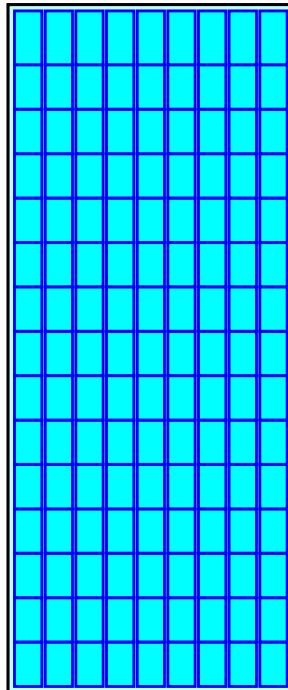
Overall Storage Efficiency = 62.6%

Overall System Size = 108.50' x 45.00' x 3.88'

135 Chambers

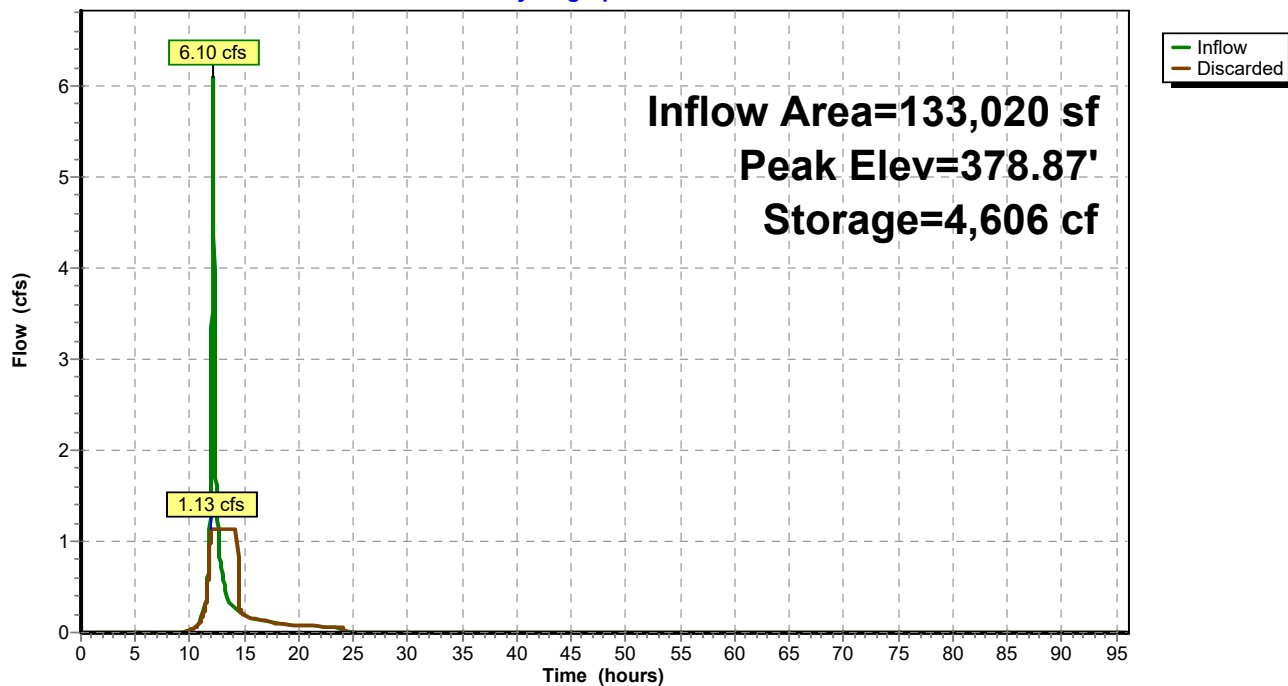
700.7 cy Field

436.2 cy Stone



Pond 41: INF-3

Hydrograph



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NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Subcatchment 42: Post B4

Runoff = 11.68 cfs @ 12.26 hrs, Volume= 44,049 cf, Depth= 0.60"

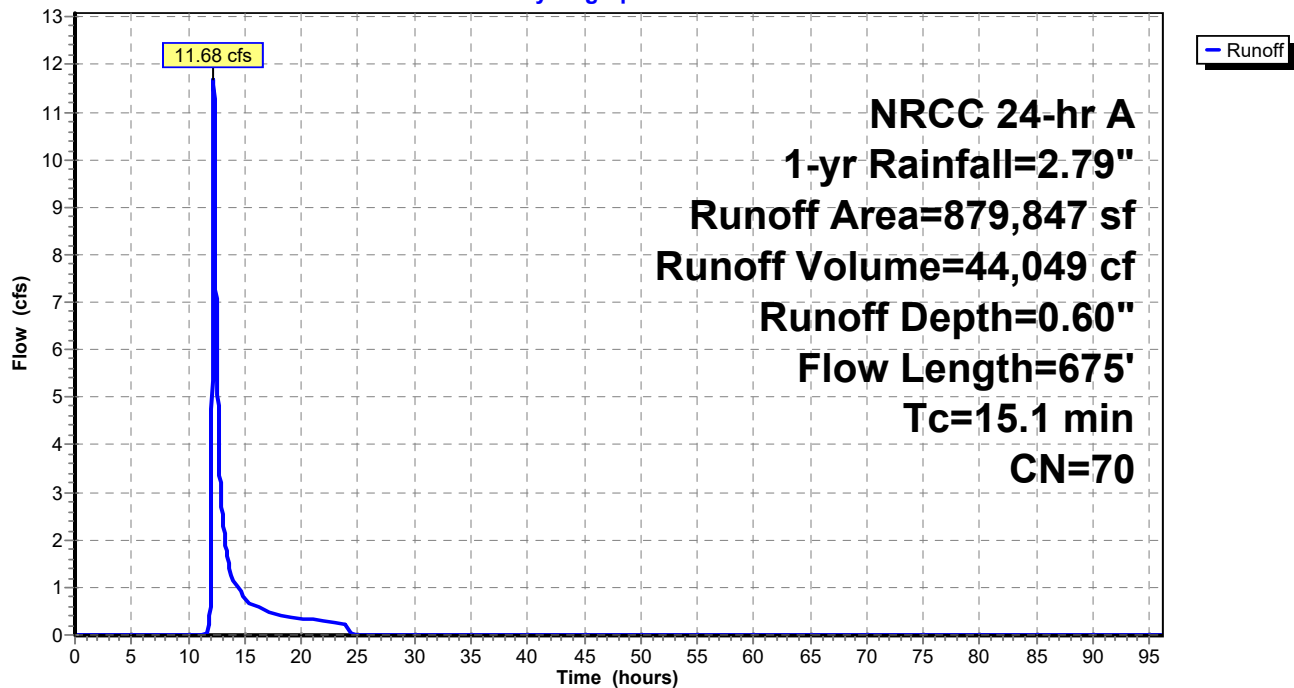
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 1-yr Rainfall=2.79"

Area (sf)	CN	Description
19,672	61	>75% Grass cover, Good, HSG B
13,245	74	>75% Grass cover, Good, HSG C
16,422	55	Woods, Good, HSG B
810,443	70	Woods, Good, HSG C
20,065	70	Woods, Good, HSG C
879,847	70	Weighted Average
879,847		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0600	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.9	575	0.0950	4.96		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	675	Total			

Subcatchment 42: Post B4

Hydrograph



N60 P1 Post-B 3-17-20

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NRCC 24-hr A 1-yr Rainfall=2.79"

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Summary for Reach 43: Existing Stream B

Inflow Area = 2,628,278 sf, 22.30% Impervious, Inflow Depth > 1.00" for 1-yr event
Inflow = 11.75 cfs @ 12.26 hrs, Volume= 219,892 cf
Outflow = 10.91 cfs @ 12.32 hrs, Volume= 219,740 cf, Atten= 7%, Lag= 3.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.06 fps, Min. Travel Time= 4.5 min
Avg. Velocity = 1.50 fps, Avg. Travel Time= 15.1 min

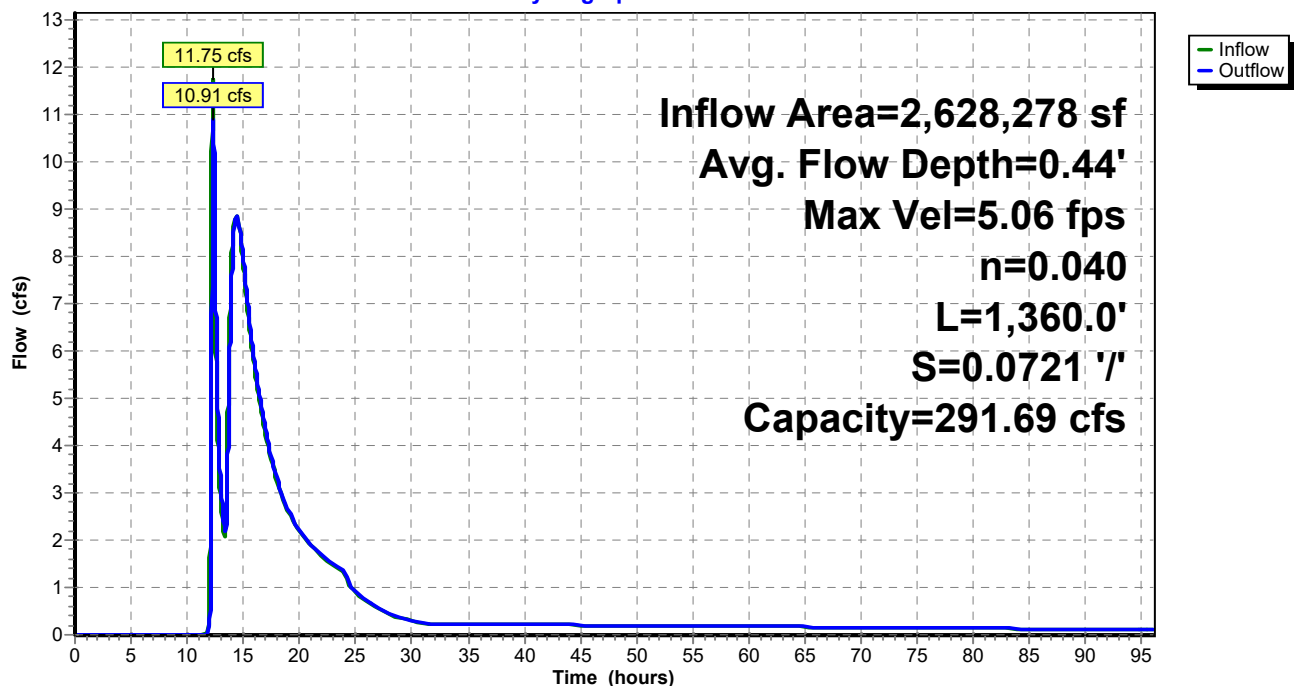
Peak Storage= 2,933 cf @ 12.32 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 2.50' Flow Area= 22.5 sf, Capacity= 291.69 cfs

4.00' x 2.50' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 1,360.0' Slope= 0.0721 '/'
Inlet Invert= 312.00', Outlet Invert= 214.00'



Reach 43: Existing Stream B

Hydrograph



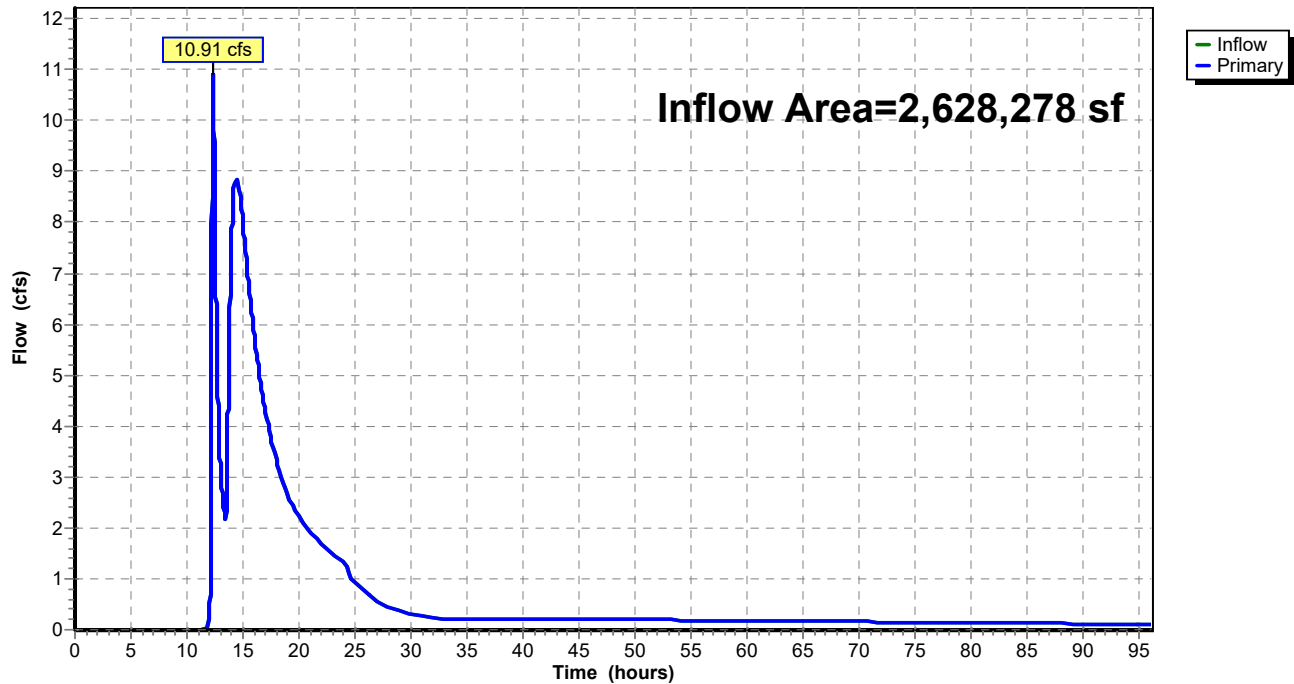
Summary for Link 44: Design Point B

Inflow Area = 2,628,278 sf, 22.30% Impervious, Inflow Depth > 1.00" for 1-yr event
 Inflow = 10.91 cfs @ 12.32 hrs, Volume= 219,740 cf
 Primary = 10.91 cfs @ 12.32 hrs, Volume= 219,740 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 44: Design Point B

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment34: Post B0 (Offsite) Runoff Area=1,510,771 sf 32.24% Impervious Runoff Depth=1.87"
Flow Length=1,871' Tc=32.3 min CN=84 Runoff=49.64 cfs 235,196 cf

Pond 35: Offsite Pond B Peak Elev=383.84' Storage=102,972 cf Inflow=49.64 cfs 235,196 cf
36.0" Round Culvert n=0.025 L=158.0' S=0.0127 '/' Outflow=16.27 cfs 233,939 cf

Subcatchment36: Post B1 Runoff Area=110,105 sf 49.74% Impervious Runoff Depth=1.79"
Tc=6.0 min CN=83 Runoff=7.11 cfs 16,438 cf

Subcatchment37: Post B3 Runoff Area=127,555 sf 34.71% Impervious Runoff Depth=1.44"
Tc=6.0 min CN=78 Runoff=6.62 cfs 15,273 cf

Pond 38: Wet Pond (SWP-4) Peak Elev=377.45' Storage=204,605 cf Inflow=17.48 cfs 265,650 cf
Outflow=14.07 cfs 250,862 cf

Subcatchment39: Post B2 Runoff Area=133,020 sf 50.44% Impervious Runoff Depth=1.95"
Tc=6.0 min CN=85 Runoff=9.29 cfs 21,581 cf

Pond 40: DIV-3 Peak Elev=381.26' Inflow=9.29 cfs 21,581 cf
Primary=6.27 cfs 20,624 cf Secondary=3.04 cfs 957 cf Outflow=9.29 cfs 21,581 cf

Pond 41: INF-3 Peak Elev=379.42' Storage=6,757 cf Inflow=6.27 cfs 20,624 cf
Outflow=1.13 cfs 20,624 cf

Subcatchment42: Post B4 Runoff Area=879,847 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=675' Tc=15.1 min CN=70 Runoff=20.16 cfs 70,319 cf

Reach 43: Existing Stream B Avg. Flow Depth=0.61' Max Vel=6.07 fps Inflow=20.27 cfs 322,138 cf
n=0.040 L=1,360.0' S=0.0721 '/' Capacity=291.69 cfs Outflow=19.41 cfs 321,985 cf

Link 44: Design Point B Inflow=19.41 cfs 321,985 cf
Primary=19.41 cfs 321,985 cf

Total Runoff Area = 2,761,298 sf Runoff Volume = 358,808 cf Average Runoff Depth = 1.56"
76.34% Pervious = 2,108,111 sf 23.66% Impervious = 653,187 sf

N60 P1 Post-B 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 34: Post B0 (Offsite)

Runoff = 49.64 cfs @ 12.45 hrs, Volume= 235,196 cf, Depth= 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
487,056	98	Paved parking, HSG C
497,987	77	Woods, Good, HSG D
134,328	70	Woods, Good, HSG C
375,457	80	>75% Grass cover, Good, HSG D
15,943	74	>75% Grass cover, Good, HSG C
1,510,771	84	Weighted Average
1,023,715		67.76% Pervious Area
487,056		32.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.0300	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	848	0.0085	1.48		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	856	0.0093	2.78	3.06	Trap/Vee/Rect Channel Flow, Bot.W=3.00' D=0.33' Z= 1.0 '/' Top.W=3.66' n= 0.022 Earth, clean & straight
0.2	67	0.0150	6.66	64.08	Pipe Channel, 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.025 Corrugated metal
32.3	1,871	Total			

N60 P1 Post-B 3-17-20

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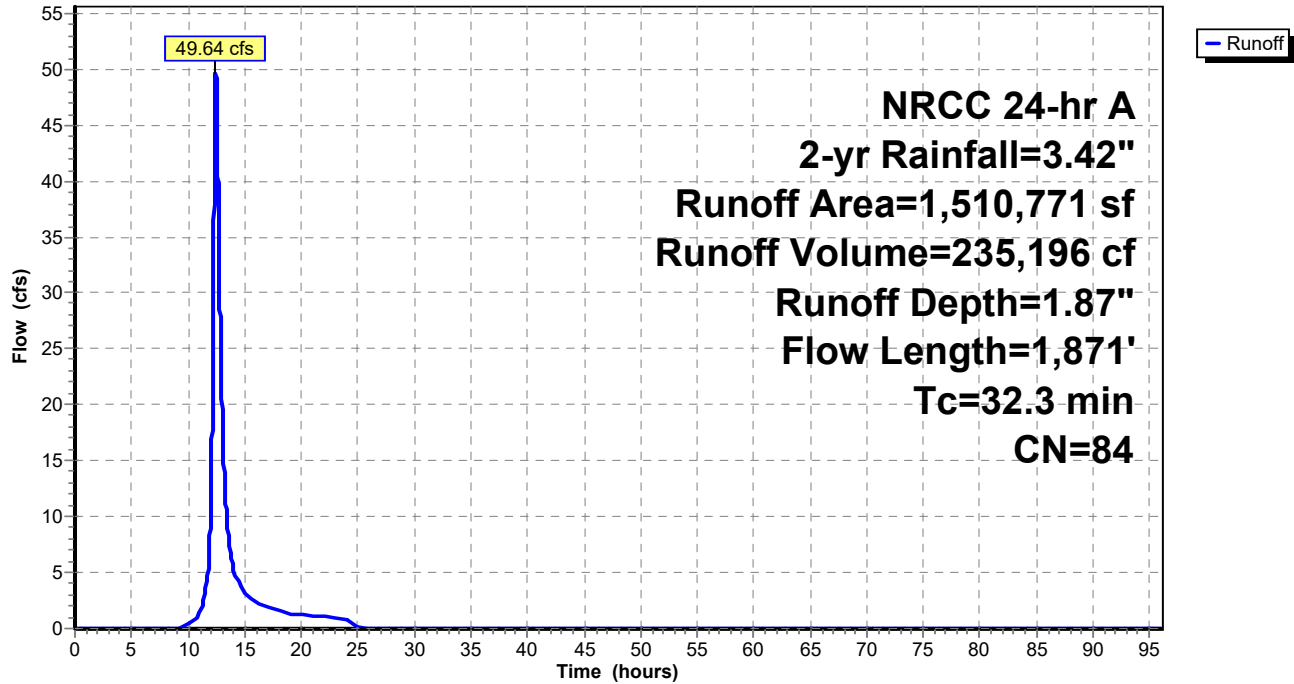
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NRCC 24-hr A 2-yr Rainfall=3.42"

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Subcatchment 34: Post B0 (Offsite)

Hydrograph



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NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 35: Offsite Pond B

Inflow Area = 1,510,771 sf, 32.24% Impervious, Inflow Depth = 1.87" for 2-yr event
 Inflow = 49.64 cfs @ 12.45 hrs, Volume= 235,196 cf
 Outflow = 16.27 cfs @ 13.10 hrs, Volume= 233,939 cf, Atten= 67%, Lag= 38.7 min
 Primary = 16.27 cfs @ 13.10 hrs, Volume= 233,939 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 383.84' @ 13.10 hrs Surf.Area= 77,765 sf Storage= 102,972 cf

Plug-Flow detention time= 176.7 min calculated for 233,915 cf (99% of inflow)
 Center-of-Mass det. time= 173.8 min (1,014.1 - 840.3)

Volume	Invert	Avail.Storage	Storage Description
#1	382.00'	610,998 cf	Custom Stage Data (Irregular) Listed below (Recalc)

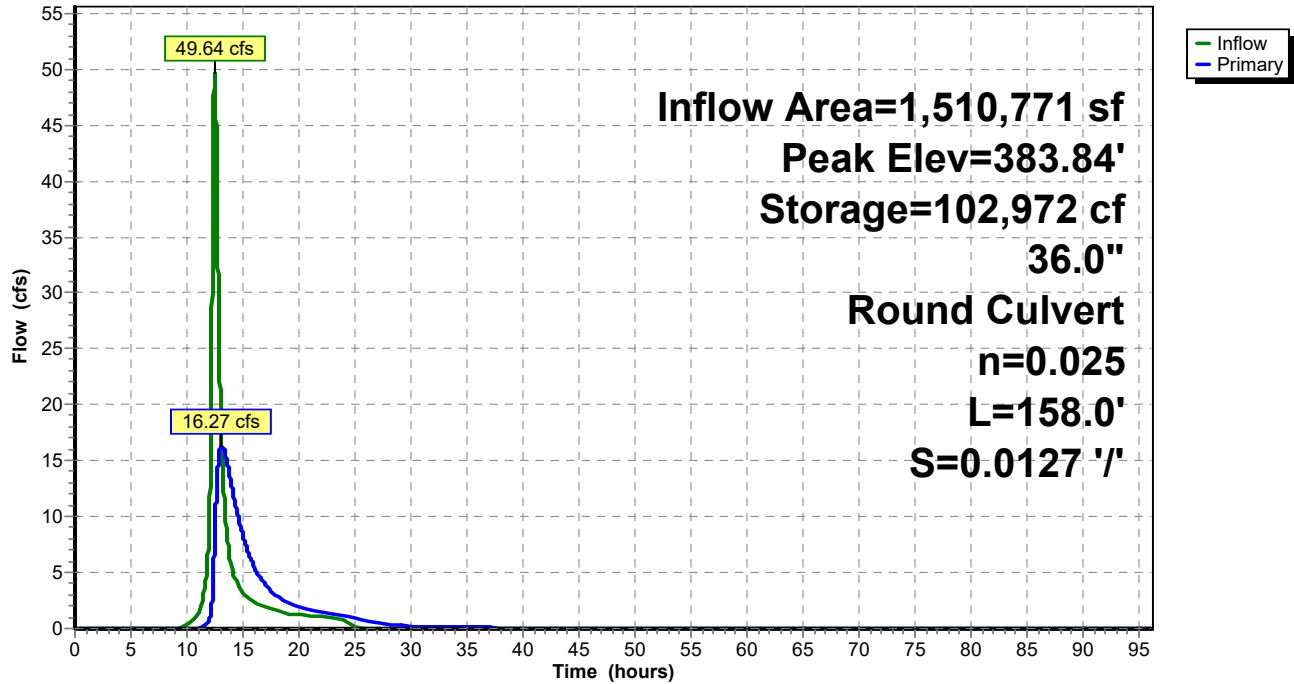
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
382.00	36,540	1,177.0	0	0	36,540
384.00	81,987	1,579.0	115,507	115,507	124,748
386.00	96,790	1,622.0	178,572	294,080	136,159
388.00	108,795	1,657.0	205,468	499,548	145,863
389.00	114,127	1,679.0	111,450	610,998	151,937

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	36.0" Round Culvert L= 158.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.00' S= 0.0127 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 7.07 sf

Primary OutFlow Max=16.27 cfs @ 13.10 hrs HW=383.84' TW=377.20' (Dynamic Tailwater)
 ↑**1=Culvert** (Barrel Controls 16.27 cfs @ 5.11 fps)

Pond 35: Offsite Pond B

Hydrograph



N60 P1 Post-B 3-17-20

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NRCC 24-hr A 2-yr Rainfall=3.42"

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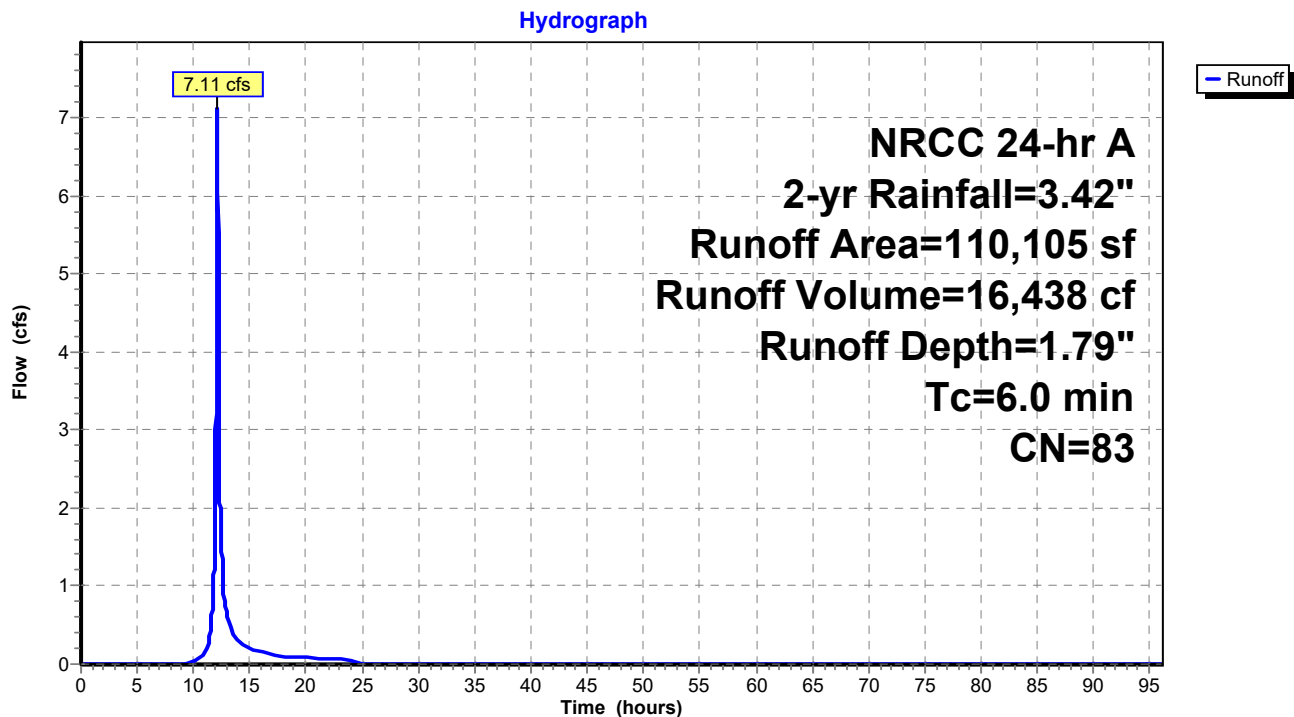
Summary for Subcatchment 36: Post B1

Runoff = 7.11 cfs @ 12.13 hrs, Volume= 16,438 cf, Depth= 1.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
29,570	98	Paved parking, HSG C
38,521	74	>75% Grass cover, Good, HSG C
4,537	61	>75% Grass cover, Good, HSG B
12,282	55	Woods, Good, HSG B
25,195	98	Roofs, HSG C
110,105	83	Weighted Average
55,340		50.26% Pervious Area
54,765		49.74% Impervious Area

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

Subcatchment 36: Post B1

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NRCC 24-hr A 2-yr Rainfall=3.42"

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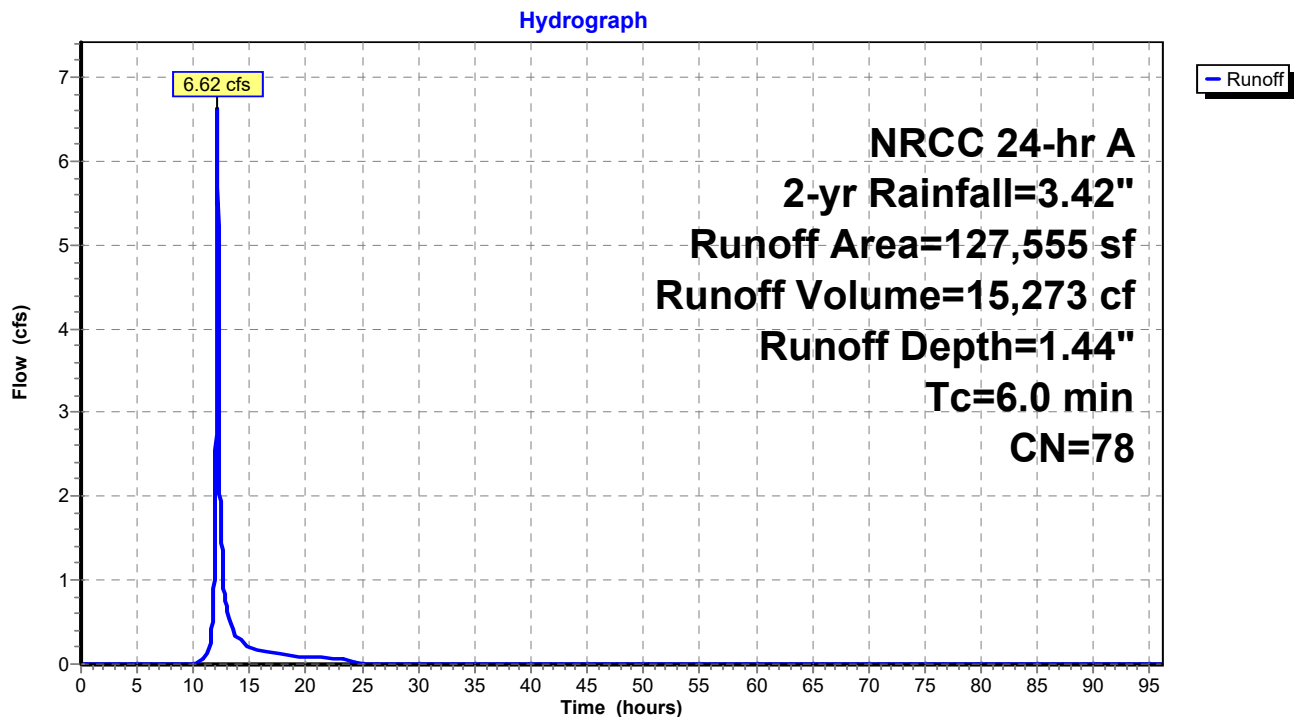
Summary for Subcatchment 37: Post B3

Runoff = 6.62 cfs @ 12.14 hrs, Volume= 15,273 cf, Depth= 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
44,276	98	Water Surface, HSG C
22,184	74	>75% Grass cover, Good, HSG C
61,095	65	Brush, Good, HSG C
127,555	78	Weighted Average
83,279		65.29% Pervious Area
44,276		34.71% Impervious Area

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

Subcatchment 37: Post B3

N60 P1 Post-B 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 38: Wet Pond (SWP-4)

Inflow Area = 1,748,431 sf, 33.52% Impervious, Inflow Depth > 1.82" for 2-yr event
 Inflow = 17.48 cfs @ 13.04 hrs, Volume= 265,650 cf
 Outflow = 14.07 cfs @ 13.85 hrs, Volume= 250,862 cf, Atten= 20%, Lag= 48.8 min
 Primary = 14.07 cfs @ 13.85 hrs, Volume= 250,862 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Starting Elev= 376.00' Surf.Area= 88,186 sf Storage= 134,213 cf
 Peak Elev= 377.45' @ 13.85 hrs Surf.Area= 95,749 sf Storage= 204,605 cf (70,392 cf above start)

Plug-Flow detention time= 1,275.3 min calculated for 116,636 cf (44% of inflow)
 Center-of-Mass det. time= 439.4 min (1,430.9 - 991.5)

Volume	Invert	Avail.Storage	Storage Description
#1	372.00'	7,914 cf	Forebay (Irregular) Listed below (Recalc)
#2	372.00'	121,847 cf	Permanent Pool (Irregular) Listed below (Recalc)
#3	375.90'	259,334 cf	Additional Storage (Irregular) Listed below (Recalc)
		389,094 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
372.00	885	114.0	0	0	885
373.00	1,392	139.2	1,129	1,129	1,408
374.00	1,998	164.4	1,686	2,815	2,036
375.00	2,707	189.5	2,344	5,158	2,764
375.90	3,430	212.2	2,755	7,914	3,512

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
372.00	22,804	1,051.3	0	0	22,804
373.00	27,060	1,076.5	24,902	24,902	27,202
374.00	31,416	1,101.7	29,211	54,113	31,703
375.00	35,874	1,127.0	33,620	87,733	36,327
375.90	39,971	1,149.7	34,114	121,847	40,565

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
375.90	44,276	1,380.7	0	0	44,276
377.00	50,030	1,294.2	51,836	51,836	62,747
378.00	55,257	1,319.4	52,622	104,458	68,149
379.00	60,586	1,344.7	57,901	162,359	73,675
380.00	66,015	1,370.0	63,281	225,640	79,307
380.50	68,768	1,382.6	33,693	259,334	82,151

Device	Routing	Invert	Outlet Devices
#1	Primary	372.00'	24.0" Round Culvert L= 227.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 372.00' / 347.00' S= 0.1101 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	376.00'	3.0" Vert. Orifice/Grate C= 0.600

N60 P1 Post-B 3-17-20

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NRCC 24-hr A 2-yr Rainfall=3.42"

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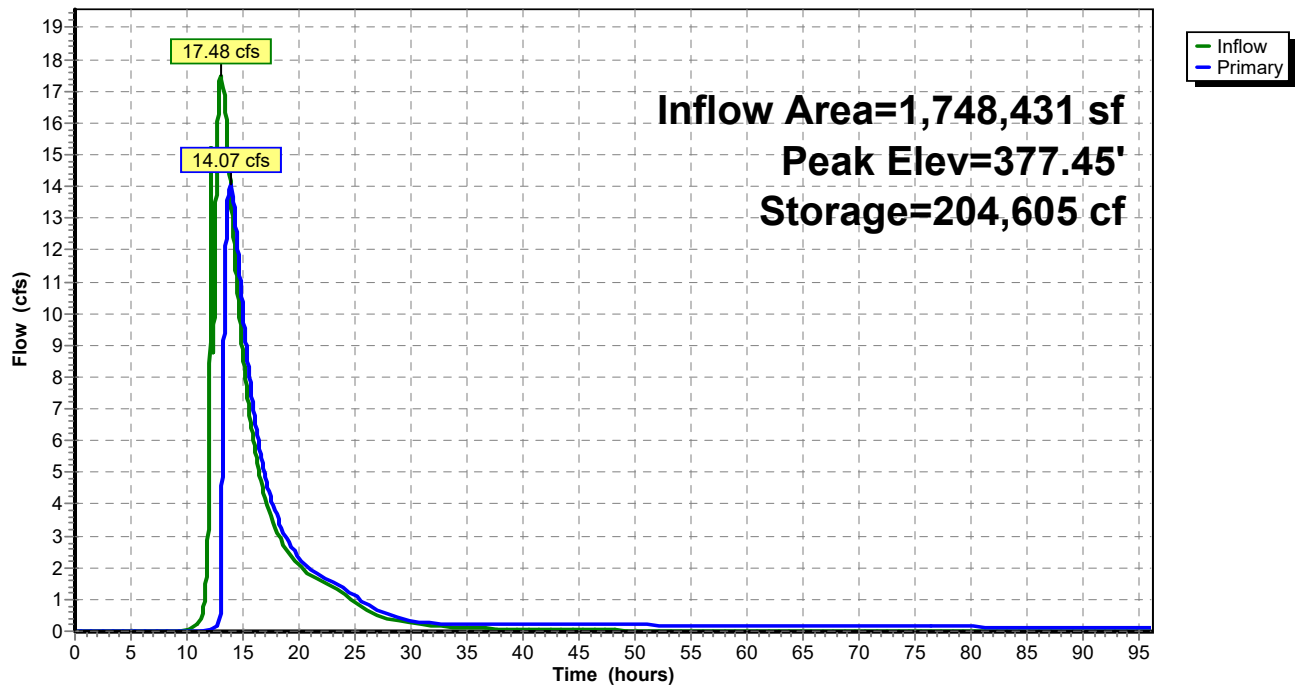
#3 Device 1 377.00' **36.0" x 48.0" Horiz. Orifice/Grate** C= 0.600
Limited to weir flow at low heads

Primary OutFlow Max=14.07 cfs @ 13.85 hrs HW=377.45' TW=312.55' (Dynamic Tailwater)

- 1=Culvert (Passes 14.07 cfs of 31.91 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.27 cfs @ 5.54 fps)
- 3=Orifice/Grate (Weir Controls 13.80 cfs @ 2.19 fps)

Pond 38: Wet Pond (SWP-4)

Hydrograph



N60 P1 Post-B 3-17-20

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NRCC 24-hr A 2-yr Rainfall=3.42"

Printed 3/24/2020

Summary for Subcatchment 39: Post B2

Runoff = 9.29 cfs @ 12.13 hrs, Volume= 21,581 cf, Depth= 1.95"

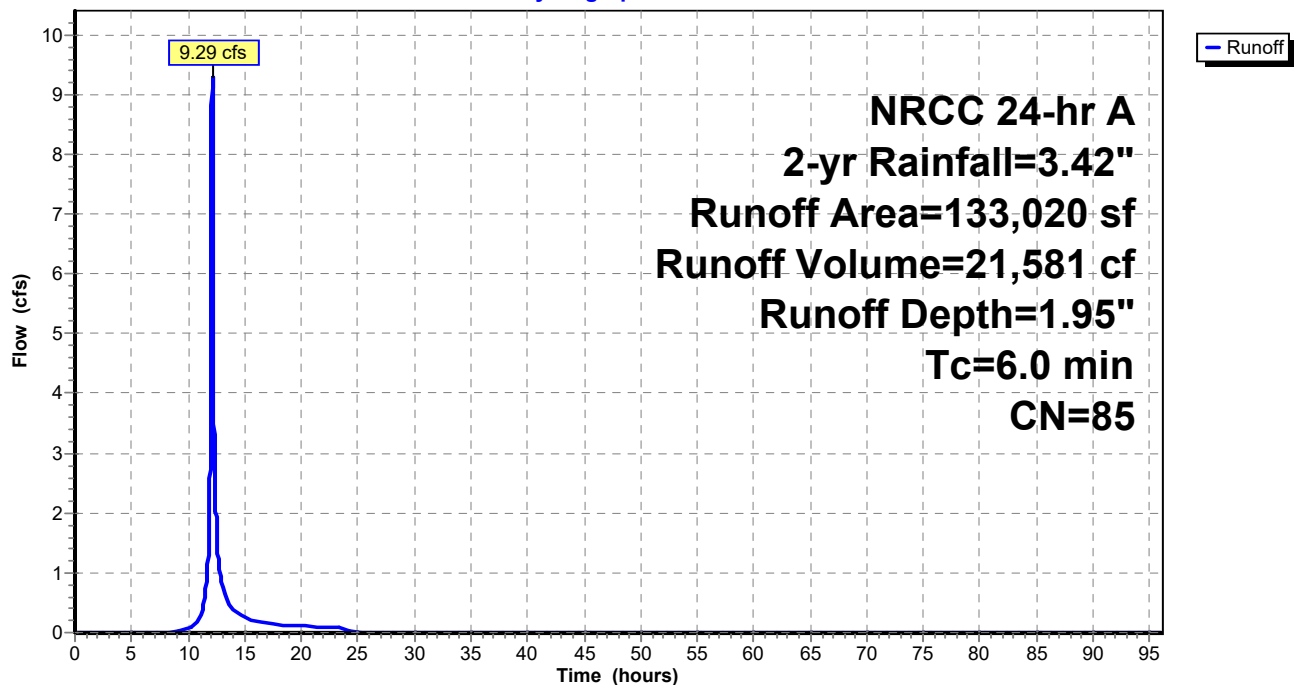
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
67,090	98	Paved parking, HSG C
40,460	74	>75% Grass cover, Good, HSG C
7,690	61	>75% Grass cover, Good, HSG B
17,780	70	Woods, Good, HSG C
133,020	85	Weighted Average
65,930		49.56% Pervious Area
67,090		50.44% Impervious Area

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

Subcatchment 39: Post B2

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 40: DIV-3

Inflow Area = 133,020 sf, 50.44% Impervious, Inflow Depth = 1.95" for 2-yr event
 Inflow = 9.29 cfs @ 12.13 hrs, Volume= 21,581 cf
 Outflow = 9.29 cfs @ 12.13 hrs, Volume= 21,581 cf, Atten= 0%, Lag= 0.0 min
 Primary = 6.27 cfs @ 12.12 hrs, Volume= 20,624 cf
 Secondary = 3.04 cfs @ 12.14 hrs, Volume= 957 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 381.26' @ 12.14 hrs

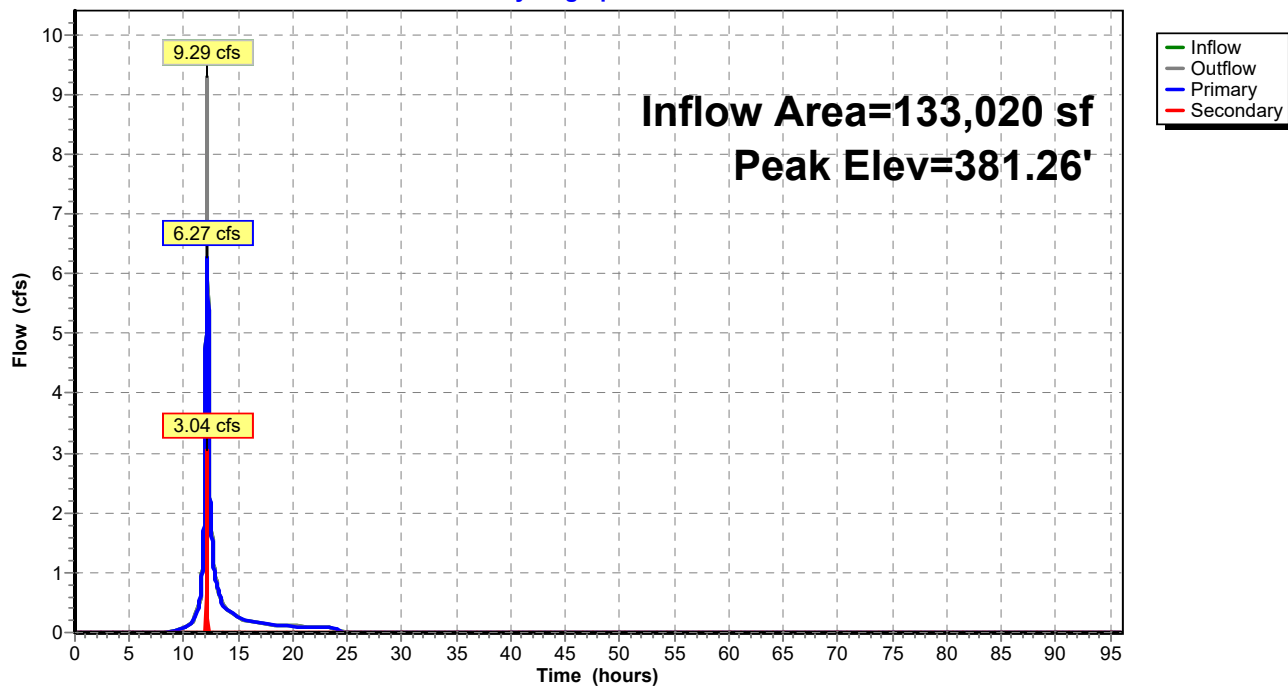
Flood Elev= 386.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	378.00'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 378.00' / 378.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	378.00'	24.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 378.00' / 377.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	381.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=6.25 cfs @ 12.12 hrs HW=381.25' TW=378.53' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 6.25 cfs @ 7.95 fps)**Secondary OutFlow** Max=3.01 cfs @ 12.14 hrs HW=381.26' TW=312.41' (Dynamic Tailwater)↑ **2=Culvert** (Passes 3.01 cfs of 22.74 cfs potential flow)↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 3.01 cfs @ 1.45 fps)

Pond 40: DIV-3

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Pond 41: INF-3

Inflow Area = 133,020 sf, 50.44% Impervious, Inflow Depth = 1.86" for 2-yr event
 Inflow = 6.27 cfs @ 12.12 hrs, Volume= 20,624 cf
 Outflow = 1.13 cfs @ 11.80 hrs, Volume= 20,624 cf, Atten= 82%, Lag= 0.0 min
 Discarded = 1.13 cfs @ 11.80 hrs, Volume= 20,624 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 379.42' @ 12.70 hrs Surf.Area= 4,883 sf Storage= 6,757 cf

Plug-Flow detention time= 43.5 min calculated for 20,622 cf (100% of inflow)
 Center-of-Mass det. time= 43.5 min (860.5 - 817.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	377.50'	4,711 cf	45.00'W x 108.50'L x 3.88'H Field A 18,920 cf Overall - 7,142 cf Embedded = 11,778 cf x 40.0% Voids
#2A	378.00'	7,142 cf	Cultec R-330XLHD x 135 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 9 rows
		11,853 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	377.50'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.10'

Discarded OutFlow Max=1.13 cfs @ 11.80 hrs HW=377.62' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 1.13 cfs)

N60 P1 Post-B 3-17-20

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Pond 41: INF-3 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 9 rows

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

15 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 106.50' Row Length +12.0" End Stone x 2 = 108.50' Base Length

9 Rows x 52.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 45.00' Base Width

6.0" Base + 30.5" Chamber Height + 10.0" Cover = 3.88' Field Height

135 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 9 Rows = 7,141.8 cf Chamber Storage

18,919.7 cf Field - 7,141.8 cf Chambers = 11,777.9 cf Stone x 40.0% Voids = 4,711.2 cf Stone Storage

Chamber Storage + Stone Storage = 11,852.9 cf = 0.272 af

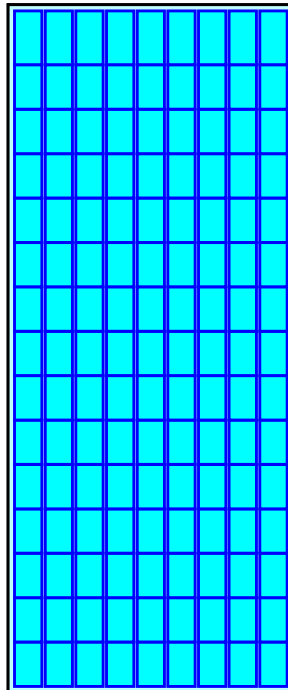
Overall Storage Efficiency = 62.6%

Overall System Size = 108.50' x 45.00' x 3.88'

135 Chambers

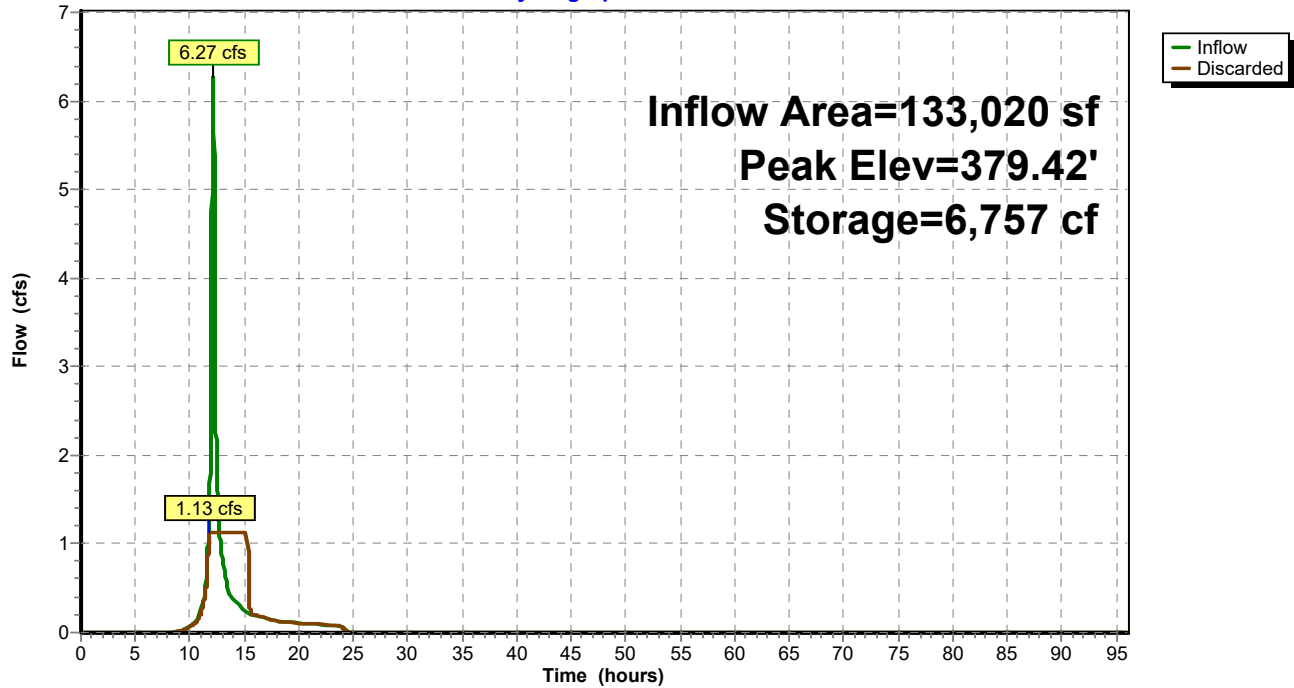
700.7 cy Field

436.2 cy Stone



Pond 41: INF-3

Hydrograph



N60 P1 Post-B 3-17-20

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NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Subcatchment 42: Post B4

Runoff = 20.16 cfs @ 12.25 hrs, Volume= 70,319 cf, Depth= 0.96"

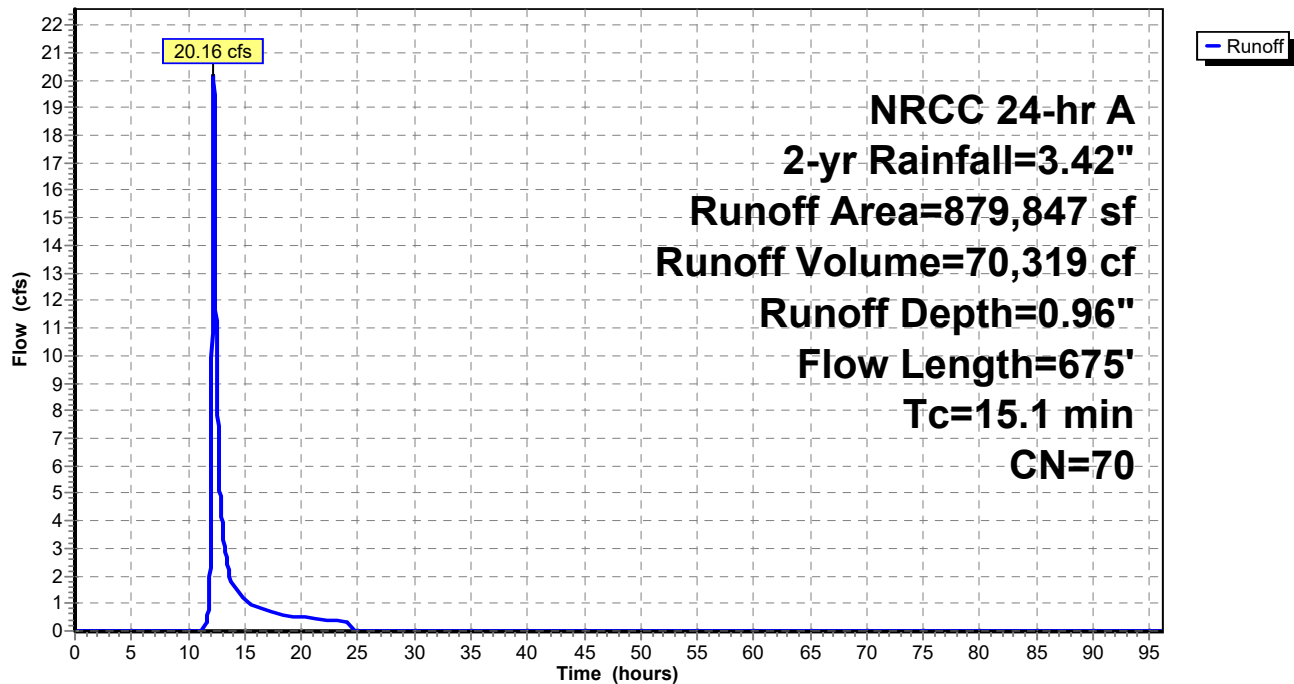
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 2-yr Rainfall=3.42"

Area (sf)	CN	Description
19,672	61	>75% Grass cover, Good, HSG B
13,245	74	>75% Grass cover, Good, HSG C
16,422	55	Woods, Good, HSG B
810,443	70	Woods, Good, HSG C
20,065	70	Woods, Good, HSG C
879,847	70	Weighted Average
879,847		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0600	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.9	575	0.0950	4.96		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	675	Total			

Subcatchment 42: Post B4

Hydrograph



N60 P1 Post-B 3-17-20

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NRCC 24-hr A 2-yr Rainfall=3.42"

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Summary for Reach 43: Existing Stream B

Inflow Area = 2,628,278 sf, 22.30% Impervious, Inflow Depth > 1.47" for 2-yr event
Inflow = 20.27 cfs @ 12.25 hrs, Volume= 322,138 cf
Outflow = 19.41 cfs @ 12.29 hrs, Volume= 321,985 cf, Atten= 4%, Lag= 2.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.07 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 1.59 fps, Avg. Travel Time= 14.3 min

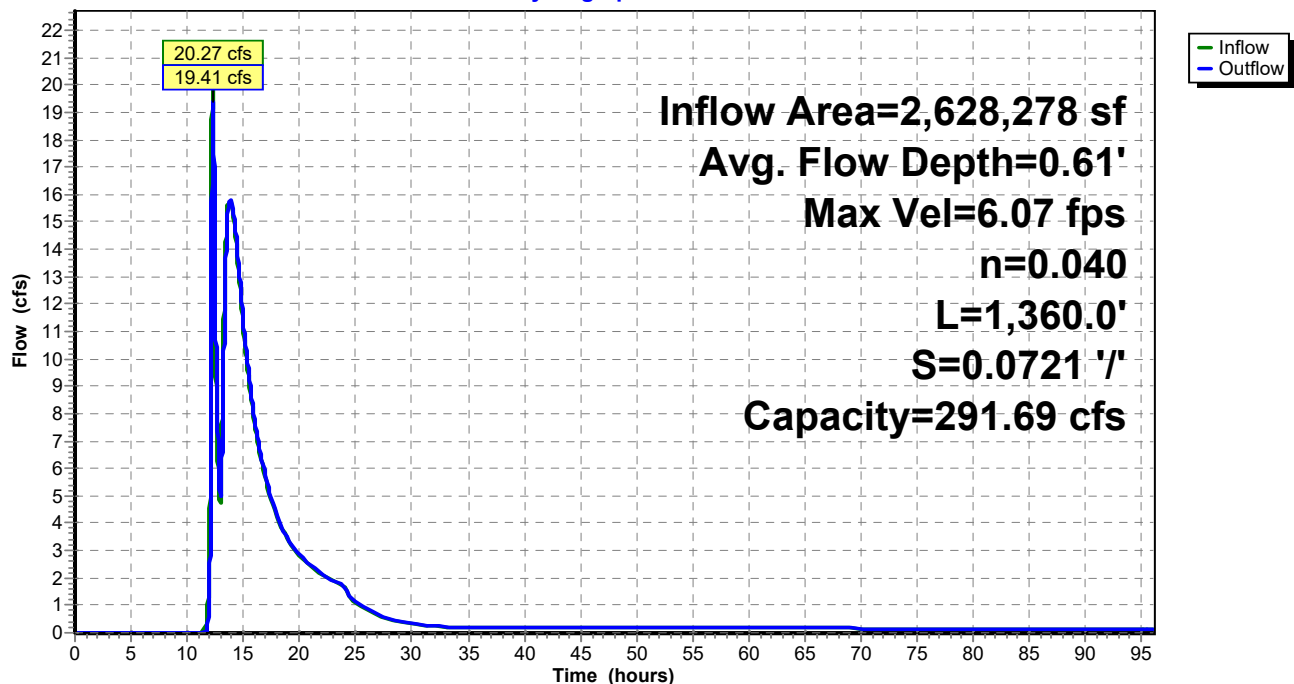
Peak Storage= 4,349 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.61'
Bank-Full Depth= 2.50' Flow Area= 22.5 sf, Capacity= 291.69 cfs

4.00' x 2.50' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 1,360.0' Slope= 0.0721 '/'
Inlet Invert= 312.00', Outlet Invert= 214.00'



Reach 43: Existing Stream B

Hydrograph



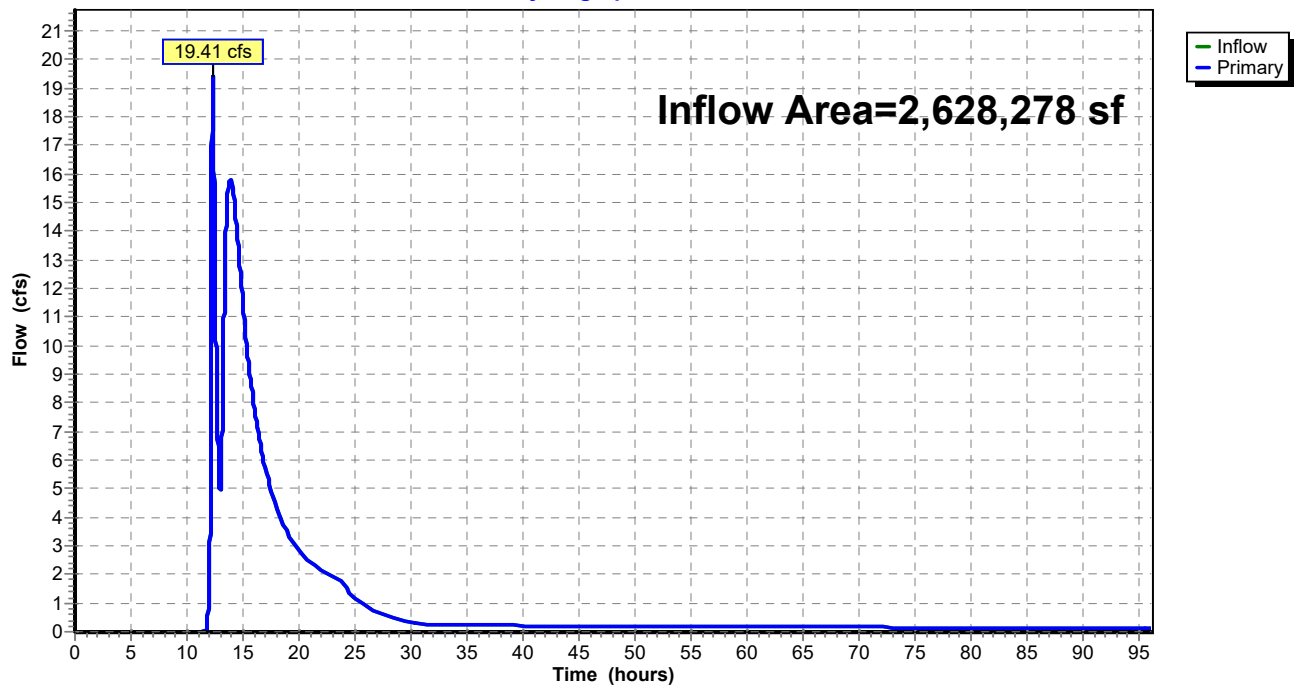
Summary for Link 44: Design Point B

Inflow Area = 2,628,278 sf, 22.30% Impervious, Inflow Depth > 1.47" for 2-yr event
 Inflow = 19.41 cfs @ 12.29 hrs, Volume= 321,985 cf
 Primary = 19.41 cfs @ 12.29 hrs, Volume= 321,985 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 44: Design Point B

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment34: Post B0 (Offsite) Runoff Area=1,510,771 sf 32.24% Impervious Runoff Depth=3.38"
Flow Length=1,871' Tc=32.3 min CN=84 Runoff=89.40 cfs 425,581 cf

Pond 35: Offsite Pond B Peak Elev=384.79' Storage=182,615 cf Inflow=89.40 cfs 425,581 cf
36.0" Round Culvert n=0.025 L=158.0' S=0.0127 ' Outflow=31.40 cfs 424,308 cf

Subcatchment36: Post B1 Runoff Area=110,105 sf 49.74% Impervious Runoff Depth=3.28"
Tc=6.0 min CN=83 Runoff=12.78 cfs 30,122 cf

Subcatchment37: Post B3 Runoff Area=127,555 sf 34.71% Impervious Runoff Depth=2.81"
Tc=6.0 min CN=78 Runoff=12.90 cfs 29,910 cf

Pond 38: Wet Pond (SWP-4) Peak Elev=377.77' Storage=221,720 cf Inflow=33.66 cfs 484,340 cf
Outflow=31.31 cfs 469,178 cf

Subcatchment39: Post B2 Runoff Area=133,020 sf 50.44% Impervious Runoff Depth=3.48"
Tc=6.0 min CN=85 Runoff=16.21 cfs 38,566 cf

Pond 40: DIV-3 Peak Elev=381.56' Inflow=16.21 cfs 38,566 cf
Primary=6.12 cfs 31,960 cf Secondary=10.33 cfs 6,606 cf Outflow=16.21 cfs 38,566 cf

Pond 41: INF-3 Peak Elev=380.96' Storage=11,051 cf Inflow=6.12 cfs 31,960 cf
Outflow=1.13 cfs 31,960 cf

Subcatchment42: Post B4 Runoff Area=879,847 sf 0.00% Impervious Runoff Depth=2.13"
Flow Length=675' Tc=15.1 min CN=70 Runoff=47.48 cfs 155,860 cf

Reach 43: Existing Stream B Avg. Flow Depth=1.02' Max Vel=8.01 fps Inflow=50.61 cfs 631,644 cf
n=0.040 L=1,360.0' S=0.0721 ' Capacity=291.69 cfs Outflow=49.39 cfs 631,489 cf

Link 44: Design Point B Inflow=49.39 cfs 631,489 cf
Primary=49.39 cfs 631,489 cf

Total Runoff Area = 2,761,298 sf Runoff Volume = 680,039 cf Average Runoff Depth = 2.96"
76.34% Pervious = 2,108,111 sf 23.66% Impervious = 653,187 sf

N60 P1 Post-B 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 34: Post B0 (Offsite)

Runoff = 89.40 cfs @ 12.45 hrs, Volume= 425,581 cf, Depth= 3.38"

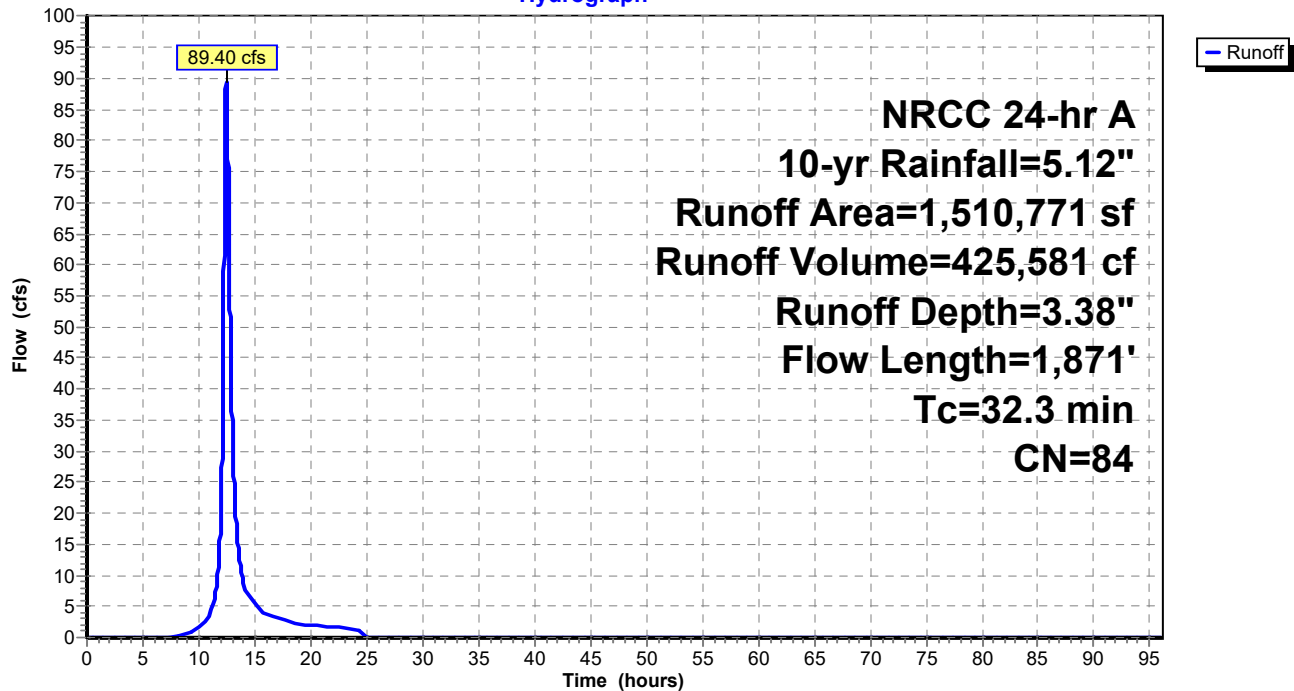
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
487,056	98	Paved parking, HSG C
497,987	77	Woods, Good, HSG D
134,328	70	Woods, Good, HSG C
375,457	80	>75% Grass cover, Good, HSG D
15,943	74	>75% Grass cover, Good, HSG C
1,510,771	84	Weighted Average
1,023,715		67.76% Pervious Area
487,056		32.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.0300	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	848	0.0085	1.48		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	856	0.0093	2.78	3.06	Trap/Vee/Rect Channel Flow, Bot.W=3.00' D=0.33' Z= 1.0 '/' Top.W=3.66' n= 0.022 Earth, clean & straight
0.2	67	0.0150	6.66	64.08	Pipe Channel, 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.025 Corrugated metal
32.3	1,871	Total			

Subcatchment 34: Post B0 (Offsite)

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Pond 35: Offsite Pond B

Inflow Area = 1,510,771 sf, 32.24% Impervious, Inflow Depth = 3.38" for 10-yr event
 Inflow = 89.40 cfs @ 12.45 hrs, Volume= 425,581 cf
 Outflow = 31.40 cfs @ 13.03 hrs, Volume= 424,308 cf, Atten= 65%, Lag= 34.8 min
 Primary = 31.40 cfs @ 13.03 hrs, Volume= 424,308 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 384.79' @ 13.03 hrs Surf.Area= 87,696 sf Storage= 182,615 cf

Plug-Flow detention time= 142.8 min calculated for 424,308 cf (100% of inflow)
 Center-of-Mass det. time= 140.8 min (966.9 - 826.0)

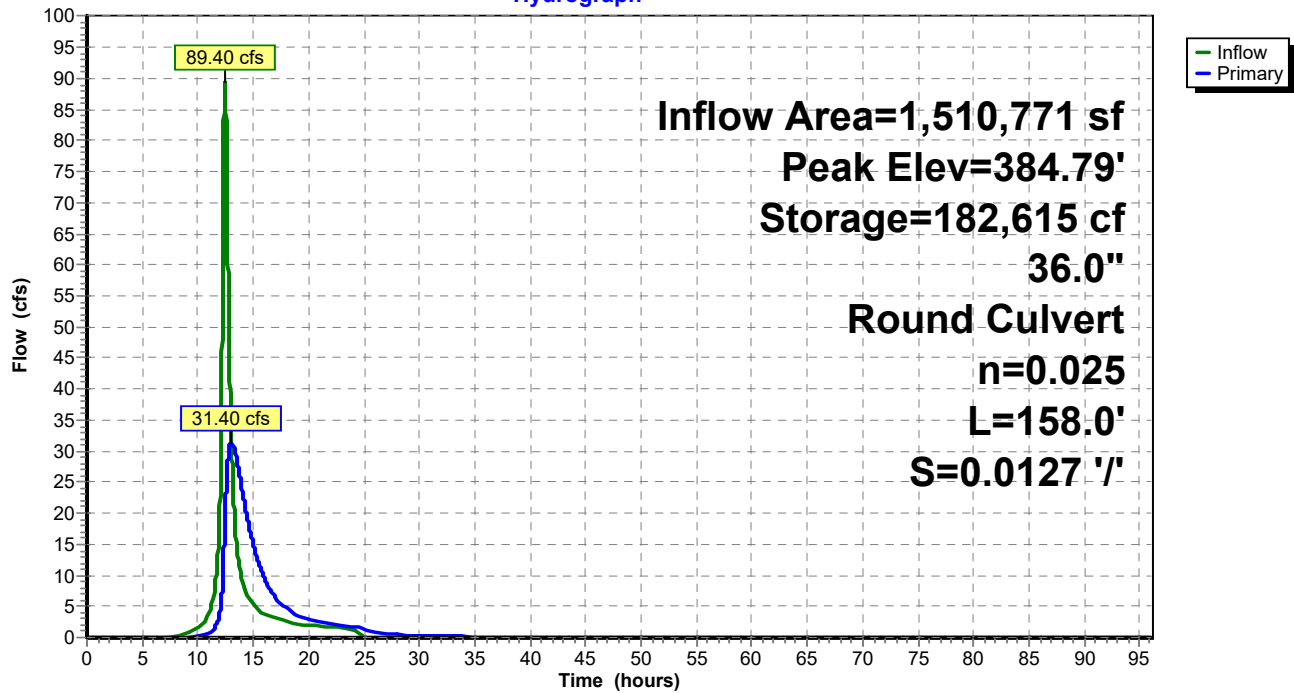
Volume	Invert	Avail.Storage	Storage Description		
#1	382.00'	610,998 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
382.00	36,540	1,177.0	0	0	36,540
384.00	81,987	1,579.0	115,507	115,507	124,748
386.00	96,790	1,622.0	178,572	294,080	136,159
388.00	108,795	1,657.0	205,468	499,548	145,863
389.00	114,127	1,679.0	111,450	610,998	151,937

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	36.0" Round Culvert L= 158.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.00' S= 0.0127 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 7.07 sf

Primary OutFlow Max=31.40 cfs @ 13.03 hrs HW=384.79' TW=377.72' (Dynamic Tailwater)
 ↑**1=Culvert** (Barrel Controls 31.40 cfs @ 5.96 fps)

Pond 35: Offsite Pond B

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 36: Post B1

Runoff = 12.78 cfs @ 12.13 hrs, Volume= 30,122 cf, Depth= 3.28"

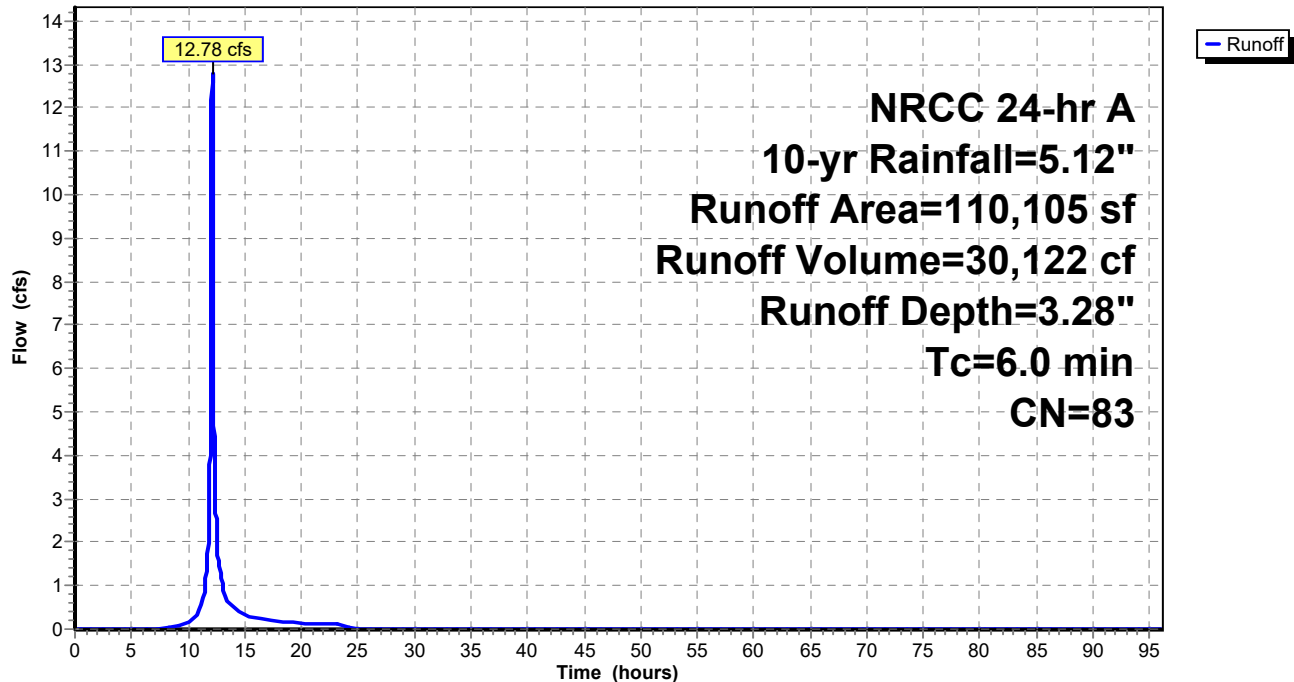
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
29,570	98	Paved parking, HSG C
38,521	74	>75% Grass cover, Good, HSG C
4,537	61	>75% Grass cover, Good, HSG B
12,282	55	Woods, Good, HSG B
25,195	98	Roofs, HSG C
110,105	83	Weighted Average
55,340		50.26% Pervious Area
54,765		49.74% Impervious Area

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

Subcatchment 36: Post B1

Hydrograph



N60 P1 Post-B 3-17-20

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NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 37: Post B3

Runoff = 12.90 cfs @ 12.13 hrs, Volume= 29,910 cf, Depth= 2.81"

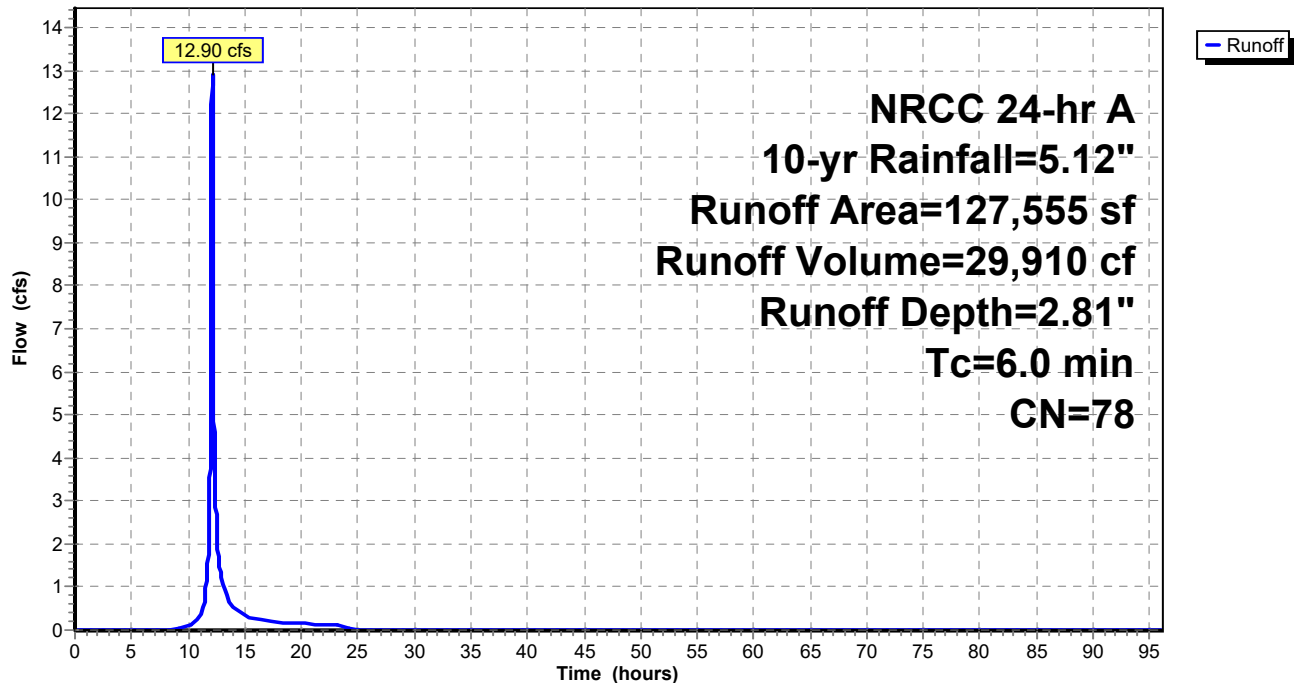
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
44,276	98	Water Surface, HSG C
22,184	74	>75% Grass cover, Good, HSG C
61,095	65	Brush, Good, HSG C
127,555	78	Weighted Average
83,279		65.29% Pervious Area
44,276		34.71% Impervious Area

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

Subcatchment 37: Post B3

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Pond 38: Wet Pond (SWP-4)

Inflow Area = 1,748,431 sf, 33.52% Impervious, Inflow Depth > 3.32" for 10-yr event
 Inflow = 33.66 cfs @ 12.96 hrs, Volume= 484,340 cf
 Outflow = 31.31 cfs @ 13.38 hrs, Volume= 469,178 cf, Atten= 7%, Lag= 25.2 min
 Primary = 31.31 cfs @ 13.38 hrs, Volume= 469,178 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Starting Elev= 376.00' Surf.Area= 88,186 sf Storage= 134,213 cf
 Peak Elev= 377.77' @ 13.38 hrs Surf.Area= 97,440 sf Storage= 221,720 cf (87,506 cf above start)

Plug-Flow detention time= 544.4 min calculated for 334,965 cf (69% of inflow)

Center-of-Mass det. time= 247.7 min (1,195.1 - 947.4)

Volume	Invert	Avail.Storage	Storage Description
#1	372.00'	7,914 cf	Forebay (Irregular) Listed below (Recalc)
#2	372.00'	121,847 cf	Permanent Pool (Irregular) Listed below (Recalc)
#3	375.90'	259,334 cf	Additional Storage (Irregular) Listed below (Recalc)
		389,094 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
372.00	885	114.0	0	0	885
373.00	1,392	139.2	1,129	1,129	1,408
374.00	1,998	164.4	1,686	2,815	2,036
375.00	2,707	189.5	2,344	5,158	2,764
375.90	3,430	212.2	2,755	7,914	3,512

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
372.00	22,804	1,051.3	0	0	22,804
373.00	27,060	1,076.5	24,902	24,902	27,202
374.00	31,416	1,101.7	29,211	54,113	31,703
375.00	35,874	1,127.0	33,620	87,733	36,327
375.90	39,971	1,149.7	34,114	121,847	40,565

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
375.90	44,276	1,380.7	0	0	44,276
377.00	50,030	1,294.2	51,836	51,836	62,747
378.00	55,257	1,319.4	52,622	104,458	68,149
379.00	60,586	1,344.7	57,901	162,359	73,675
380.00	66,015	1,370.0	63,281	225,640	79,307
380.50	68,768	1,382.6	33,693	259,334	82,151

Device	Routing	Invert	Outlet Devices
#1	Primary	372.00'	24.0" Round Culvert L= 227.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 372.00' / 347.00' S= 0.1101 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	376.00'	3.0" Vert. Orifice/Grate C= 0.600

N60 P1 Post-B 3-17-20

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NRCC 24-hr A 10-yr Rainfall=5.12"

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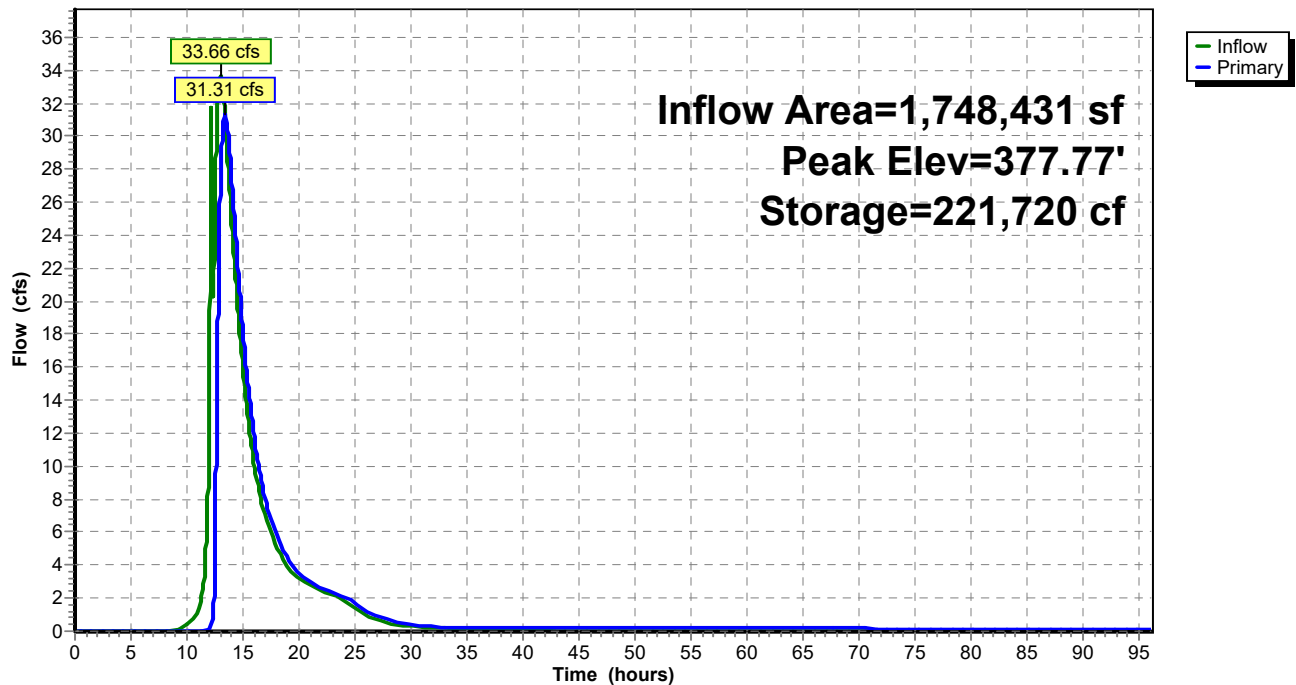
#3 Device 1 377.00' **36.0" x 48.0" Horiz. Orifice/Grate** C= 0.600
Limited to weir flow at low heads

Primary OutFlow Max=31.31 cfs @ 13.38 hrs HW=377.77' TW=312.87' (Dynamic Tailwater)

- 1=Culvert (Passes 31.31 cfs of 33.04 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.30 cfs @ 6.18 fps)
- 3=Orifice/Grate (Weir Controls 31.01 cfs @ 2.87 fps)

Pond 38: Wet Pond (SWP-4)

Hydrograph



N60 P1 Post-B 3-17-20

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NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 39: Post B2

Runoff = 16.21 cfs @ 12.13 hrs, Volume= 38,566 cf, Depth= 3.48"

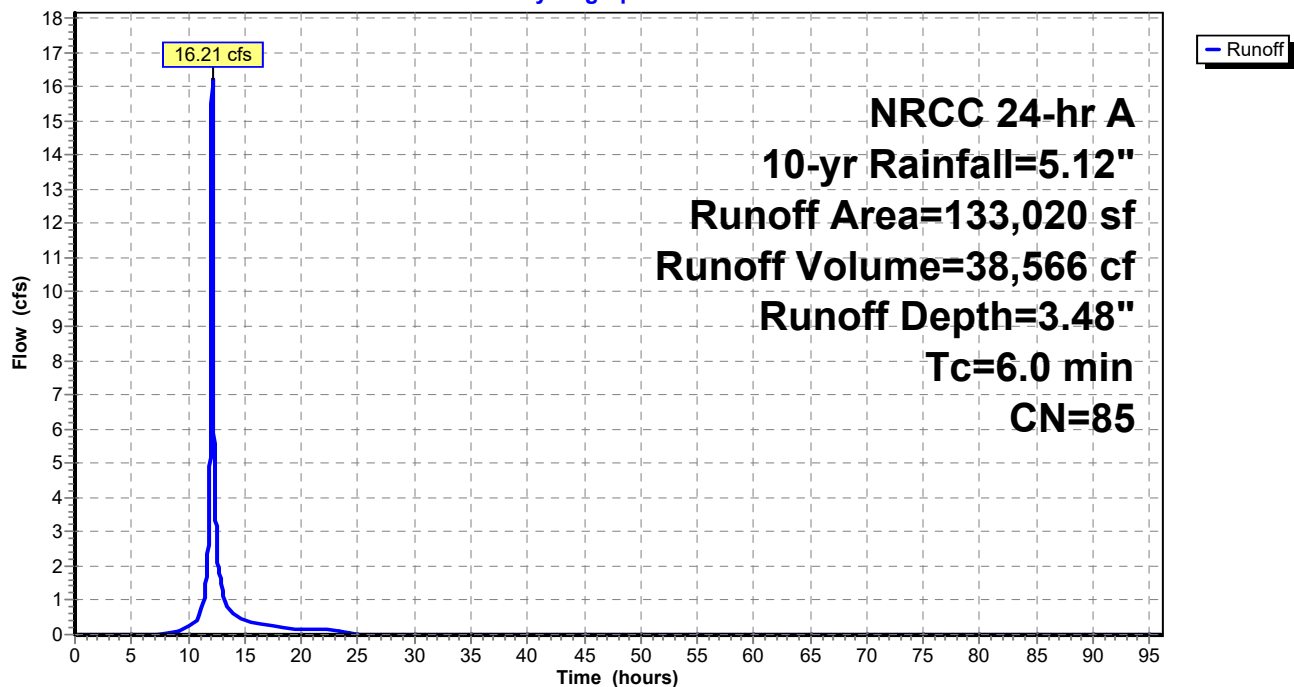
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
67,090	98	Paved parking, HSG C
40,460	74	>75% Grass cover, Good, HSG C
7,690	61	>75% Grass cover, Good, HSG B
17,780	70	Woods, Good, HSG C
133,020	85	Weighted Average
65,930		49.56% Pervious Area
67,090		50.44% Impervious Area

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

Subcatchment 39: Post B2

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Pond 40: DIV-3

Inflow Area = 133,020 sf, 50.44% Impervious, Inflow Depth = 3.48" for 10-yr event
 Inflow = 16.21 cfs @ 12.13 hrs, Volume= 38,566 cf
 Outflow = 16.21 cfs @ 12.13 hrs, Volume= 38,566 cf, Atten= 0%, Lag= 0.0 min
 Primary = 6.12 cfs @ 11.99 hrs, Volume= 31,960 cf
 Secondary = 10.33 cfs @ 12.13 hrs, Volume= 6,606 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 381.56' @ 12.13 hrs

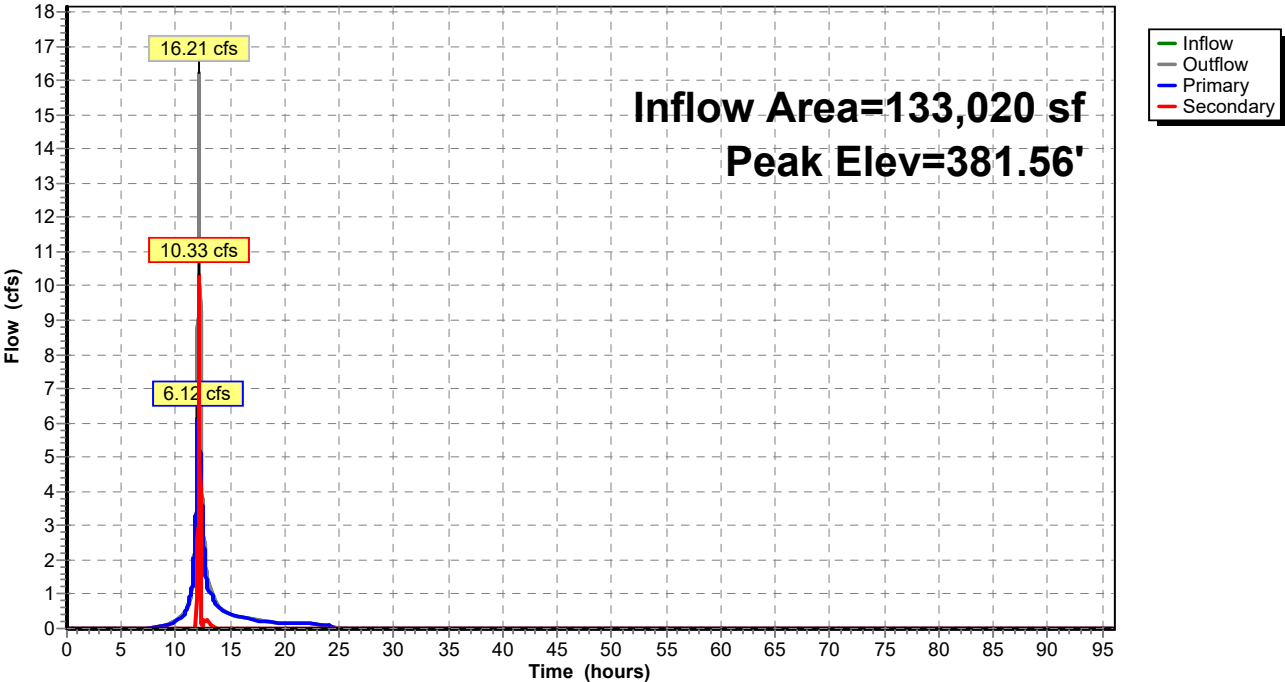
Flood Elev= 386.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	378.00'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 378.00' / 378.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	378.00'	24.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 378.00' / 377.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	381.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=6.07 cfs @ 11.99 hrs HW=381.15' TW=378.57' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 6.07 cfs @ 7.73 fps)**Secondary OutFlow** Max=10.30 cfs @ 12.13 hrs HW=381.56' TW=312.82' (Dynamic Tailwater)↑ **2=Culvert** (Passes 10.30 cfs of 24.22 cfs potential flow)↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 10.30 cfs @ 2.29 fps)

Pond 40: DIV-3

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Pond 41: INF-3

Inflow Area = 133,020 sf, 50.44% Impervious, Inflow Depth = 2.88" for 10-yr event
 Inflow = 6.12 cfs @ 11.99 hrs, Volume= 31,960 cf
 Outflow = 1.13 cfs @ 11.56 hrs, Volume= 31,960 cf, Atten= 82%, Lag= 0.0 min
 Discarded = 1.13 cfs @ 11.56 hrs, Volume= 31,960 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 380.96' @ 12.97 hrs Surf.Area= 4,883 sf Storage= 11,051 cf

Plug-Flow detention time= 74.6 min calculated for 31,957 cf (100% of inflow)
 Center-of-Mass det. time= 74.6 min (887.6 - 813.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	377.50'	4,711 cf	45.00'W x 108.50'L x 3.88'H Field A 18,920 cf Overall - 7,142 cf Embedded = 11,778 cf x 40.0% Voids
#2A	378.00'	7,142 cf	Cultec R-330XLHD x 135 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 9 rows
		11,853 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	377.50'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.10'

Discarded OutFlow Max=1.13 cfs @ 11.56 hrs HW=377.62' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 1.13 cfs)

N60 P1 Post-B 3-17-20

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NRCC 24-hr A 10-yr Rainfall=5.12"

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Pond 41: INF-3 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 9 rows

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

15 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 106.50' Row Length +12.0" End Stone x 2 = 108.50' Base Length

9 Rows x 52.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 45.00' Base Width

6.0" Base + 30.5" Chamber Height + 10.0" Cover = 3.88' Field Height

135 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 9 Rows = 7,141.8 cf Chamber Storage

18,919.7 cf Field - 7,141.8 cf Chambers = 11,777.9 cf Stone x 40.0% Voids = 4,711.2 cf Stone Storage

Chamber Storage + Stone Storage = 11,852.9 cf = 0.272 af

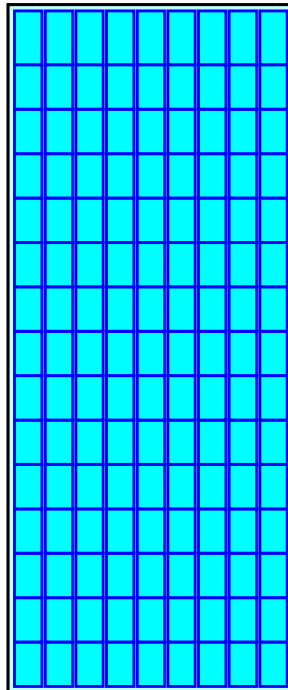
Overall Storage Efficiency = 62.6%

Overall System Size = 108.50' x 45.00' x 3.88'

135 Chambers

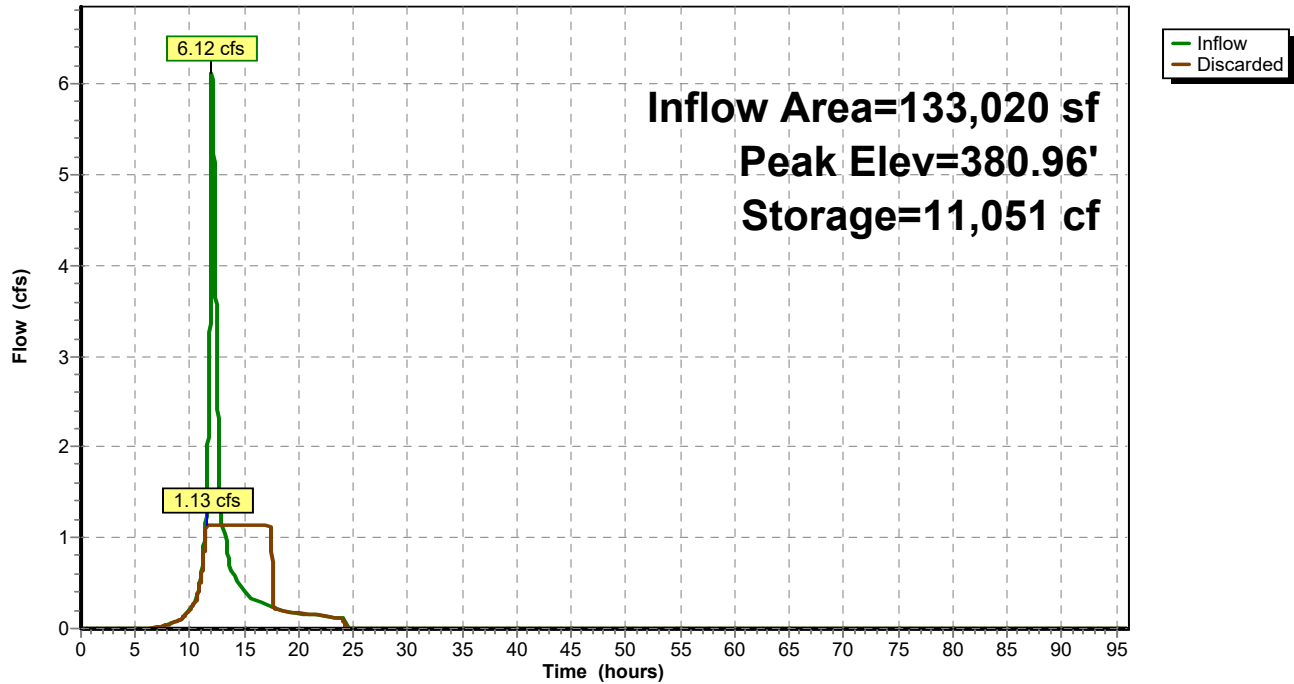
700.7 cy Field

436.2 cy Stone



Pond 41: INF-3

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 10-yr Rainfall=5.12"

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Summary for Subcatchment 42: Post B4

Runoff = 47.48 cfs @ 12.24 hrs, Volume= 155,860 cf, Depth= 2.13"

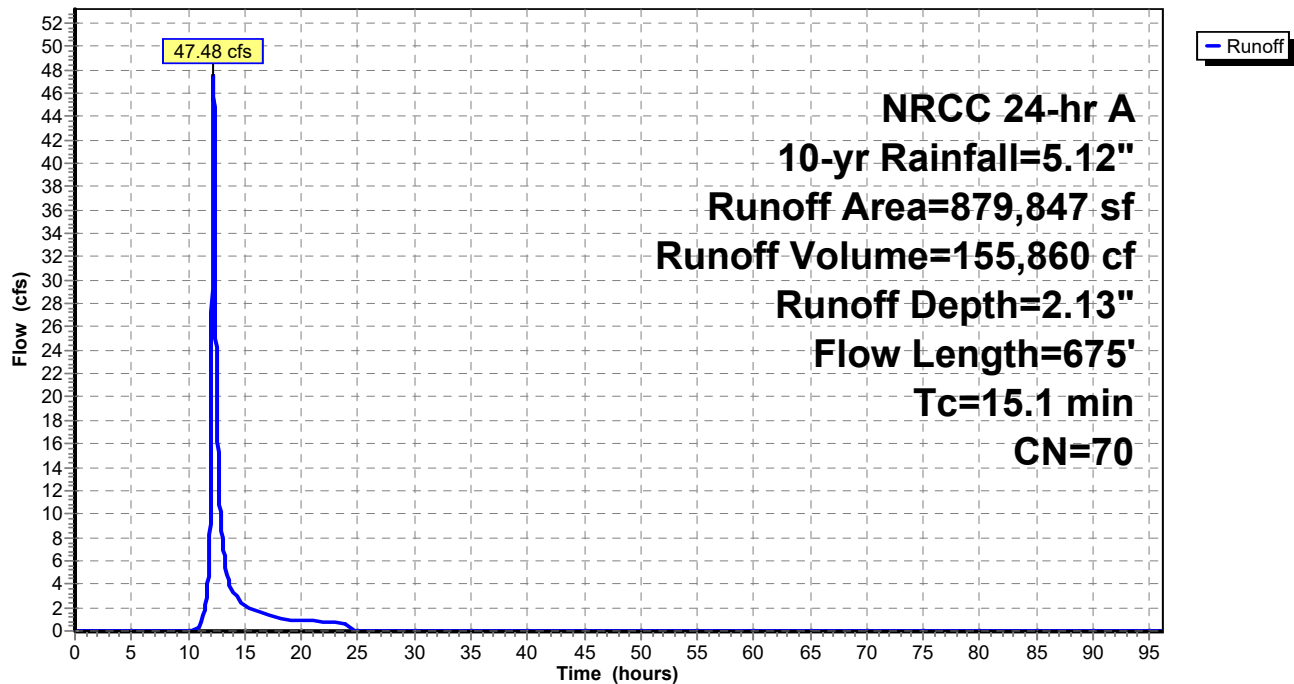
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 10-yr Rainfall=5.12"

Area (sf)	CN	Description
19,672	61	>75% Grass cover, Good, HSG B
13,245	74	>75% Grass cover, Good, HSG C
16,422	55	Woods, Good, HSG B
810,443	70	Woods, Good, HSG C
20,065	70	Woods, Good, HSG C
879,847	70	Weighted Average
879,847		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0600	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.9	575	0.0950	4.96		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	675	Total			

Subcatchment 42: Post B4

Hydrograph



Summary for Reach 43: Existing Stream B

Inflow Area = 2,628,278 sf, 22.30% Impervious, Inflow Depth > 2.88" for 10-yr event
 Inflow = 50.61 cfs @ 12.23 hrs, Volume= 631,644 cf
 Outflow = 49.39 cfs @ 12.26 hrs, Volume= 631,489 cf, Atten= 2%, Lag= 1.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Max. Velocity= 8.01 fps, Min. Travel Time= 2.8 min
 Avg. Velocity = 1.75 fps, Avg. Travel Time= 13.0 min

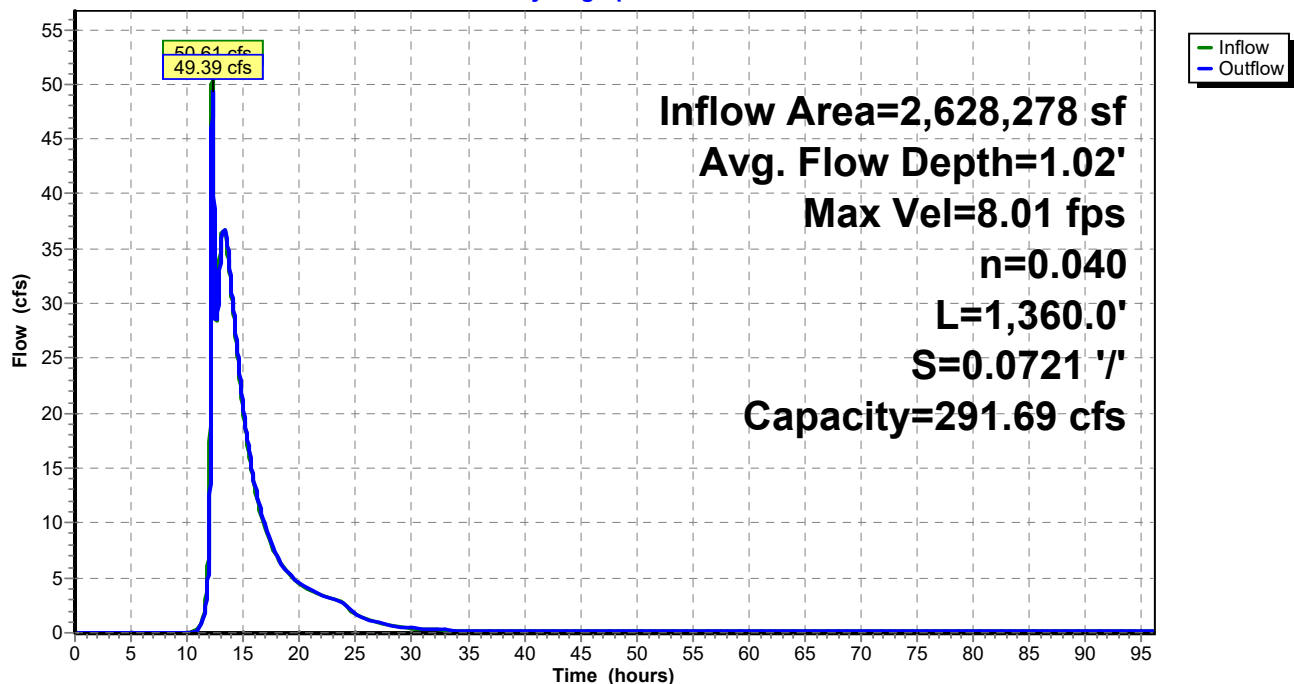
Peak Storage= 8,385 cf @ 12.26 hrs
 Average Depth at Peak Storage= 1.02'
 Bank-Full Depth= 2.50' Flow Area= 22.5 sf, Capacity= 291.69 cfs

4.00' x 2.50' deep channel, n= 0.040 Winding stream, pools & shoals
 Side Slope Z-value= 2.0 ' ' Top Width= 14.00'
 Length= 1,360.0' Slope= 0.0721 ' '
 Inlet Invert= 312.00', Outlet Invert= 214.00'



Reach 43: Existing Stream B

Hydrograph



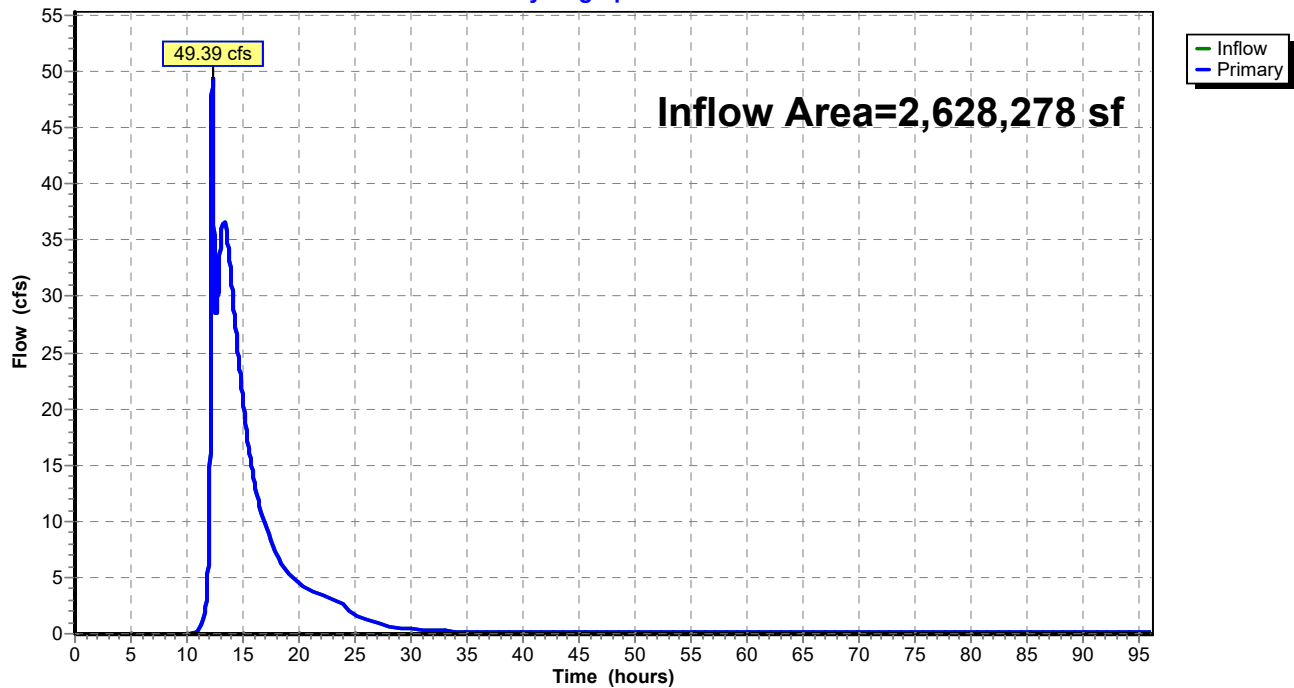
Summary for Link 44: Design Point B

Inflow Area = 2,628,278 sf, 22.30% Impervious, Inflow Depth > 2.88" for 10-yr event
 Inflow = 49.39 cfs @ 12.26 hrs, Volume= 631,489 cf
 Primary = 49.39 cfs @ 12.26 hrs, Volume= 631,489 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 44: Design Point B

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment34: Post B0 (Offsite) Runoff Area=1,510,771 sf 32.24% Impervious Runoff Depth=4.63"
Flow Length=1,871' Tc=32.3 min CN=84 Runoff=121.32 cfs 582,745 cf

Pond 35: Offsite Pond B Peak Elev=385.54' Storage=249,913 cf Inflow=121.32 cfs 582,745 cf
36.0" Round Culvert n=0.025 L=158.0' S=0.0127 ' Outflow=41.02 cfs 581,464 cf

Subcatchment36: Post B1 Runoff Area=110,105 sf 49.74% Impervious Runoff Depth=4.52"
Tc=6.0 min CN=83 Runoff=17.33 cfs 41,474 cf

Subcatchment37: Post B3 Runoff Area=127,555 sf 34.71% Impervious Runoff Depth=3.99"
Tc=6.0 min CN=78 Runoff=18.09 cfs 42,391 cf

Pond 38: Wet Pond (SWP-4) Peak Elev=378.35' Storage=253,896 cf Inflow=46.14 cfs 665,330 cf
Outflow=34.99 cfs 649,980 cf

Subcatchment39: Post B2 Runoff Area=133,020 sf 50.44% Impervious Runoff Depth=4.74"
Tc=6.0 min CN=85 Runoff=21.70 cfs 52,520 cf

Pond 40: DIV-3 Peak Elev=381.73' Inflow=21.70 cfs 52,520 cf
Primary=5.91 cfs 37,014 cf Secondary=16.19 cfs 15,507 cf Outflow=21.70 cfs 52,520 cf

Pond 41: INF-3 Peak Elev=381.06' Storage=11,239 cf Inflow=5.91 cfs 37,014 cf
Outflow=1.13 cfs 37,014 cf

Subcatchment42: Post B4 Runoff Area=879,847 sf 0.00% Impervious Runoff Depth=3.17"
Flow Length=675' Tc=15.1 min CN=70 Runoff=71.69 cfs 232,762 cf

Reach 43: Existing Stream B Avg. Flow Depth=1.36' Max Vel=9.36 fps Inflow=87.35 cfs 898,249 cf
n=0.040 L=1,360.0' S=0.0721 ' Capacity=291.69 cfs Outflow=85.84 cfs 898,093 cf

Link 44: Design Point B Inflow=85.84 cfs 898,093 cf
Primary=85.84 cfs 898,093 cf

Total Runoff Area = 2,761,298 sf Runoff Volume = 951,893 cf Average Runoff Depth = 4.14"
76.34% Pervious = 2,108,111 sf 23.66% Impervious = 653,187 sf

N60 P1 Post-B 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 34: Post B0 (Offsite)

Runoff = 121.32 cfs @ 12.45 hrs, Volume= 582,745 cf, Depth= 4.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
487,056	98	Paved parking, HSG C
497,987	77	Woods, Good, HSG D
134,328	70	Woods, Good, HSG C
375,457	80	>75% Grass cover, Good, HSG D
15,943	74	>75% Grass cover, Good, HSG C
1,510,771	84	Weighted Average
1,023,715		67.76% Pervious Area
487,056		32.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.0300	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	848	0.0085	1.48		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	856	0.0093	2.78	3.06	Trap/Vee/Rect Channel Flow, Bot.W=3.00' D=0.33' Z= 1.0 '/' Top.W=3.66' n= 0.022 Earth, clean & straight
0.2	67	0.0150	6.66	64.08	Pipe Channel, 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.025 Corrugated metal
32.3	1,871	Total			

N60 P1 Post-B 3-17-20

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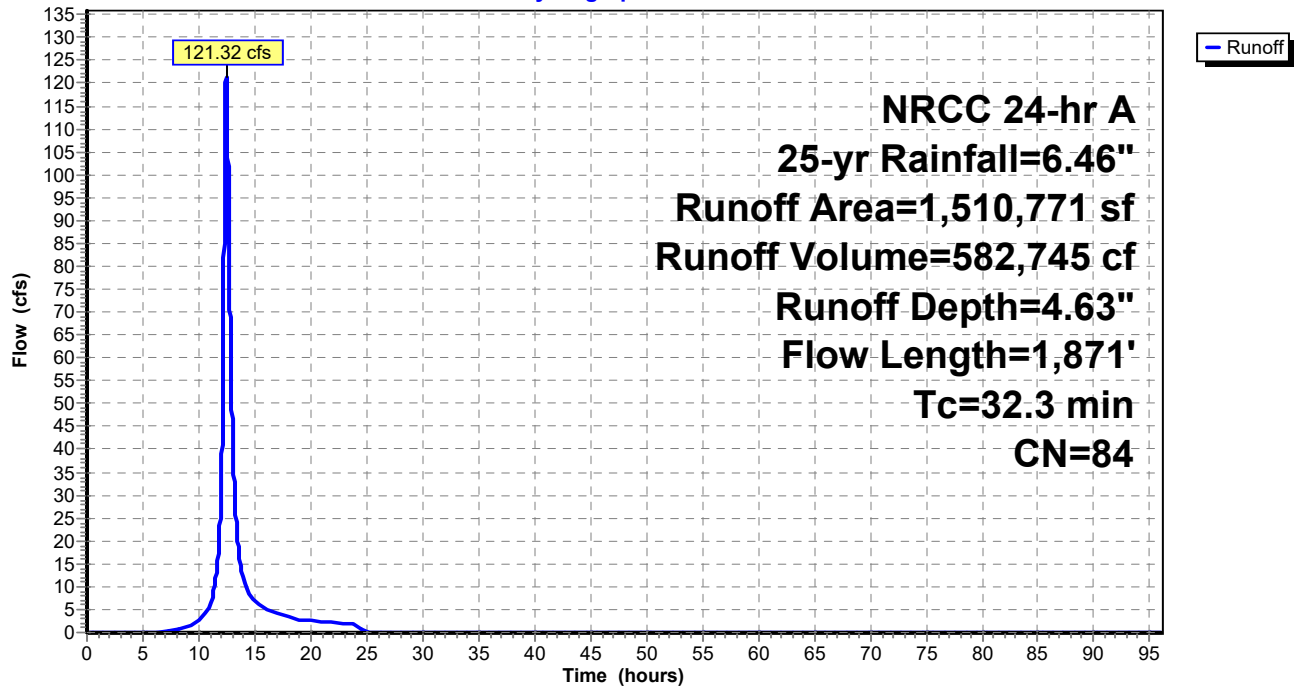
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NRCC 24-hr A 25-yr Rainfall=6.46"

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Subcatchment 34: Post B0 (Offsite)

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Pond 35: Offsite Pond B

Inflow Area = 1,510,771 sf, 32.24% Impervious, Inflow Depth = 4.63" for 25-yr event
 Inflow = 121.32 cfs @ 12.45 hrs, Volume= 582,745 cf
 Outflow = 41.02 cfs @ 13.04 hrs, Volume= 581,464 cf, Atten= 66%, Lag= 35.3 min
 Primary = 41.02 cfs @ 13.04 hrs, Volume= 581,464 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 385.54' @ 13.04 hrs Surf.Area= 93,240 sf Storage= 249,913 cf

Plug-Flow detention time= 132.1 min calculated for 581,464 cf (100% of inflow)
 Center-of-Mass det. time= 130.6 min (949.2 - 818.5)

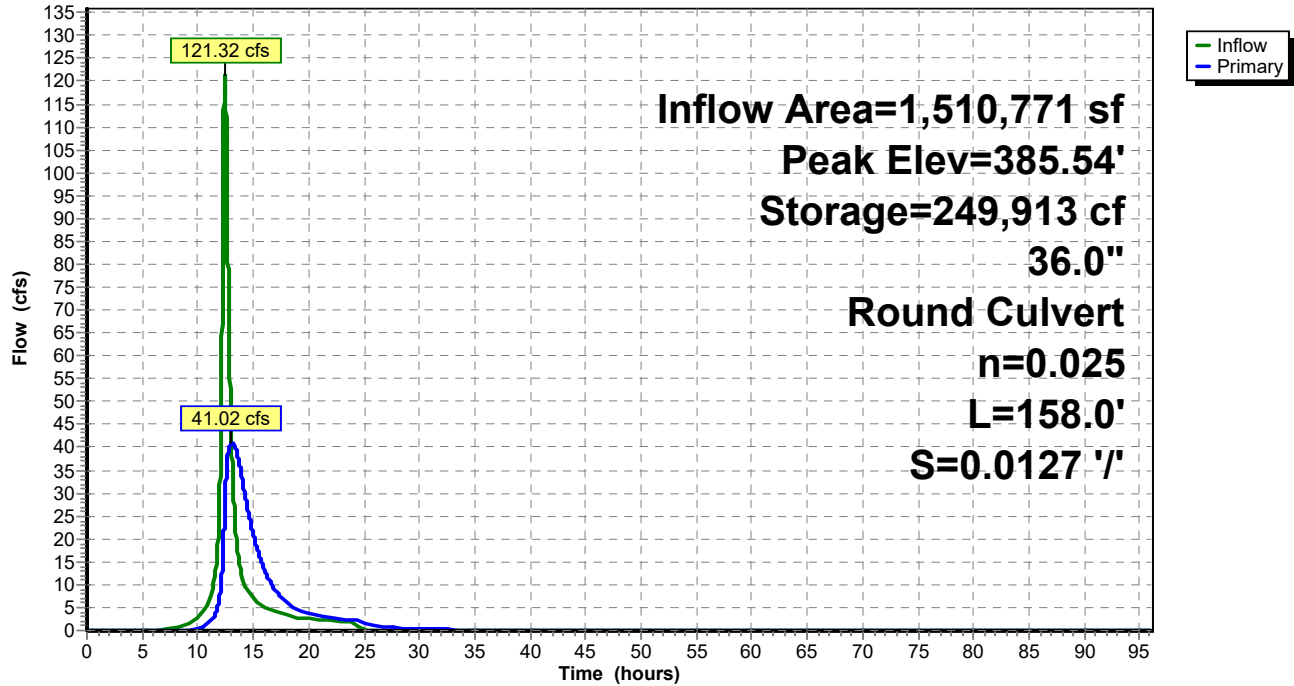
Volume	Invert	Avail.Storage	Storage Description		
#1	382.00'	610,998 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
382.00	36,540	1,177.0	0	0	36,540
384.00	81,987	1,579.0	115,507	115,507	124,748
386.00	96,790	1,622.0	178,572	294,080	136,159
388.00	108,795	1,657.0	205,468	499,548	145,863
389.00	114,127	1,679.0	111,450	610,998	151,937

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	36.0" Round Culvert L= 158.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.00' S= 0.0127 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 7.07 sf

Primary OutFlow Max=41.02 cfs @ 13.04 hrs HW=385.54' TW=378.02' (Dynamic Tailwater)
 ↑**1=Culvert** (Barrel Controls 41.02 cfs @ 6.21 fps)

Pond 35: Offsite Pond B

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 36: Post B1

Runoff = 17.33 cfs @ 12.13 hrs, Volume= 41,474 cf, Depth= 4.52"

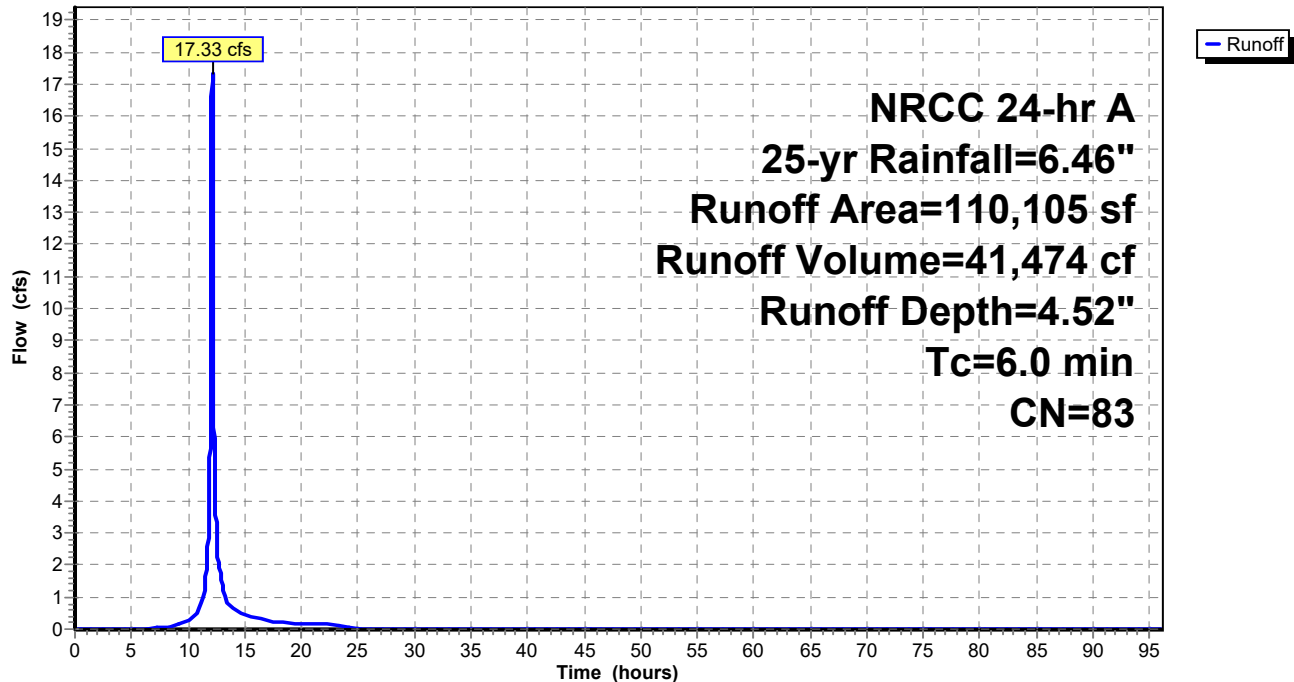
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
29,570	98	Paved parking, HSG C
38,521	74	>75% Grass cover, Good, HSG C
4,537	61	>75% Grass cover, Good, HSG B
12,282	55	Woods, Good, HSG B
25,195	98	Roofs, HSG C
110,105	83	Weighted Average
55,340		50.26% Pervious Area
54,765		49.74% Impervious Area

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

Subcatchment 36: Post B1

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 37: Post B3

Runoff = 18.09 cfs @ 12.13 hrs, Volume= 42,391 cf, Depth= 3.99"

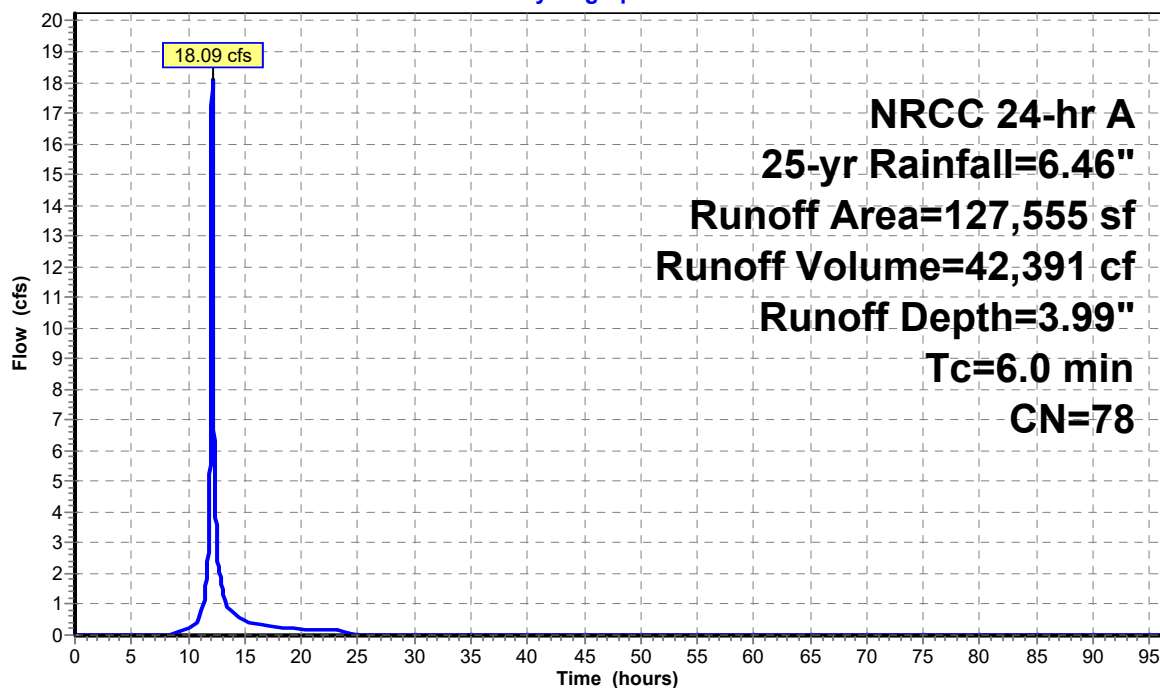
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
44,276	98	Water Surface, HSG C
22,184	74	>75% Grass cover, Good, HSG C
61,095	65	Brush, Good, HSG C
127,555	78	Weighted Average
83,279		65.29% Pervious Area
44,276		34.71% Impervious Area

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

Subcatchment 37: Post B3

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Pond 38: Wet Pond (SWP-4)

Inflow Area = 1,748,431 sf, 33.52% Impervious, Inflow Depth = 4.57" for 25-yr event
 Inflow = 46.14 cfs @ 12.14 hrs, Volume= 665,330 cf
 Outflow = 34.99 cfs @ 13.96 hrs, Volume= 649,980 cf, Atten= 24%, Lag= 109.3 min
 Primary = 34.99 cfs @ 13.96 hrs, Volume= 649,980 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Starting Elev= 376.00' Surf.Area= 88,186 sf Storage= 134,213 cf
 Peak Elev= 378.35' @ 13.96 hrs Surf.Area= 100,497 sf Storage= 253,896 cf (119,683 cf above start)

Plug-Flow detention time= 389.5 min calculated for 515,767 cf (78% of inflow)

Center-of-Mass det. time= 189.9 min (1,120.5 - 930.6)

Volume	Invert	Avail.Storage	Storage Description
#1	372.00'	7,914 cf	Forebay (Irregular) Listed below (Recalc)
#2	372.00'	121,847 cf	Permanent Pool (Irregular) Listed below (Recalc)
#3	375.90'	259,334 cf	Additional Storage (Irregular) Listed below (Recalc)
		389,094 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
372.00	885	114.0	0	0	885
373.00	1,392	139.2	1,129	1,129	1,408
374.00	1,998	164.4	1,686	2,815	2,036
375.00	2,707	189.5	2,344	5,158	2,764
375.90	3,430	212.2	2,755	7,914	3,512

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
372.00	22,804	1,051.3	0	0	22,804
373.00	27,060	1,076.5	24,902	24,902	27,202
374.00	31,416	1,101.7	29,211	54,113	31,703
375.00	35,874	1,127.0	33,620	87,733	36,327
375.90	39,971	1,149.7	34,114	121,847	40,565

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
375.90	44,276	1,380.7	0	0	44,276
377.00	50,030	1,294.2	51,836	51,836	62,747
378.00	55,257	1,319.4	52,622	104,458	68,149
379.00	60,586	1,344.7	57,901	162,359	73,675
380.00	66,015	1,370.0	63,281	225,640	79,307
380.50	68,768	1,382.6	33,693	259,334	82,151

Device	Routing	Invert	Outlet Devices
#1	Primary	372.00'	24.0" Round Culvert L= 227.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 372.00' / 347.00' S= 0.1101 ' /' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	376.00'	3.0" Vert. Orifice/Grate C= 0.600

N60 P1 Post-B 3-17-20

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NRCC 24-hr A 25-yr Rainfall=6.46"

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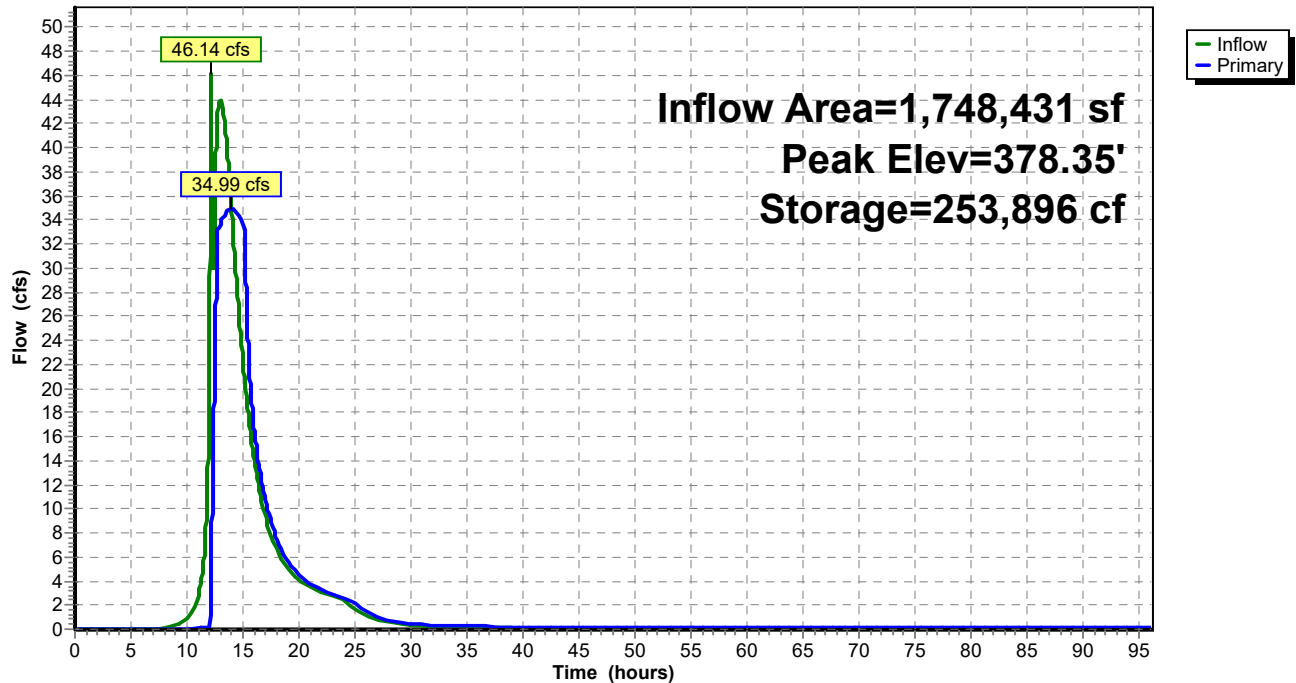
#3 Device 1 377.00' **36.0" x 48.0" Horiz. Orifice/Grate** C= 0.600
Limited to weir flow at low heads

Primary OutFlow Max=34.99 cfs @ 13.96 hrs HW=378.35' TW=312.91' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 34.99 cfs @ 11.14 fps)
- 2=Orifice/Grate (Passes < 0.35 cfs potential flow)
- 3=Orifice/Grate (Passes < 67.14 cfs potential flow)

Pond 38: Wet Pond (SWP-4)

Hydrograph



N60 P1 Post-B 3-17-20

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NRCC 24-hr A 25-yr Rainfall=6.46"

Printed 3/24/2020

Summary for Subcatchment 39: Post B2

Runoff = 21.70 cfs @ 12.13 hrs, Volume= 52,520 cf, Depth= 4.74"

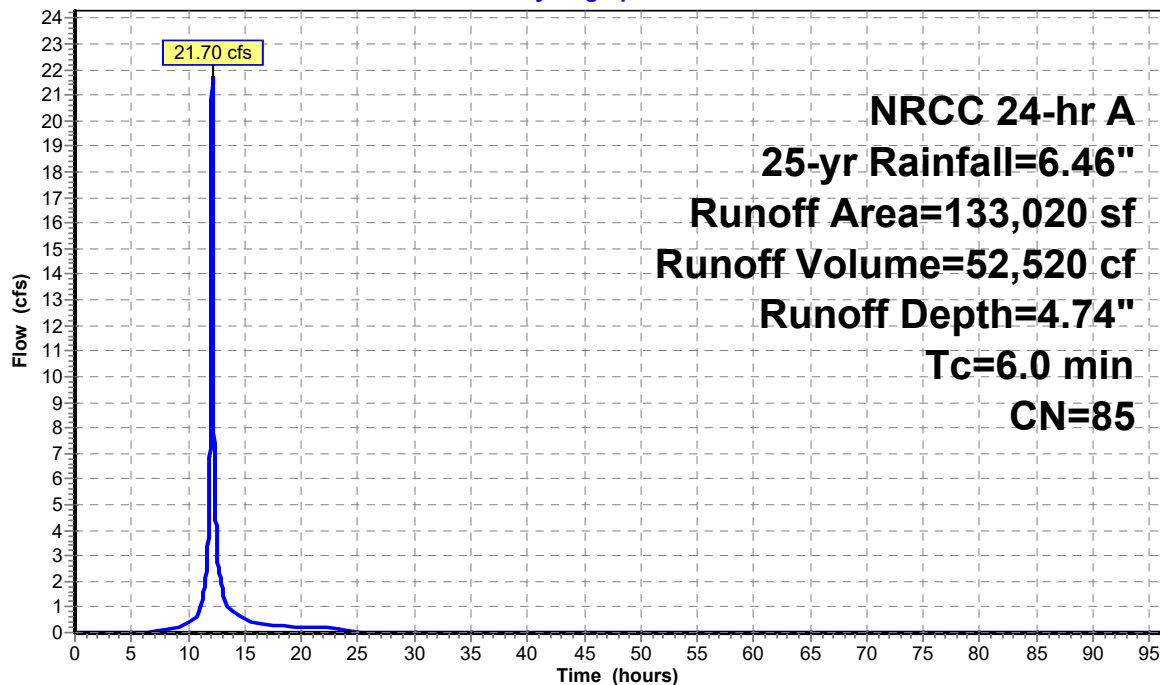
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
67,090	98	Paved parking, HSG C
40,460	74	>75% Grass cover, Good, HSG C
7,690	61	>75% Grass cover, Good, HSG B
17,780	70	Woods, Good, HSG C
133,020	85	Weighted Average
65,930		49.56% Pervious Area
67,090		50.44% Impervious Area

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

Subcatchment 39: Post B2

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Pond 40: DIV-3

Inflow Area = 133,020 sf, 50.44% Impervious, Inflow Depth = 4.74" for 25-yr event
 Inflow = 21.70 cfs @ 12.13 hrs, Volume= 52,520 cf
 Outflow = 21.70 cfs @ 12.13 hrs, Volume= 52,520 cf, Atten= 0%, Lag= 0.0 min
 Primary = 5.91 cfs @ 11.89 hrs, Volume= 37,014 cf
 Secondary = 16.19 cfs @ 12.13 hrs, Volume= 15,507 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 381.73' @ 12.13 hrs

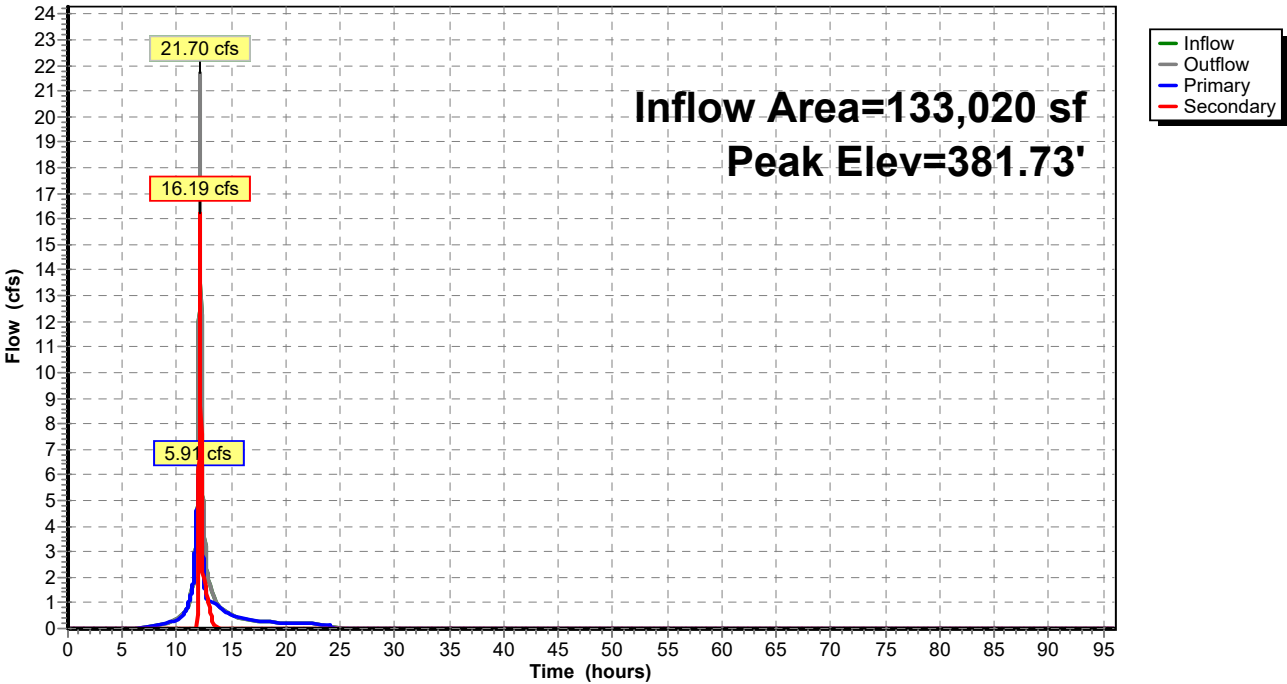
Flood Elev= 386.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	378.00'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 378.00' / 378.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	378.00'	24.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 378.00' / 377.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	381.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.83 cfs @ 11.89 hrs HW=381.04' TW=378.66' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 5.83 cfs @ 7.42 fps)**Secondary OutFlow** Max=16.16 cfs @ 12.13 hrs HW=381.73' TW=313.08' (Dynamic Tailwater)↑ **2=Culvert** (Passes 16.16 cfs of 25.00 cfs potential flow)↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 16.16 cfs @ 2.76 fps)

Pond 40: DIV-3

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Pond 41: INF-3

Inflow Area = 133,020 sf, 50.44% Impervious, Inflow Depth = 3.34" for 25-yr event
 Inflow = 5.91 cfs @ 11.89 hrs, Volume= 37,014 cf
 Outflow = 1.13 cfs @ 11.28 hrs, Volume= 37,014 cf, Atten= 81%, Lag= 0.0 min
 Discarded = 1.13 cfs @ 11.28 hrs, Volume= 37,014 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 381.06' @ 12.70 hrs Surf.Area= 4,883 sf Storage= 11,239 cf

Plug-Flow detention time= 76.4 min calculated for 37,010 cf (100% of inflow)
 Center-of-Mass det. time= 76.4 min (891.3 - 814.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	377.50'	4,711 cf	45.00'W x 108.50'L x 3.88'H Field A 18,920 cf Overall - 7,142 cf Embedded = 11,778 cf x 40.0% Voids
#2A	378.00'	7,142 cf	Cultec R-330XLHD x 135 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 9 rows
		11,853 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	377.50'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.10'

Discarded OutFlow Max=1.13 cfs @ 11.28 hrs HW=377.62' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 1.13 cfs)

N60 P1 Post-B 3-17-20

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NRCC 24-hr A 25-yr Rainfall=6.46"

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Pond 41: INF-3 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 9 rows

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

15 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 106.50' Row Length +12.0" End Stone x 2 = 108.50' Base Length

9 Rows x 52.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 45.00' Base Width

6.0" Base + 30.5" Chamber Height + 10.0" Cover = 3.88' Field Height

135 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 9 Rows = 7,141.8 cf Chamber Storage

18,919.7 cf Field - 7,141.8 cf Chambers = 11,777.9 cf Stone x 40.0% Voids = 4,711.2 cf Stone Storage

Chamber Storage + Stone Storage = 11,852.9 cf = 0.272 af

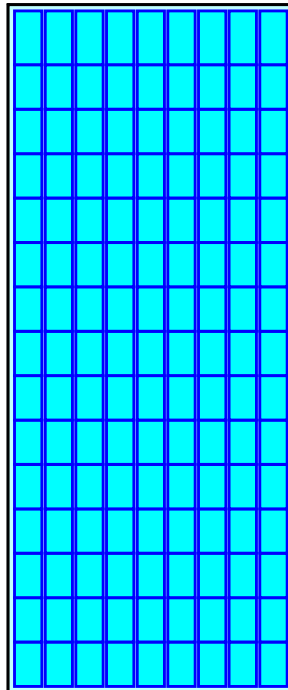
Overall Storage Efficiency = 62.6%

Overall System Size = 108.50' x 45.00' x 3.88'

135 Chambers

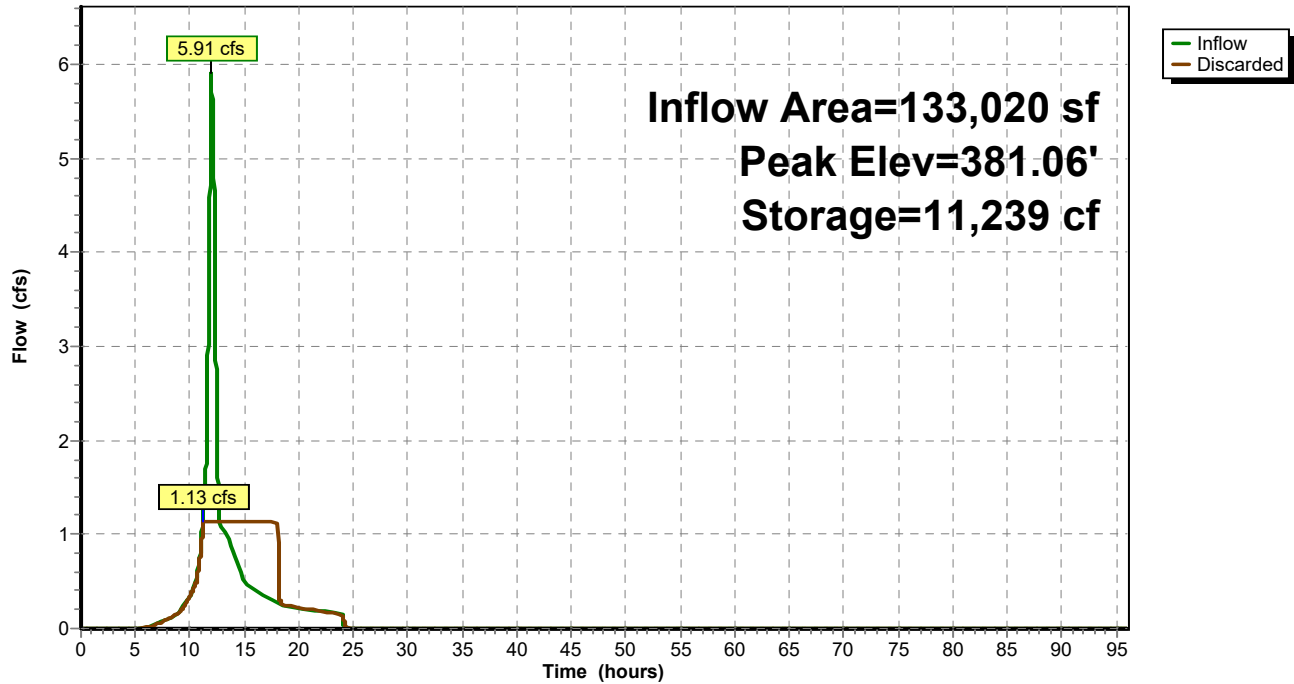
700.7 cy Field

436.2 cy Stone



Pond 41: INF-3

Hydrograph



N60 P1 Post-B 3-17-20

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NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Subcatchment 42: Post B4

Runoff = 71.69 cfs @ 12.23 hrs, Volume= 232,762 cf, Depth= 3.17"

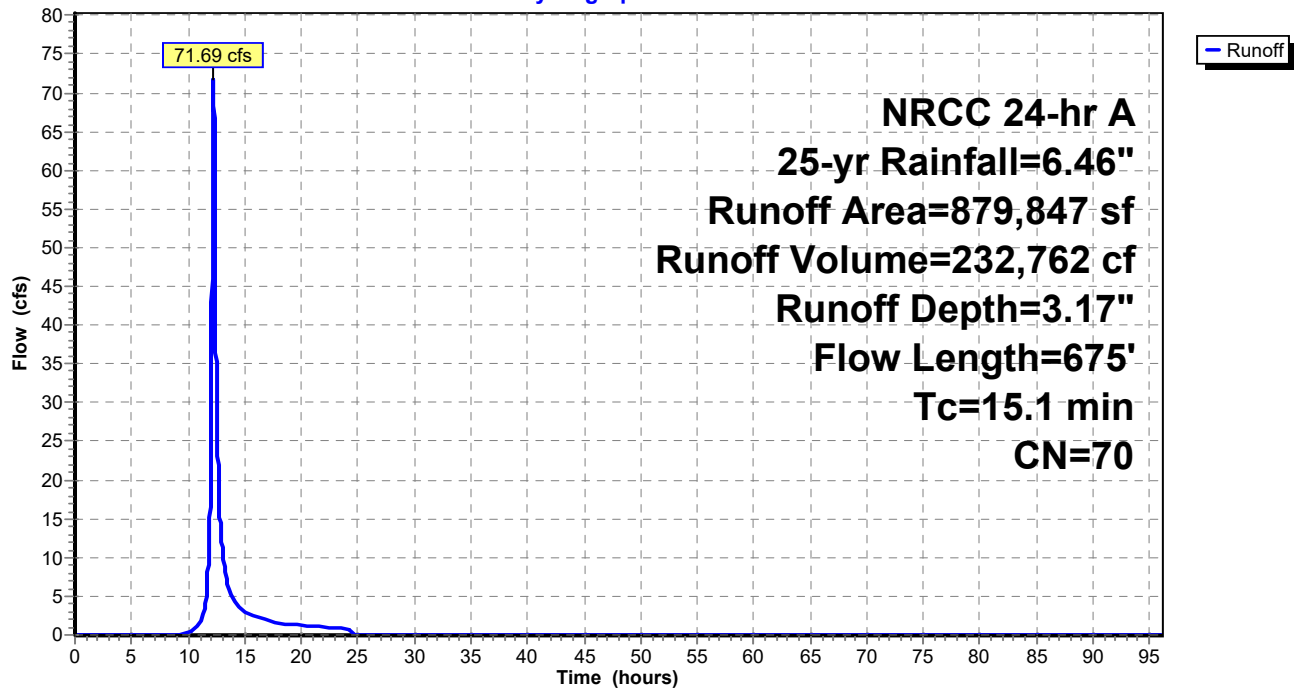
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 25-yr Rainfall=6.46"

Area (sf)	CN	Description
19,672	61	>75% Grass cover, Good, HSG B
13,245	74	>75% Grass cover, Good, HSG C
16,422	55	Woods, Good, HSG B
810,443	70	Woods, Good, HSG C
20,065	70	Woods, Good, HSG C
879,847	70	Weighted Average
879,847		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0600	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.9	575	0.0950	4.96		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	675	Total			

Subcatchment 42: Post B4

Hydrograph



N60 P1 Post-B 3-17-20

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NRCC 24-hr A 25-yr Rainfall=6.46"

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Summary for Reach 43: Existing Stream B

Inflow Area = 2,628,278 sf, 22.30% Impervious, Inflow Depth > 4.10" for 25-yr event
Inflow = 87.35 cfs @ 12.24 hrs, Volume= 898,249 cf
Outflow = 85.84 cfs @ 12.27 hrs, Volume= 898,093 cf, Atten= 2%, Lag= 1.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.36 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 1.84 fps, Avg. Travel Time= 12.3 min

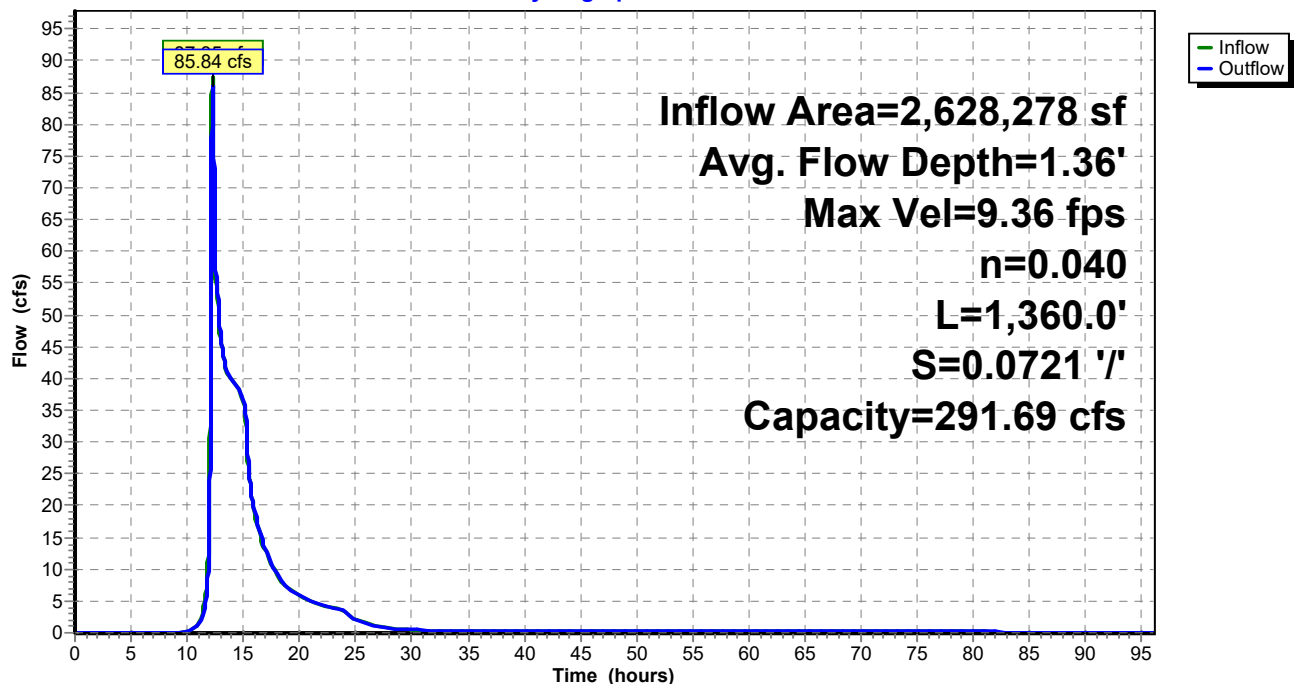
Peak Storage= 12,479 cf @ 12.27 hrs
Average Depth at Peak Storage= 1.36'
Bank-Full Depth= 2.50' Flow Area= 22.5 sf, Capacity= 291.69 cfs

4.00' x 2.50' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 ' ' Top Width= 14.00'
Length= 1,360.0' Slope= 0.0721 ' '
Inlet Invert= 312.00', Outlet Invert= 214.00'



Reach 43: Existing Stream B

Hydrograph



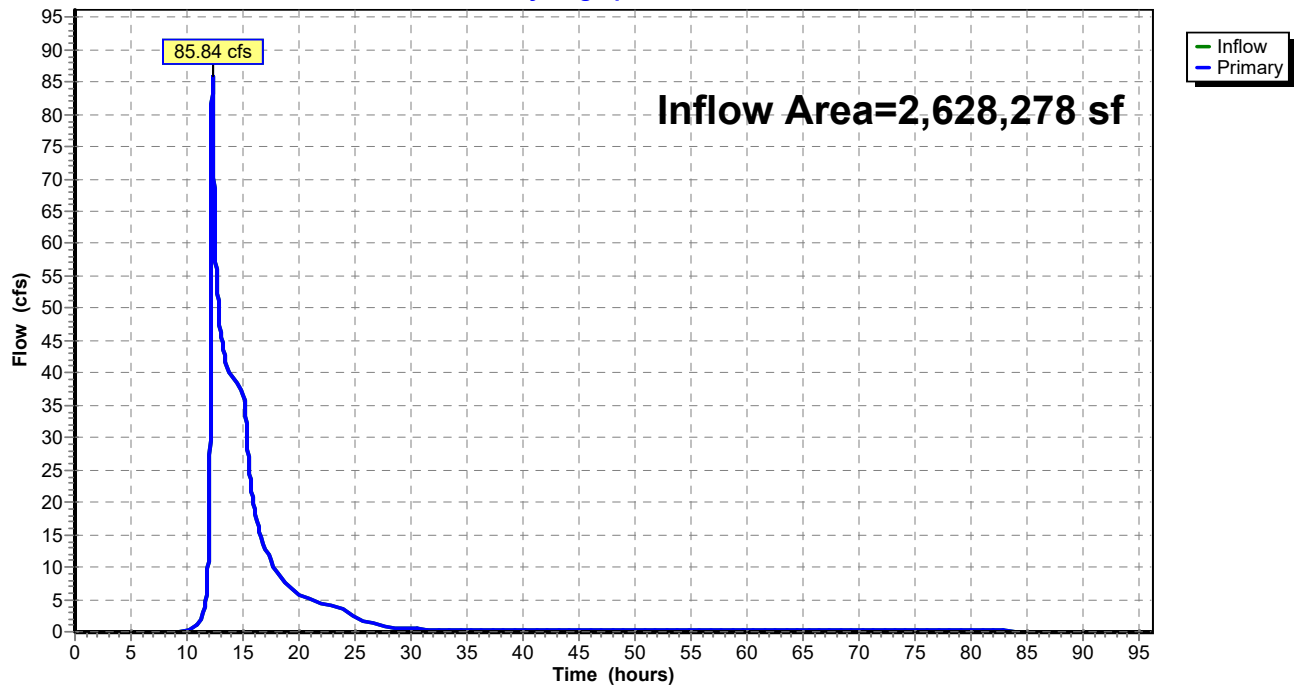
Summary for Link 44: Design Point B

Inflow Area = 2,628,278 sf, 22.30% Impervious, Inflow Depth > 4.10" for 25-yr event
 Inflow = 85.84 cfs @ 12.27 hrs, Volume= 898,093 cf
 Primary = 85.84 cfs @ 12.27 hrs, Volume= 898,093 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 44: Design Point B

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment34: Post B0 (Offsite) Runoff Area=1,510,771 sf 32.24% Impervious Runoff Depth=5.81"
Flow Length=1,871' Tc=32.3 min CN=84 Runoff=150.90 cfs 731,166 cf

Pond 35: Offsite Pond B Peak Elev=386.31' Storage=324,023 cf Inflow=150.90 cfs 731,166 cf
36.0" Round Culvert n=0.025 L=158.0' S=0.0127 '/' Outflow=43.05 cfs 729,880 cf

Subcatchment36: Post B1 Runoff Area=110,105 sf 49.74% Impervious Runoff Depth=5.69"
Tc=6.0 min CN=83 Runoff=21.53 cfs 52,221 cf

Subcatchment37: Post B3 Runoff Area=127,555 sf 34.71% Impervious Runoff Depth=5.11"
Tc=6.0 min CN=78 Runoff=22.94 cfs 54,364 cf

Pond 38: Wet Pond (SWP-4) Peak Elev=378.98' Storage=291,163 cf Inflow=59.40 cfs 836,465 cf
Outflow=37.00 cfs 820,983 cf

Subcatchment39: Post B2 Runoff Area=133,020 sf 50.44% Impervious Runoff Depth=5.92"
Tc=6.0 min CN=85 Runoff=26.76 cfs 65,669 cf

Pond 40: DIV-3 Peak Elev=381.87' Inflow=26.76 cfs 65,669 cf
Primary=5.68 cfs 41,403 cf Secondary=21.62 cfs 24,265 cf Outflow=26.76 cfs 65,669 cf

Pond 41: INF-3 Peak Elev=381.18' Storage=11,473 cf Inflow=5.68 cfs 41,403 cf
Outflow=1.13 cfs 41,403 cf

Subcatchment42: Post B4 Runoff Area=879,847 sf 0.00% Impervious Runoff Depth=4.21"
Flow Length=675' Tc=15.1 min CN=70 Runoff=95.15 cfs 308,504 cf

Reach 43: Existing Stream B Avg. Flow Depth=1.68' Max Vel=10.46 fps Inflow=131.19 cfs 1,153,753 cf
n=0.040 L=1,360.0' S=0.0721 '/' Capacity=291.69 cfs Outflow=129.30 cfs 1,153,597 cf

Link 44: Design Point B Inflow=129.30 cfs 1,153,597 cf
Primary=129.30 cfs 1,153,597 cf

Total Runoff Area = 2,761,298 sf Runoff Volume = 1,211,925 cf Average Runoff Depth = 5.27"
76.34% Pervious = 2,108,111 sf 23.66% Impervious = 653,187 sf

N60 P1 Post-B 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 34: Post B0 (Offsite)

Runoff = 150.90 cfs @ 12.45 hrs, Volume= 731,166 cf, Depth= 5.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
487,056	98	Paved parking, HSG C
497,987	77	Woods, Good, HSG D
134,328	70	Woods, Good, HSG C
375,457	80	>75% Grass cover, Good, HSG D
15,943	74	>75% Grass cover, Good, HSG C
1,510,771	84	Weighted Average
1,023,715		67.76% Pervious Area
487,056		32.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.0300	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	848	0.0085	1.48		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	856	0.0093	2.78	3.06	Trap/Vee/Rect Channel Flow, Bot.W=3.00' D=0.33' Z= 1.0 '/' Top.W=3.66' n= 0.022 Earth, clean & straight
0.2	67	0.0150	6.66	64.08	Pipe Channel, 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.025 Corrugated metal
32.3	1,871	Total			

N60 P1 Post-B 3-17-20

Prepared by {enter your company name here}

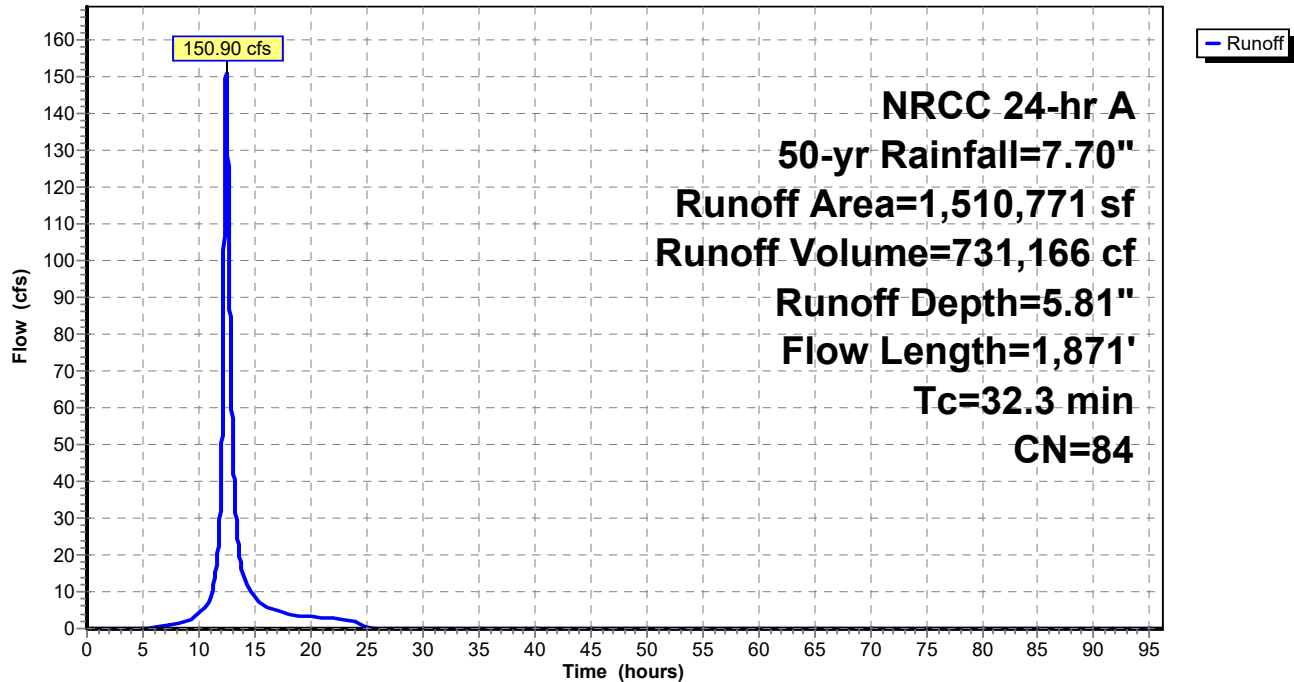
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NRCC 24-hr A 50-yr Rainfall=7.70"

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Subcatchment 34: Post B0 (Offsite)

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Pond 35: Offsite Pond B

Inflow Area = 1,510,771 sf, 32.24% Impervious, Inflow Depth = 5.81" for 50-yr event
 Inflow = 150.90 cfs @ 12.45 hrs, Volume= 731,166 cf
 Outflow = 43.05 cfs @ 13.12 hrs, Volume= 729,880 cf, Atten= 71%, Lag= 40.3 min
 Primary = 43.05 cfs @ 13.12 hrs, Volume= 729,880 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 386.31' @ 13.12 hrs Surf.Area= 98,584 sf Storage= 324,023 cf

Plug-Flow detention time= 131.2 min calculated for 729,804 cf (100% of inflow)
 Center-of-Mass det. time= 130.5 min (943.6 - 813.2)

Volume	Invert	Avail.Storage	Storage Description		
#1	382.00'	610,998 cf	Custom Stage Data (Irregular) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
382.00	36,540	1,177.0	0	0	36,540
384.00	81,987	1,579.0	115,507	115,507	124,748
386.00	96,790	1,622.0	178,572	294,080	136,159
388.00	108,795	1,657.0	205,468	499,548	145,863
389.00	114,127	1,679.0	111,450	610,998	151,937

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	36.0" Round Culvert L= 158.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.00' S= 0.0127 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 7.07 sf

Primary OutFlow Max=43.05 cfs @ 13.12 hrs HW=386.31' TW=378.38' (Dynamic Tailwater)
 ↑**1=Culvert** (Barrel Controls 43.05 cfs @ 6.09 fps)

N60 P1 Post-B 3-17-20

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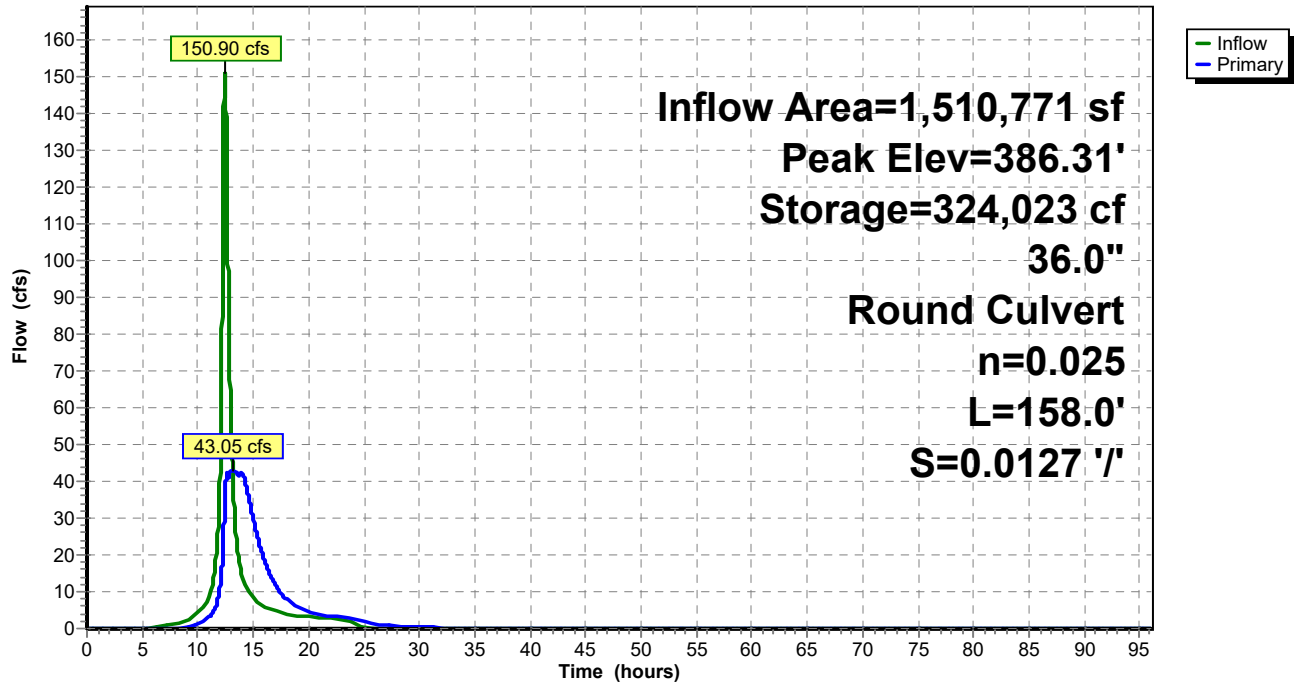
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NRCC 24-hr A 50-yr Rainfall=7.70"

Printed 3/24/2020

Pond 35: Offsite Pond B

Hydrograph



N60 P1 Post-B 3-17-20

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Summary for Subcatchment 36: Post B1

Runoff = 21.53 cfs @ 12.13 hrs, Volume= 52,221 cf, Depth= 5.69"

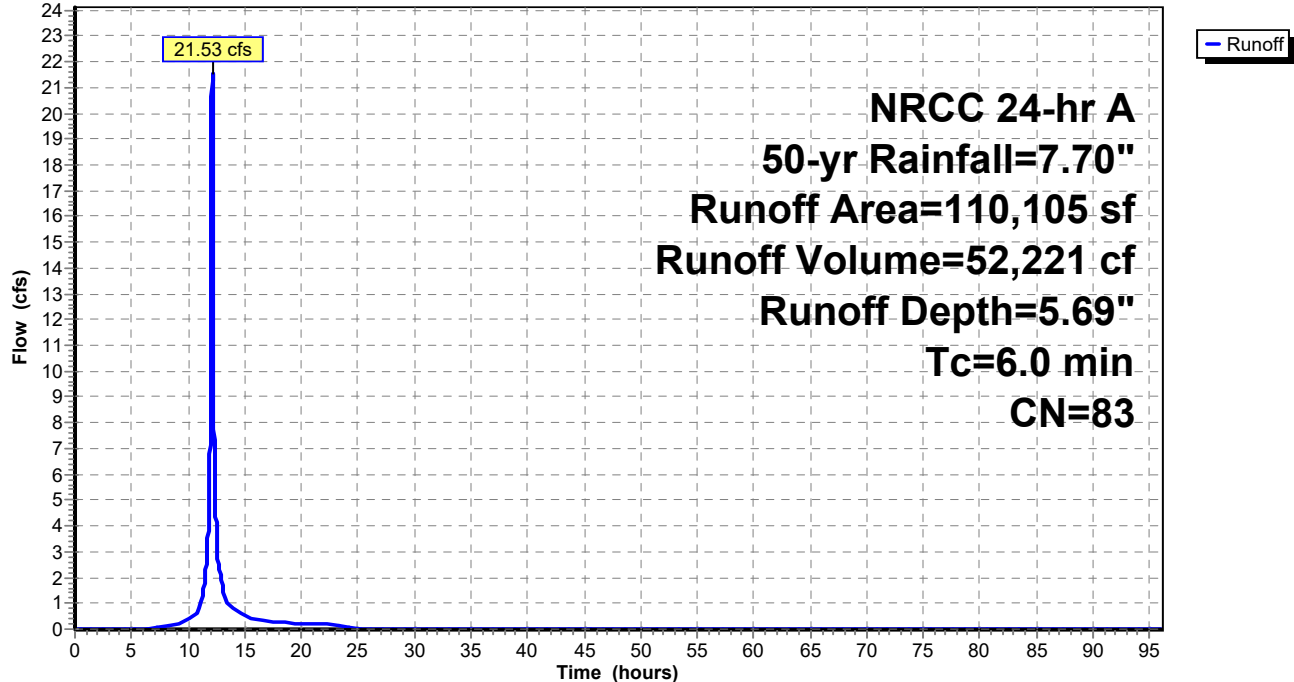
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
29,570	98	Paved parking, HSG C
38,521	74	>75% Grass cover, Good, HSG C
4,537	61	>75% Grass cover, Good, HSG B
12,282	55	Woods, Good, HSG B
25,195	98	Roofs, HSG C
110,105	83	Weighted Average
55,340		50.26% Pervious Area
54,765		49.74% Impervious Area

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

Subcatchment 36: Post B1

Hydrograph



N60 P1 Post-B 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 37: Post B3

Runoff = 22.94 cfs @ 12.13 hrs, Volume= 54,364 cf, Depth= 5.11"

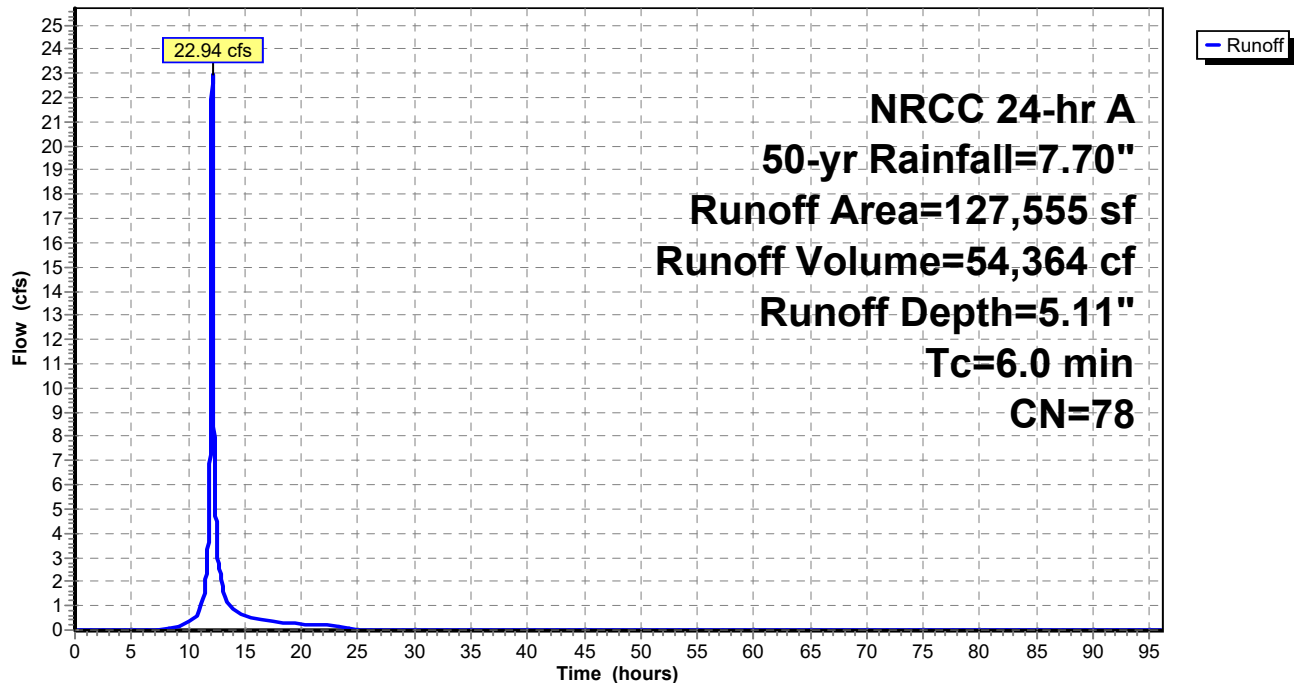
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
44,276	98	Water Surface, HSG C
22,184	74	>75% Grass cover, Good, HSG C
61,095	65	Brush, Good, HSG C
127,555	78	Weighted Average
83,279		65.29% Pervious Area
44,276		34.71% Impervious Area

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

Subcatchment 37: Post B3

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Pond 38: Wet Pond (SWP-4)

Inflow Area = 1,748,431 sf, 33.52% Impervious, Inflow Depth = 5.74" for 50-yr event
 Inflow = 59.40 cfs @ 12.13 hrs, Volume= 836,465 cf
 Outflow = 37.00 cfs @ 14.59 hrs, Volume= 820,983 cf, Atten= 38%, Lag= 147.0 min
 Primary = 37.00 cfs @ 14.59 hrs, Volume= 820,983 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Starting Elev= 376.00' Surf.Area= 88,186 sf Storage= 134,213 cf
 Peak Elev= 378.98' @ 14.59 hrs Surf.Area= 103,901 sf Storage= 291,163 cf (156,949 cf above start)

Plug-Flow detention time= 320.6 min calculated for 686,770 cf (82% of inflow)
 Center-of-Mass det. time= 164.1 min (1,089.0 - 924.8)

Volume	Invert	Avail.Storage	Storage Description
#1	372.00'	7,914 cf	Forebay (Irregular) Listed below (Recalc)
#2	372.00'	121,847 cf	Permanent Pool (Irregular) Listed below (Recalc)
#3	375.90'	259,334 cf	Additional Storage (Irregular) Listed below (Recalc)
		389,094 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
372.00	885	114.0	0	0	885
373.00	1,392	139.2	1,129	1,129	1,408
374.00	1,998	164.4	1,686	2,815	2,036
375.00	2,707	189.5	2,344	5,158	2,764
375.90	3,430	212.2	2,755	7,914	3,512

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
372.00	22,804	1,051.3	0	0	22,804
373.00	27,060	1,076.5	24,902	24,902	27,202
374.00	31,416	1,101.7	29,211	54,113	31,703
375.00	35,874	1,127.0	33,620	87,733	36,327
375.90	39,971	1,149.7	34,114	121,847	40,565

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
375.90	44,276	1,380.7	0	0	44,276
377.00	50,030	1,294.2	51,836	51,836	62,747
378.00	55,257	1,319.4	52,622	104,458	68,149
379.00	60,586	1,344.7	57,901	162,359	73,675
380.00	66,015	1,370.0	63,281	225,640	79,307
380.50	68,768	1,382.6	33,693	259,334	82,151

Device	Routing	Invert	Outlet Devices
#1	Primary	372.00'	24.0" Round Culvert L= 227.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 372.00' / 347.00' S= 0.1101 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	376.00'	3.0" Vert. Orifice/Grate C= 0.600

N60 P1 Post-B 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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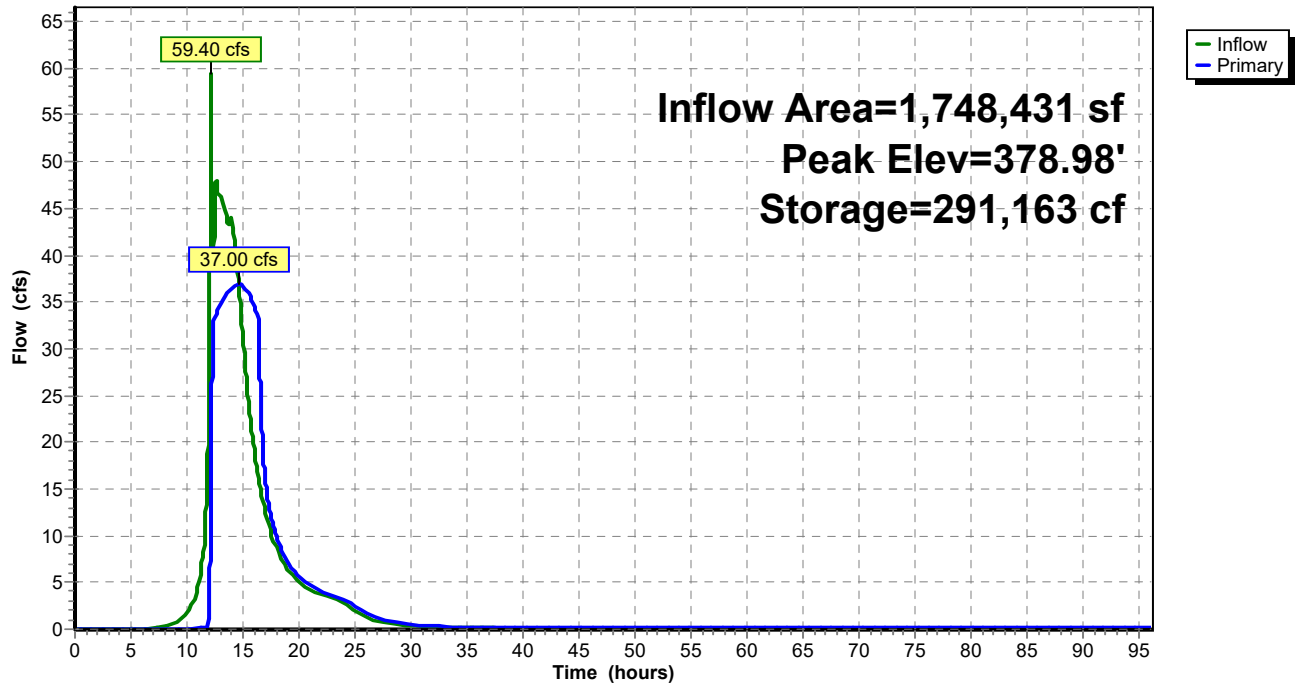
#3 Device 1 377.00' **36.0" x 48.0" Horiz. Orifice/Grate** C= 0.600
Limited to weir flow at low heads

Primary OutFlow Max=37.00 cfs @ 14.59 hrs HW=378.98' TW=312.93' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 37.00 cfs @ 11.78 fps)
- 2=Orifice/Grate (Passes < 0.40 cfs potential flow)
- 3=Orifice/Grate (Passes < 81.39 cfs potential flow)

Pond 38: Wet Pond (SWP-4)

Hydrograph



N60 P1 Post-B 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Subcatchment 39: Post B2

Runoff = 26.76 cfs @ 12.13 hrs, Volume= 65,669 cf, Depth= 5.92"

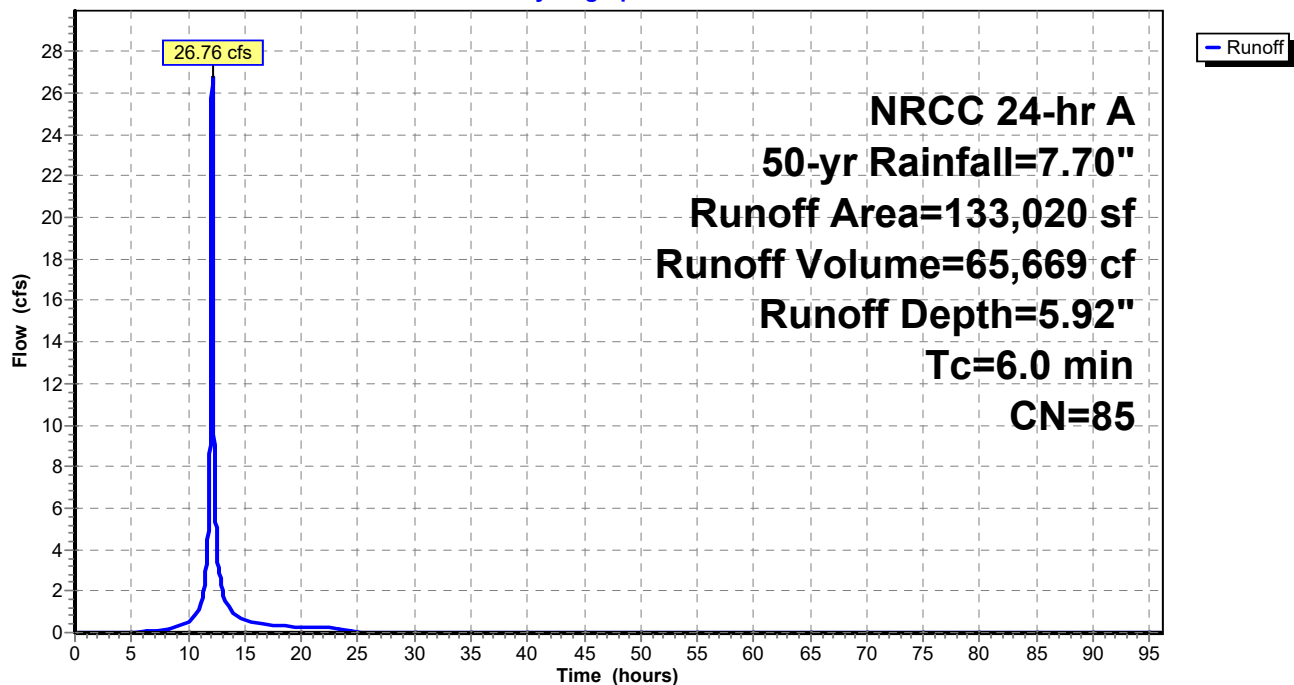
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
67,090	98	Paved parking, HSG C
40,460	74	>75% Grass cover, Good, HSG C
7,690	61	>75% Grass cover, Good, HSG B
17,780	70	Woods, Good, HSG C
133,020	85	Weighted Average
65,930		49.56% Pervious Area
67,090		50.44% Impervious Area

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

Subcatchment 39: Post B2

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Pond 40: DIV-3

Inflow Area = 133,020 sf, 50.44% Impervious, Inflow Depth = 5.92" for 50-yr event
 Inflow = 26.76 cfs @ 12.13 hrs, Volume= 65,669 cf
 Outflow = 26.76 cfs @ 12.13 hrs, Volume= 65,669 cf, Atten= 0%, Lag= 0.0 min
 Primary = 5.68 cfs @ 11.82 hrs, Volume= 41,403 cf
 Secondary = 21.62 cfs @ 12.13 hrs, Volume= 24,265 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 381.87' @ 12.13 hrs

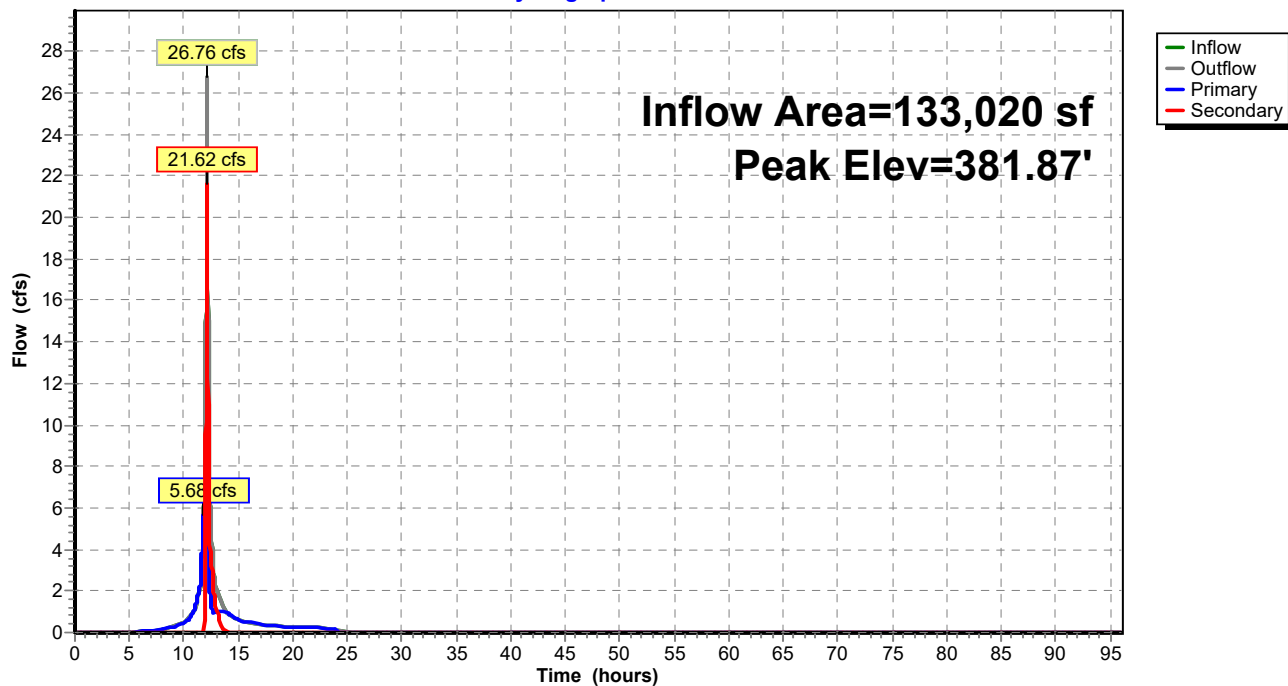
Flood Elev= 386.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	378.00'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 378.00' / 378.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	378.00'	24.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 378.00' / 377.00' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	381.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.61 cfs @ 11.82 hrs HW=381.02' TW=378.81' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 5.61 cfs @ 7.15 fps)**Secondary OutFlow** Max=21.59 cfs @ 12.13 hrs HW=381.87' TW=313.38' (Dynamic Tailwater)↑ **2=Culvert** (Passes 21.59 cfs of 25.64 cfs potential flow)↑ **3=Broad-Crested Rectangular Weir** (Weir Controls 21.59 cfs @ 3.09 fps)

Pond 40: DIV-3

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Pond 41: INF-3

Inflow Area = 133,020 sf, 50.44% Impervious, Inflow Depth = 3.74" for 50-yr event
 Inflow = 5.68 cfs @ 11.82 hrs, Volume= 41,403 cf
 Outflow = 1.13 cfs @ 11.09 hrs, Volume= 41,403 cf, Atten= 80%, Lag= 0.0 min
 Discarded = 1.13 cfs @ 11.09 hrs, Volume= 41,403 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 381.18' @ 12.57 hrs Surf.Area= 4,883 sf Storage= 11,473 cf

Plug-Flow detention time= 78.3 min calculated for 41,399 cf (100% of inflow)
 Center-of-Mass det. time= 78.3 min (893.4 - 815.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	377.50'	4,711 cf	45.00'W x 108.50'L x 3.88'H Field A 18,920 cf Overall - 7,142 cf Embedded = 11,778 cf x 40.0% Voids
#2A	378.00'	7,142 cf	Cultec R-330XLHD x 135 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 9 rows
		11,853 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	377.50'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.10'

Discarded OutFlow Max=1.13 cfs @ 11.09 hrs HW=377.62' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 1.13 cfs)

N60 P1 Post-B 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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Pond 41: INF-3 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 9 rows

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

15 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 106.50' Row Length +12.0" End Stone x 2 = 108.50' Base Length

9 Rows x 52.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 45.00' Base Width

6.0" Base + 30.5" Chamber Height + 10.0" Cover = 3.88' Field Height

135 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 9 Rows = 7,141.8 cf Chamber Storage

18,919.7 cf Field - 7,141.8 cf Chambers = 11,777.9 cf Stone x 40.0% Voids = 4,711.2 cf Stone Storage

Chamber Storage + Stone Storage = 11,852.9 cf = 0.272 af

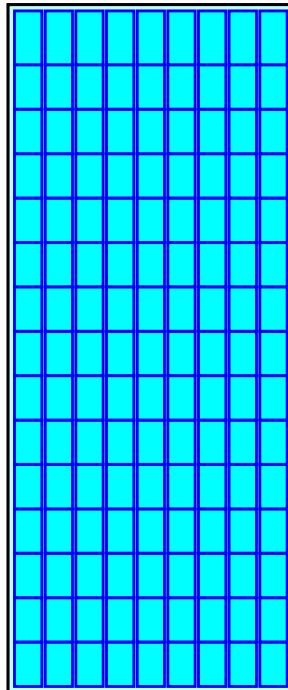
Overall Storage Efficiency = 62.6%

Overall System Size = 108.50' x 45.00' x 3.88'

135 Chambers

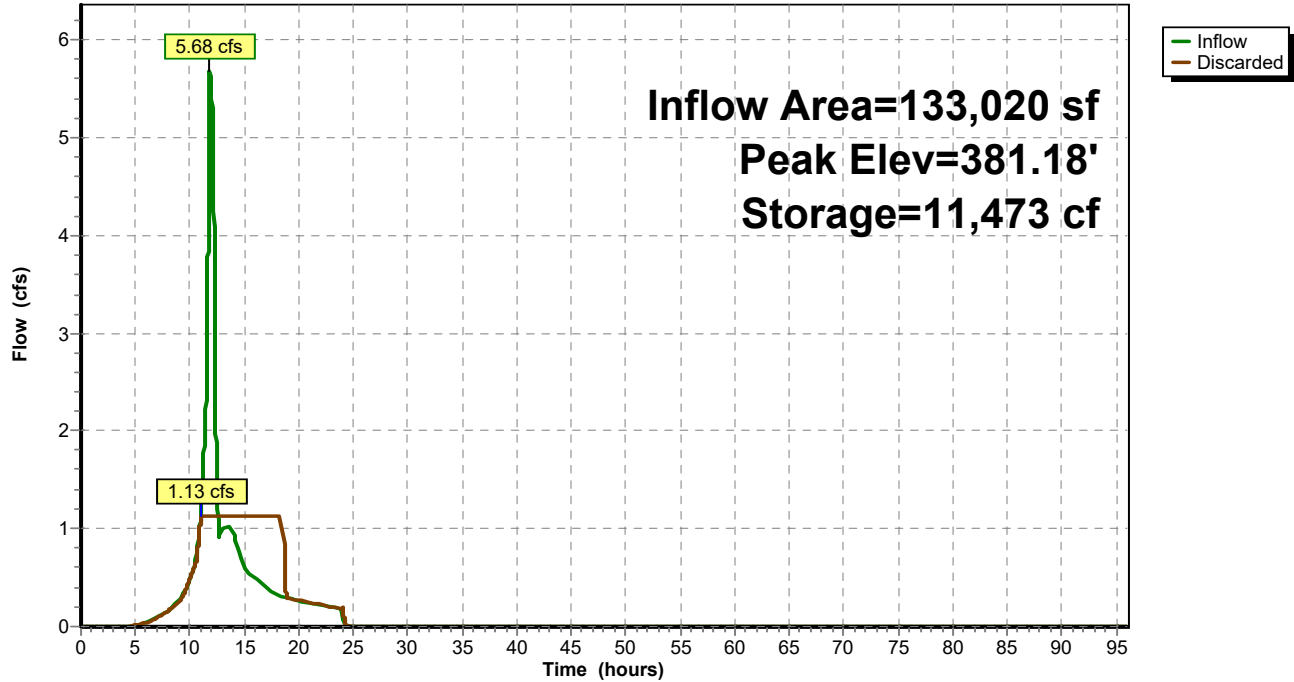
700.7 cy Field

436.2 cy Stone



Pond 41: INF-3

Hydrograph



N60 P1 Post-B 3-17-20

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Summary for Subcatchment 42: Post B4

Runoff = 95.15 cfs @ 12.23 hrs, Volume= 308,504 cf, Depth= 4.21"

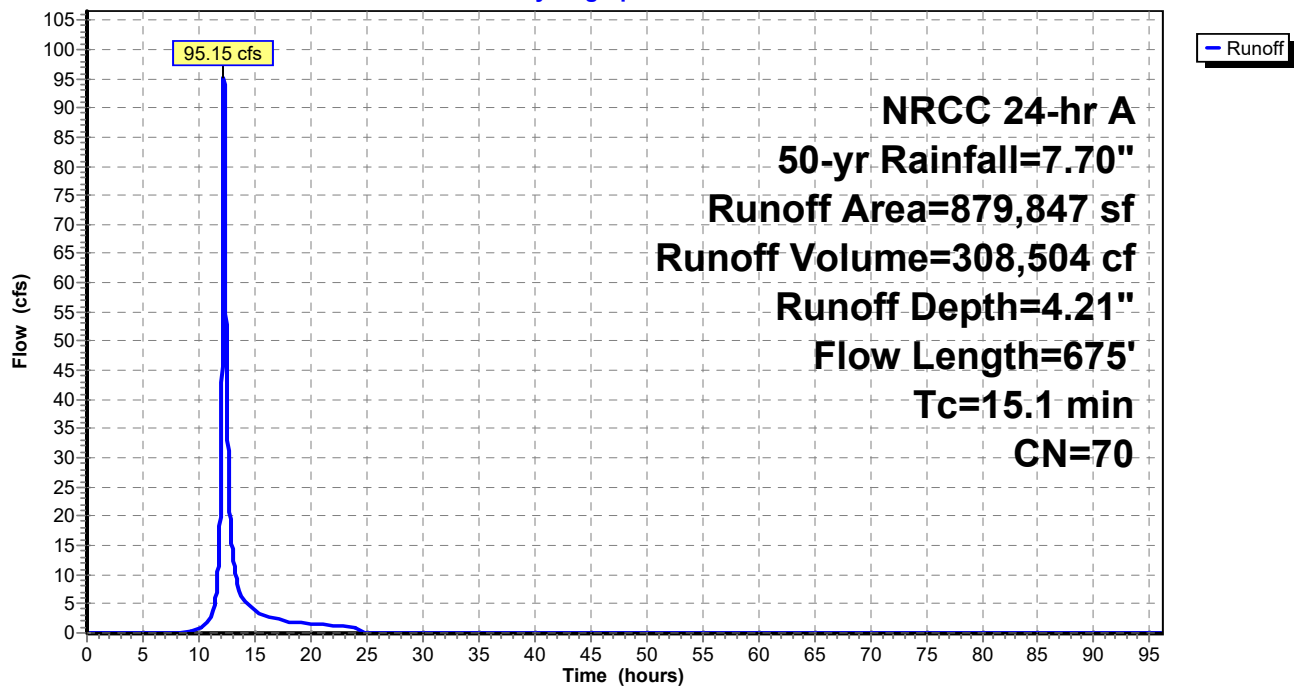
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 50-yr Rainfall=7.70"

Area (sf)	CN	Description
19,672	61	>75% Grass cover, Good, HSG B
13,245	74	>75% Grass cover, Good, HSG C
16,422	55	Woods, Good, HSG B
810,443	70	Woods, Good, HSG C
20,065	70	Woods, Good, HSG C
879,847	70	Weighted Average
879,847		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0600	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.9	575	0.0950	4.96		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	675	Total			

Subcatchment 42: Post B4

Hydrograph



N60 P1 Post-B 3-17-20

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NRCC 24-hr A 50-yr Rainfall=7.70"

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Summary for Reach 43: Existing Stream B

Inflow Area = 2,628,278 sf, 22.30% Impervious, Inflow Depth > 5.27" for 50-yr event
Inflow = 131.19 cfs @ 12.23 hrs, Volume= 1,153,753 cf
Outflow = 129.30 cfs @ 12.26 hrs, Volume= 1,153,597 cf, Atten= 1%, Lag= 1.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.46 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 1.92 fps, Avg. Travel Time= 11.8 min

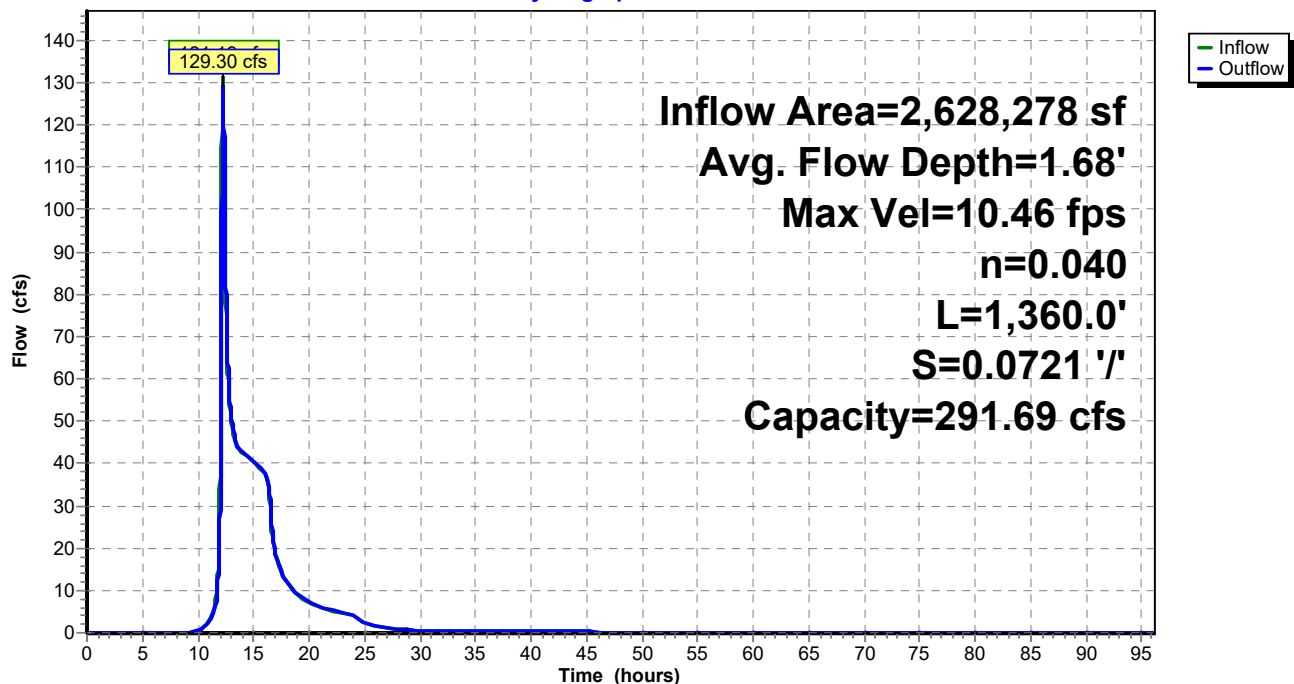
Peak Storage= 16,814 cf @ 12.26 hrs
Average Depth at Peak Storage= 1.68'
Bank-Full Depth= 2.50' Flow Area= 22.5 sf, Capacity= 291.69 cfs

4.00' x 2.50' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 ' ' Top Width= 14.00'
Length= 1,360.0' Slope= 0.0721 ' '
Inlet Invert= 312.00', Outlet Invert= 214.00'



Reach 43: Existing Stream B

Hydrograph



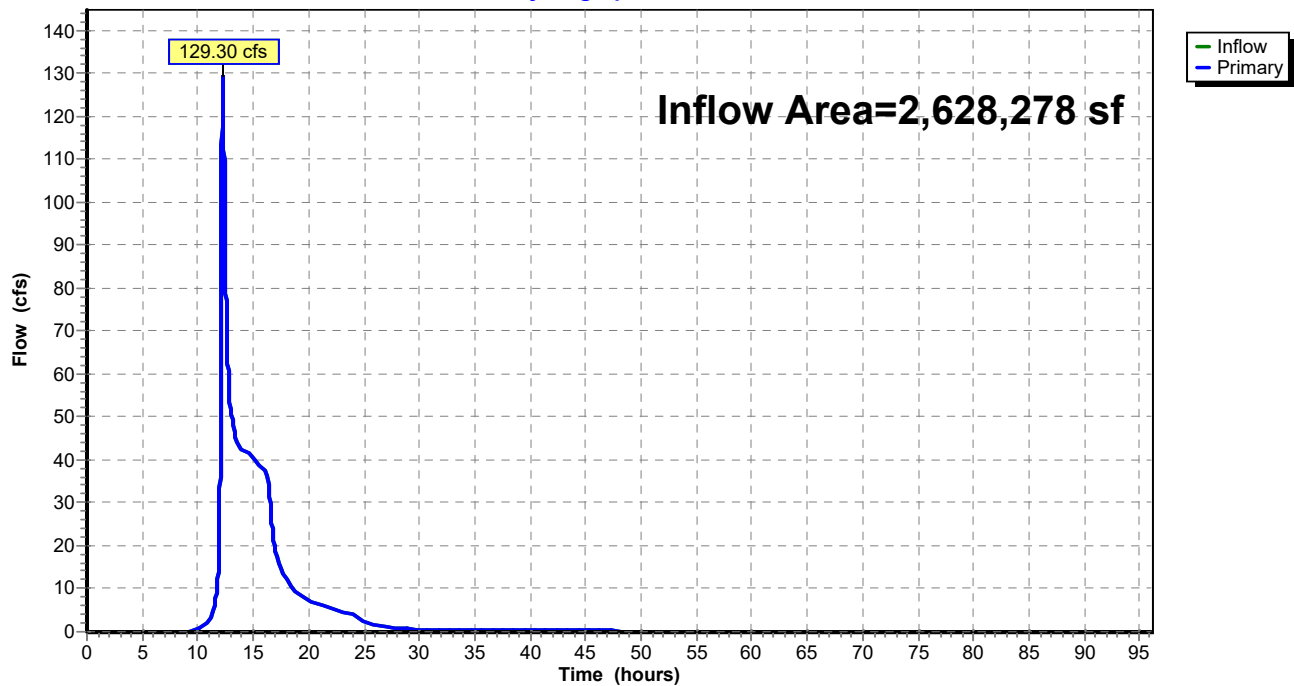
Summary for Link 44: Design Point B

Inflow Area = 2,628,278 sf, 22.30% Impervious, Inflow Depth > 5.27" for 50-yr event
 Inflow = 129.30 cfs @ 12.26 hrs, Volume= 1,153,597 cf
 Primary = 129.30 cfs @ 12.26 hrs, Volume= 1,153,597 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 44: Design Point B

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Time span=0.00-96.00 hrs, dt=0.01 hrs, 9601 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

Subcatchment34: Post B0 (Offsite) Runoff Area=1,510,771 sf 32.24% Impervious Runoff Depth=7.23"
Flow Length=1,871' Tc=32.3 min CN=84 Runoff=186.10 cfs 910,648 cf

Pond 35: Offsite Pond B Peak Elev=387.20' Storage=414,374 cf Inflow=186.10 cfs 910,648 cf
36.0" Round Culvert n=0.025 L=158.0' S=0.0127 '/' Outflow=48.51 cfs 909,356 cf

Subcatchment36: Post B1 Runoff Area=110,105 sf 49.74% Impervious Runoff Depth=7.11"
Tc=6.0 min CN=83 Runoff=26.53 cfs 65,237 cf

Subcatchment37: Post B3 Runoff Area=127,555 sf 34.71% Impervious Runoff Depth=6.49"
Tc=6.0 min CN=78 Runoff=28.76 cfs 68,997 cf

Pond 38: Wet Pond (SWP-4) Peak Elev=379.85' Storage=345,534 cf Inflow=75.07 cfs 1,043,589 cf
Outflow=39.59 cfs 1,027,982 cf

Subcatchment39: Post B2 Runoff Area=133,020 sf 50.44% Impervious Runoff Depth=7.36"
Tc=6.0 min CN=85 Runoff=32.77 cfs 81,545 cf

Pond 40: DIV-3 Peak Elev=382.37' Inflow=32.77 cfs 81,545 cf
Primary=5.43 cfs 46,297 cf Secondary=27.76 cfs 35,248 cf Outflow=32.77 cfs 81,545 cf

Pond 41: INF-3 Peak Elev=381.35' Storage=11,796 cf Inflow=5.43 cfs 46,297 cf
Outflow=1.13 cfs 46,297 cf

Subcatchment42: Post B4 Runoff Area=879,847 sf 0.00% Impervious Runoff Depth=5.49"
Flow Length=675' Tc=15.1 min CN=70 Runoff=123.91 cfs 402,814 cf

Reach 43: Existing Stream B Avg. Flow Depth=1.92' Max Vel=11.24 fps Inflow=170.89 cfs 1,466,044 cf
n=0.040 L=1,360.0' S=0.0721 '/' Capacity=291.69 cfs Outflow=169.27 cfs 1,465,888 cf

Link 44: Design Point B Inflow=169.27 cfs 1,465,888 cf
Primary=169.27 cfs 1,465,888 cf

Total Runoff Area = 2,761,298 sf Runoff Volume = 1,529,241 cf Average Runoff Depth = 6.65"
76.34% Pervious = 2,108,111 sf 23.66% Impervious = 653,187 sf

N60 P1 Post-B 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 34: Post B0 (Offsite)

Runoff = 186.10 cfs @ 12.45 hrs, Volume= 910,648 cf, Depth= 7.23"

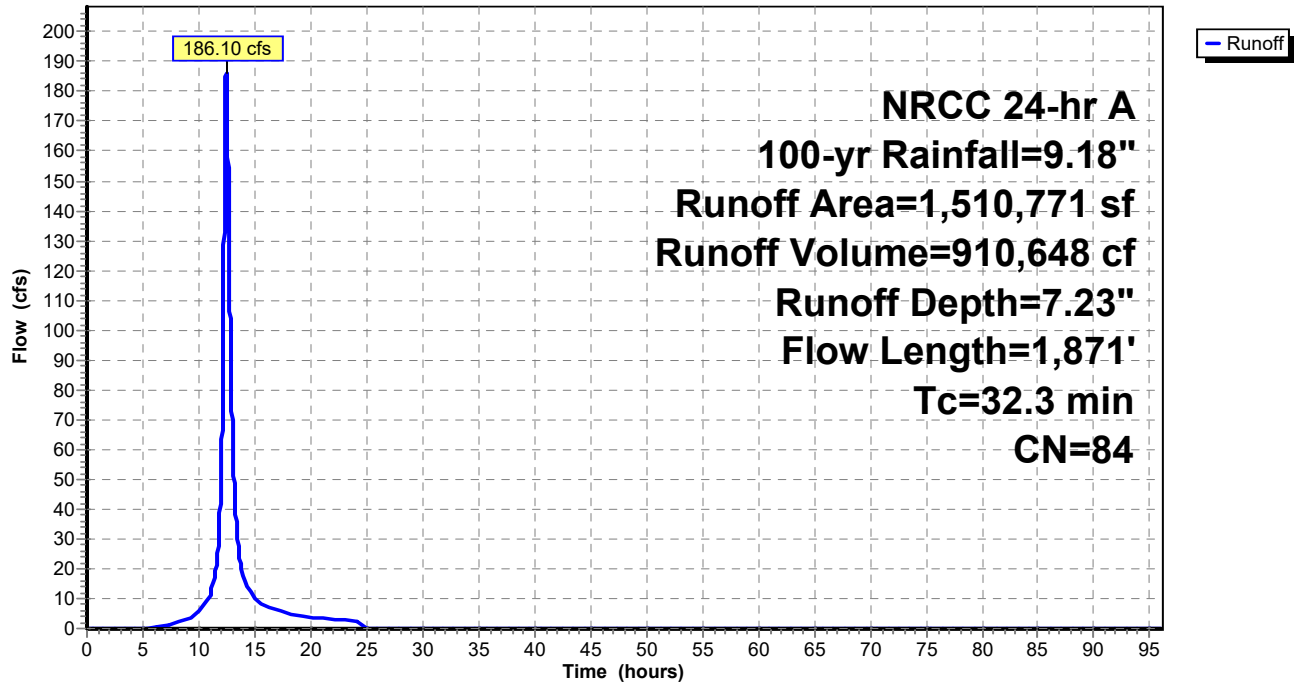
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
487,056	98	Paved parking, HSG C
497,987	77	Woods, Good, HSG D
134,328	70	Woods, Good, HSG C
375,457	80	>75% Grass cover, Good, HSG D
15,943	74	>75% Grass cover, Good, HSG C
1,510,771	84	Weighted Average
1,023,715		67.76% Pervious Area
487,056		32.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	100	0.0300	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
9.5	848	0.0085	1.48		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
5.1	856	0.0093	2.78	3.06	Trap/Vee/Rect Channel Flow, Bot.W=3.00' D=0.33' Z= 1.0 '/' Top.W=3.66' n= 0.022 Earth, clean & straight
0.2	67	0.0150	6.66	64.08	Pipe Channel, 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.025 Corrugated metal
32.3	1,871	Total			

Subcatchment 34: Post B0 (Offsite)

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 35: Offsite Pond B

Inflow Area = 1,510,771 sf, 32.24% Impervious, Inflow Depth = 7.23" for 100-yr event
 Inflow = 186.10 cfs @ 12.45 hrs, Volume= 910,648 cf
 Outflow = 48.51 cfs @ 13.17 hrs, Volume= 909,356 cf, Atten= 74%, Lag= 43.1 min
 Primary = 48.51 cfs @ 13.17 hrs, Volume= 909,356 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 387.20' @ 13.17 hrs Surf.Area= 103,903 sf Storage= 414,374 cf

Plug-Flow detention time= 134.0 min calculated for 909,261 cf (100% of inflow)
 Center-of-Mass det. time= 133.5 min (941.5 - 808.0)

Volume	Invert	Avail.Storage	Storage Description
#1	382.00'	610,998 cf	Custom Stage Data (Irregular) Listed below (Recalc)

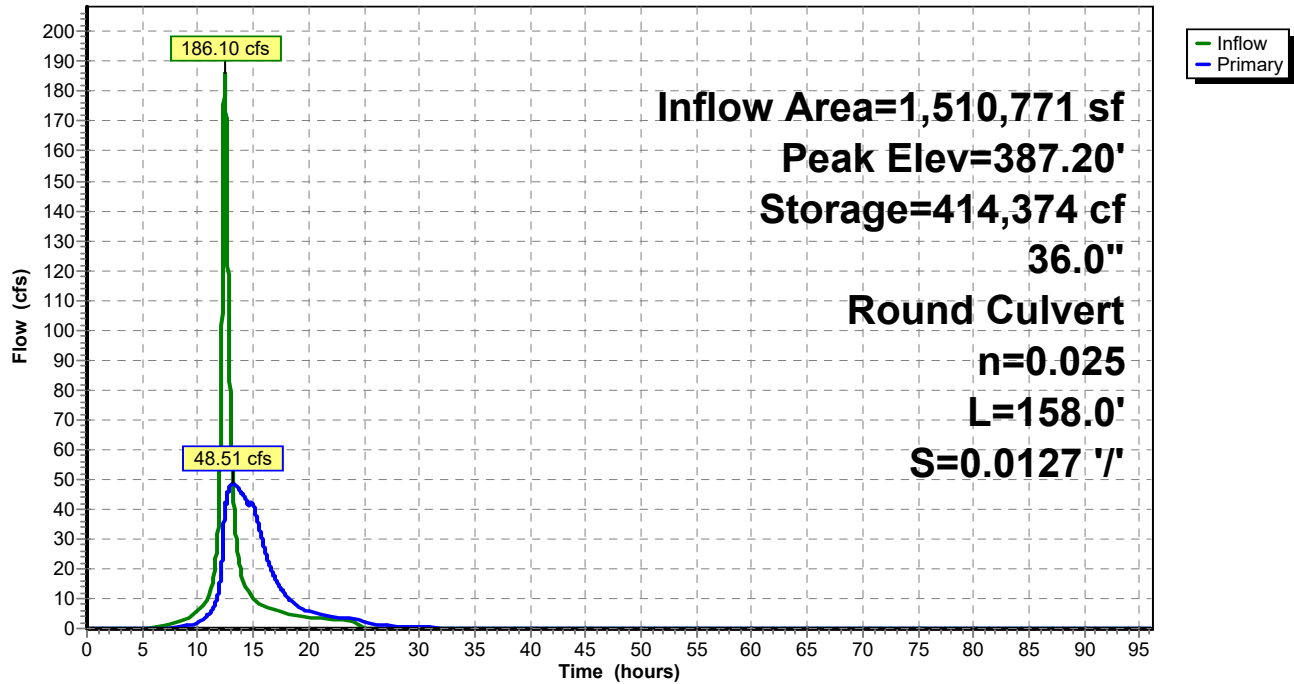
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
382.00	36,540	1,177.0	0	0	36,540
384.00	81,987	1,579.0	115,507	115,507	124,748
386.00	96,790	1,622.0	178,572	294,080	136,159
388.00	108,795	1,657.0	205,468	499,548	145,863
389.00	114,127	1,679.0	111,450	610,998	151,937

Device	Routing	Invert	Outlet Devices
#1	Primary	382.00'	36.0" Round Culvert L= 158.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 382.00' / 380.00' S= 0.0127 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 7.07 sf

Primary OutFlow Max=48.51 cfs @ 13.17 hrs HW=387.20' TW=378.96' (Dynamic Tailwater)
 ↑**1=Culvert** (Barrel Controls 48.51 cfs @ 6.86 fps)

Pond 35: Offsite Pond B

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 36: Post B1

Runoff = 26.53 cfs @ 12.13 hrs, Volume= 65,237 cf, Depth= 7.11"

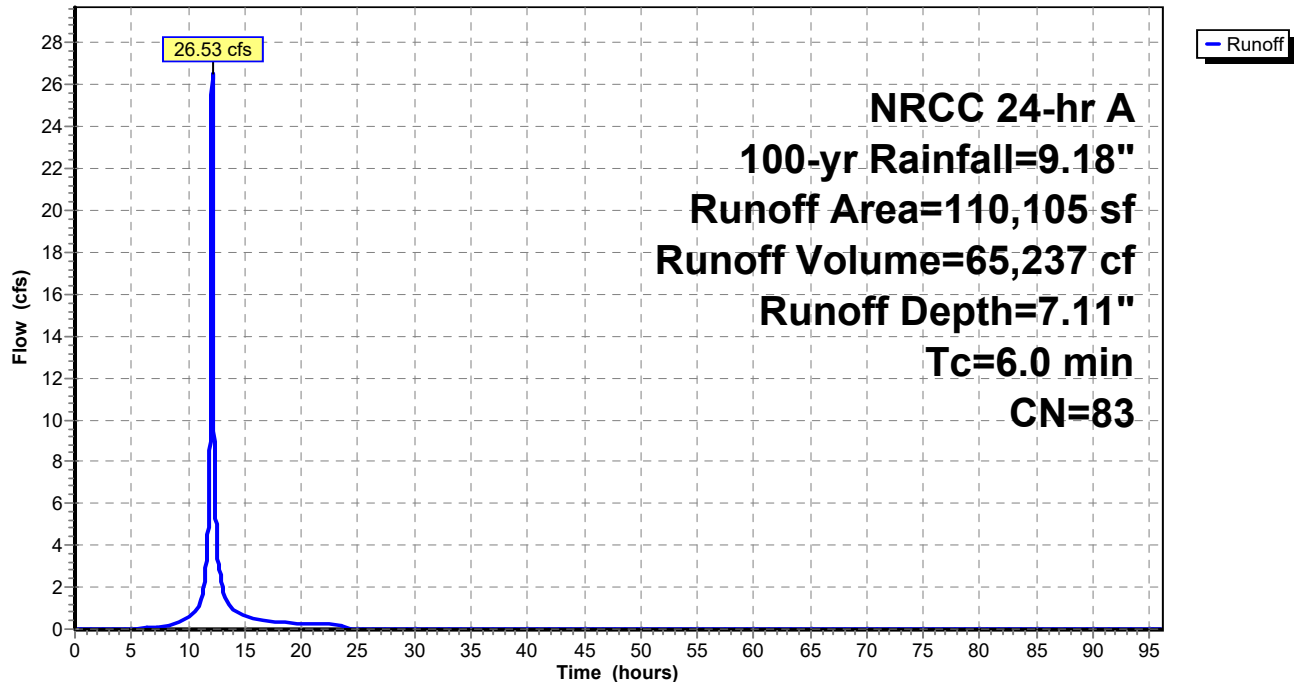
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
29,570	98	Paved parking, HSG C
38,521	74	>75% Grass cover, Good, HSG C
4,537	61	>75% Grass cover, Good, HSG B
12,282	55	Woods, Good, HSG B
25,195	98	Roofs, HSG C
110,105	83	Weighted Average
55,340		50.26% Pervious Area
54,765		49.74% Impervious Area

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

Subcatchment 36: Post B1

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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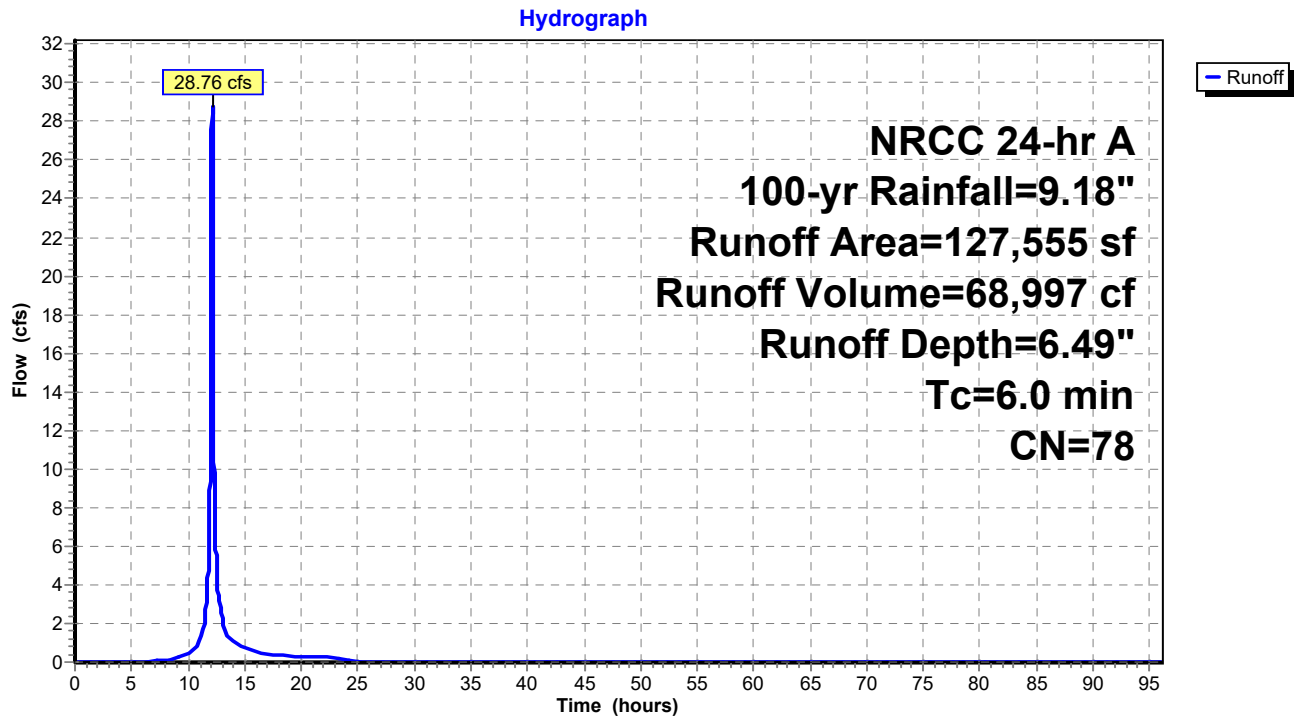
Summary for Subcatchment 37: Post B3

Runoff = 28.76 cfs @ 12.13 hrs, Volume= 68,997 cf, Depth= 6.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
44,276	98	Water Surface, HSG C
22,184	74	>75% Grass cover, Good, HSG C
61,095	65	Brush, Good, HSG C
127,555	78	Weighted Average
83,279		65.29% Pervious Area
44,276		34.71% Impervious Area

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

Subcatchment 37: Post B3

N60 P1 Post-B 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 38: Wet Pond (SWP-4)

Inflow Area = 1,748,431 sf, 33.52% Impervious, Inflow Depth = 7.16" for 100-yr event
 Inflow = 75.07 cfs @ 12.13 hrs, Volume= 1,043,589 cf
 Outflow = 39.59 cfs @ 15.21 hrs, Volume= 1,027,982 cf, Atten= 47%, Lag= 184.7 min
 Primary = 39.59 cfs @ 15.21 hrs, Volume= 1,027,982 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Starting Elev= 376.00' Surf.Area= 88,186 sf Storage= 134,213 cf
 Peak Elev= 379.85' @ 15.21 hrs Surf.Area= 108,585 sf Storage= 345,534 cf (211,320 cf above start)

Plug-Flow detention time= 278.2 min calculated for 893,769 cf (86% of inflow)
 Center-of-Mass det. time= 151.5 min (1,073.6 - 922.1)

Volume	Invert	Avail.Storage	Storage Description
#1	372.00'	7,914 cf	Forebay (Irregular) Listed below (Recalc)
#2	372.00'	121,847 cf	Permanent Pool (Irregular) Listed below (Recalc)
#3	375.90'	259,334 cf	Additional Storage (Irregular) Listed below (Recalc)
		389,094 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
372.00	885	114.0	0	0	885
373.00	1,392	139.2	1,129	1,129	1,408
374.00	1,998	164.4	1,686	2,815	2,036
375.00	2,707	189.5	2,344	5,158	2,764
375.90	3,430	212.2	2,755	7,914	3,512

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
372.00	22,804	1,051.3	0	0	22,804
373.00	27,060	1,076.5	24,902	24,902	27,202
374.00	31,416	1,101.7	29,211	54,113	31,703
375.00	35,874	1,127.0	33,620	87,733	36,327
375.90	39,971	1,149.7	34,114	121,847	40,565

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
375.90	44,276	1,380.7	0	0	44,276
377.00	50,030	1,294.2	51,836	51,836	62,747
378.00	55,257	1,319.4	52,622	104,458	68,149
379.00	60,586	1,344.7	57,901	162,359	73,675
380.00	66,015	1,370.0	63,281	225,640	79,307
380.50	68,768	1,382.6	33,693	259,334	82,151

Device	Routing	Invert	Outlet Devices
#1	Primary	372.00'	24.0" Round Culvert L= 227.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 372.00' / 347.00' S= 0.1101 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	376.00'	3.0" Vert. Orifice/Grate C= 0.600

N60 P1 Post-B 3-17-20

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NRCC 24-hr A 100-yr Rainfall=9.18"

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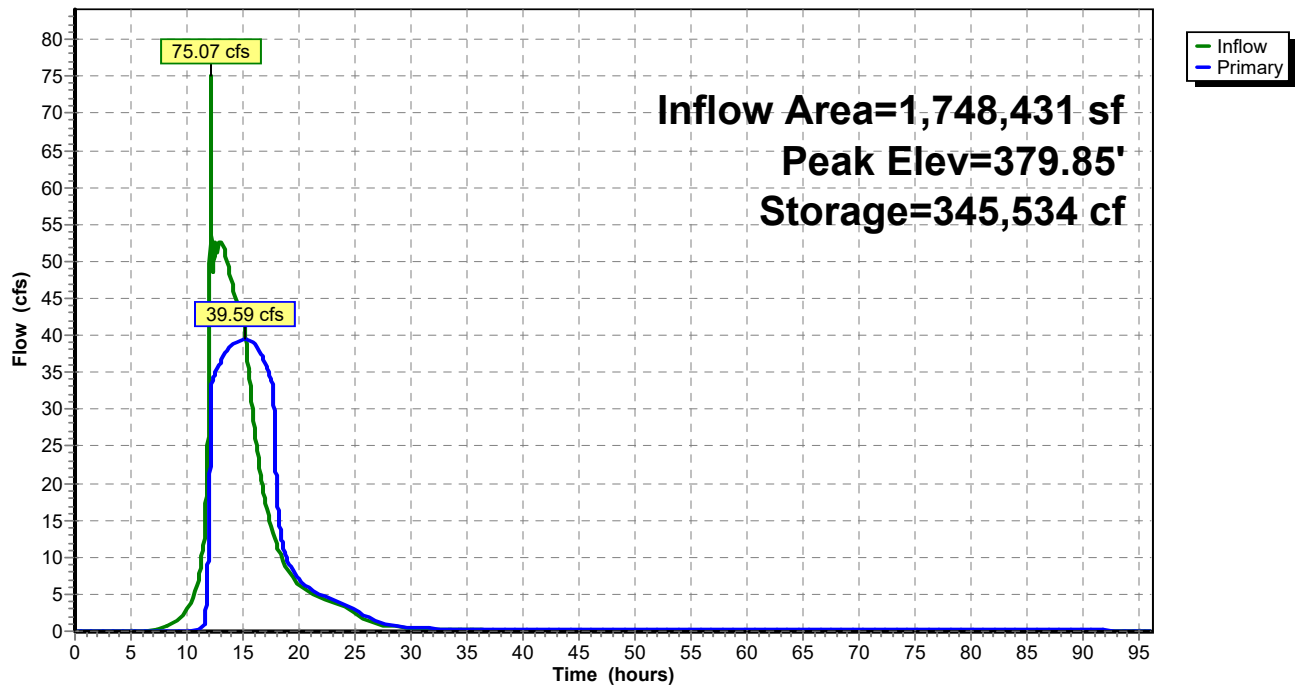
#3 Device 1 377.00' **36.0" x 48.0" Horiz. Orifice/Grate** C= 0.600
Limited to weir flow at low heads

Primary OutFlow Max=39.59 cfs @ 15.21 hrs HW=379.85' TW=312.96' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 39.59 cfs @ 12.60 fps)
- 2=Orifice/Grate (Passes < 0.46 cfs potential flow)
- 3=Orifice/Grate (Passes < 97.54 cfs potential flow)

Pond 38: Wet Pond (SWP-4)

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 39: Post B2

Runoff = 32.77 cfs @ 12.13 hrs, Volume= 81,545 cf, Depth= 7.36"

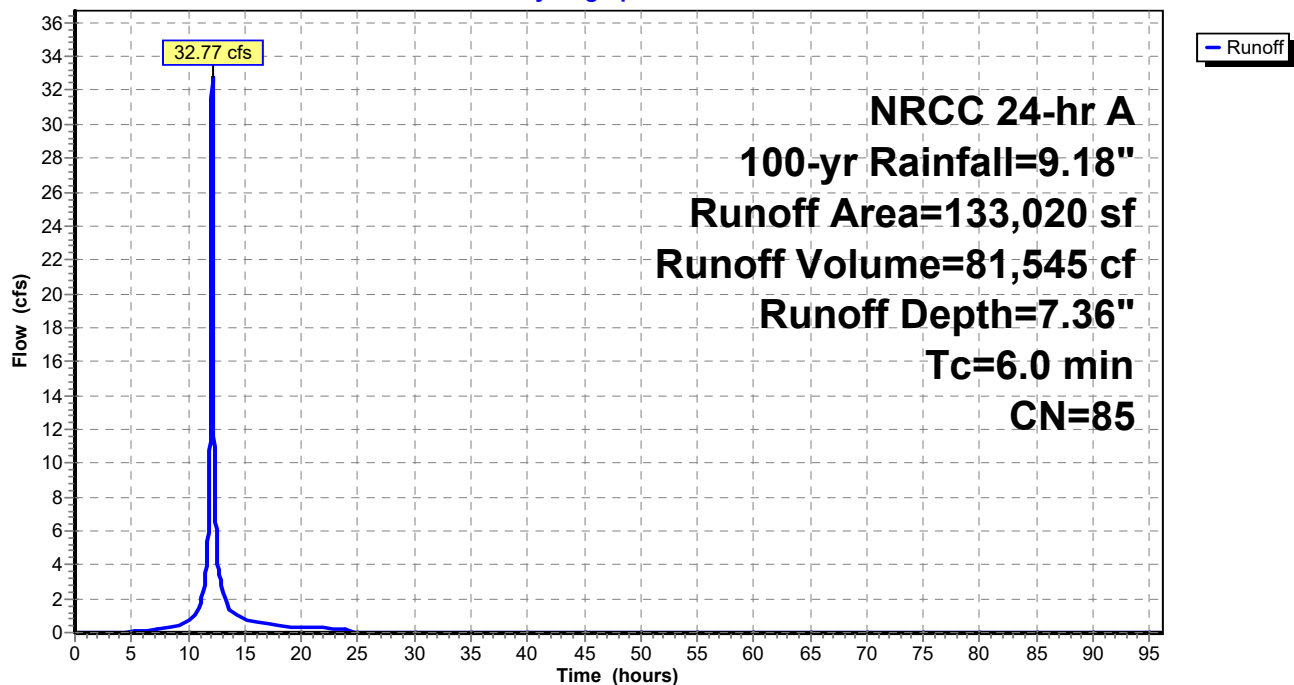
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
67,090	98	Paved parking, HSG C
40,460	74	>75% Grass cover, Good, HSG C
7,690	61	>75% Grass cover, Good, HSG B
17,780	70	Woods, Good, HSG C
133,020	85	Weighted Average
65,930		49.56% Pervious Area
67,090		50.44% Impervious Area

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

Subcatchment 39: Post B2

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 40: DIV-3

Inflow Area = 133,020 sf, 50.44% Impervious, Inflow Depth = 7.36" for 100-yr event
 Inflow = 32.77 cfs @ 12.13 hrs, Volume= 81,545 cf
 Outflow = 32.77 cfs @ 12.13 hrs, Volume= 81,545 cf, Atten= 0%, Lag= 0.0 min
 Primary = 5.43 cfs @ 11.75 hrs, Volume= 46,297 cf
 Secondary = 27.76 cfs @ 12.13 hrs, Volume= 35,248 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Peak Elev= 382.37' @ 12.13 hrs

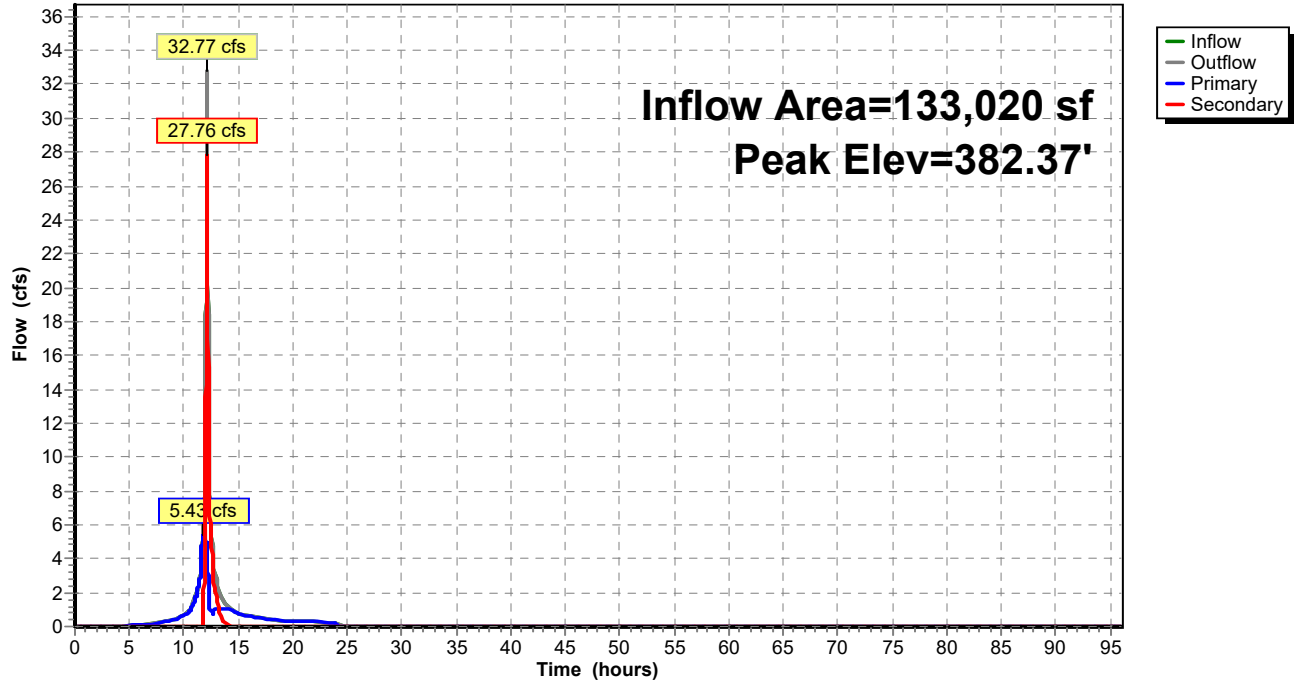
Flood Elev= 386.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	378.00'	12.0" Round Culvert L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 378.00' / 378.00' S= 0.0000 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	378.00'	24.0" Round Culvert L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 378.00' / 377.00' S= 0.0200 ' / ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#3	Device 2	381.00'	8.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=5.37 cfs @ 11.75 hrs HW=381.04' TW=379.02' (Dynamic Tailwater)↑ **1=Culvert** (Inlet Controls 5.37 cfs @ 6.84 fps)**Secondary OutFlow** Max=27.74 cfs @ 12.13 hrs HW=382.36' TW=313.69' (Dynamic Tailwater)↑ **2=Culvert** (Inlet Controls 27.74 cfs @ 8.83 fps)↑ **3=Broad-Crested Rectangular Weir** (Passes 27.74 cfs of 42.22 cfs potential flow)

Pond 40: DIV-3

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Pond 41: INF-3

Inflow Area = 133,020 sf, 50.44% Impervious, Inflow Depth = 4.18" for 100-yr event
 Inflow = 5.43 cfs @ 11.75 hrs, Volume= 46,297 cf
 Outflow = 1.13 cfs @ 10.85 hrs, Volume= 46,297 cf, Atten= 79%, Lag= 0.0 min
 Discarded = 1.13 cfs @ 10.85 hrs, Volume= 46,297 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
 Peak Elev= 381.35' @ 12.37 hrs Surf.Area= 4,883 sf Storage= 11,796 cf

Plug-Flow detention time= 80.5 min calculated for 46,293 cf (100% of inflow)
 Center-of-Mass det. time= 80.4 min (894.9 - 814.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	377.50'	4,711 cf	45.00'W x 108.50'L x 3.88'H Field A 18,920 cf Overall - 7,142 cf Embedded = 11,778 cf x 40.0% Voids
#2A	378.00'	7,142 cf	Cultec R-330XLHD x 135 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 9 rows
		11,853 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	377.50'	10.000 in/hr Exfiltration over Horizontal area Phase-In= 0.10'

Discarded OutFlow Max=1.13 cfs @ 10.85 hrs HW=377.62' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 1.13 cfs)

N60 P1 Post-B 3-17-20

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Pond 41: INF-3 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)

Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf

Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap

Row Length Adjustment= +1.50' x 7.45 sf x 9 rows

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

15 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 106.50' Row Length +12.0" End Stone x 2 = 108.50' Base Length

9 Rows x 52.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 45.00' Base Width

6.0" Base + 30.5" Chamber Height + 10.0" Cover = 3.88' Field Height

135 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 9 Rows = 7,141.8 cf Chamber Storage

18,919.7 cf Field - 7,141.8 cf Chambers = 11,777.9 cf Stone x 40.0% Voids = 4,711.2 cf Stone Storage

Chamber Storage + Stone Storage = 11,852.9 cf = 0.272 af

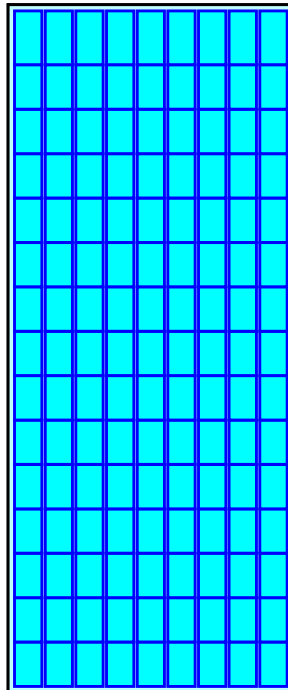
Overall Storage Efficiency = 62.6%

Overall System Size = 108.50' x 45.00' x 3.88'

135 Chambers

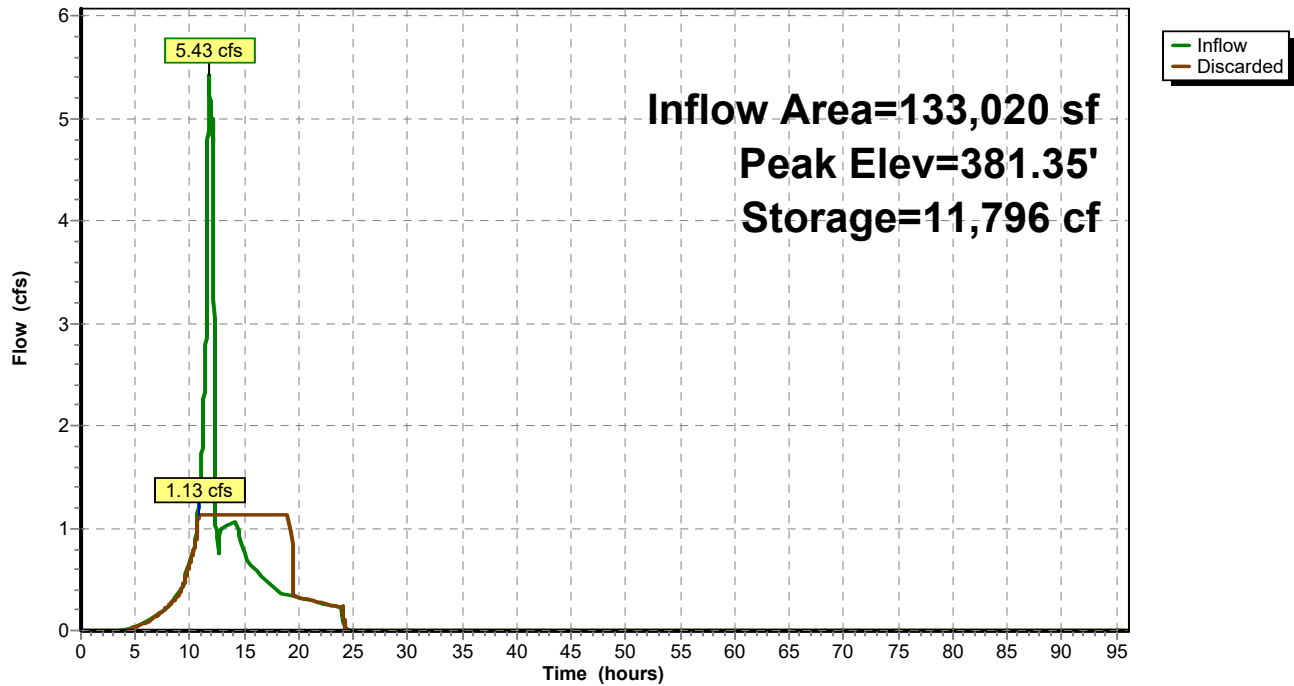
700.7 cy Field

436.2 cy Stone



Pond 41: INF-3

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Subcatchment 42: Post B4

Runoff = 123.91 cfs @ 12.23 hrs, Volume= 402,814 cf, Depth= 5.49"

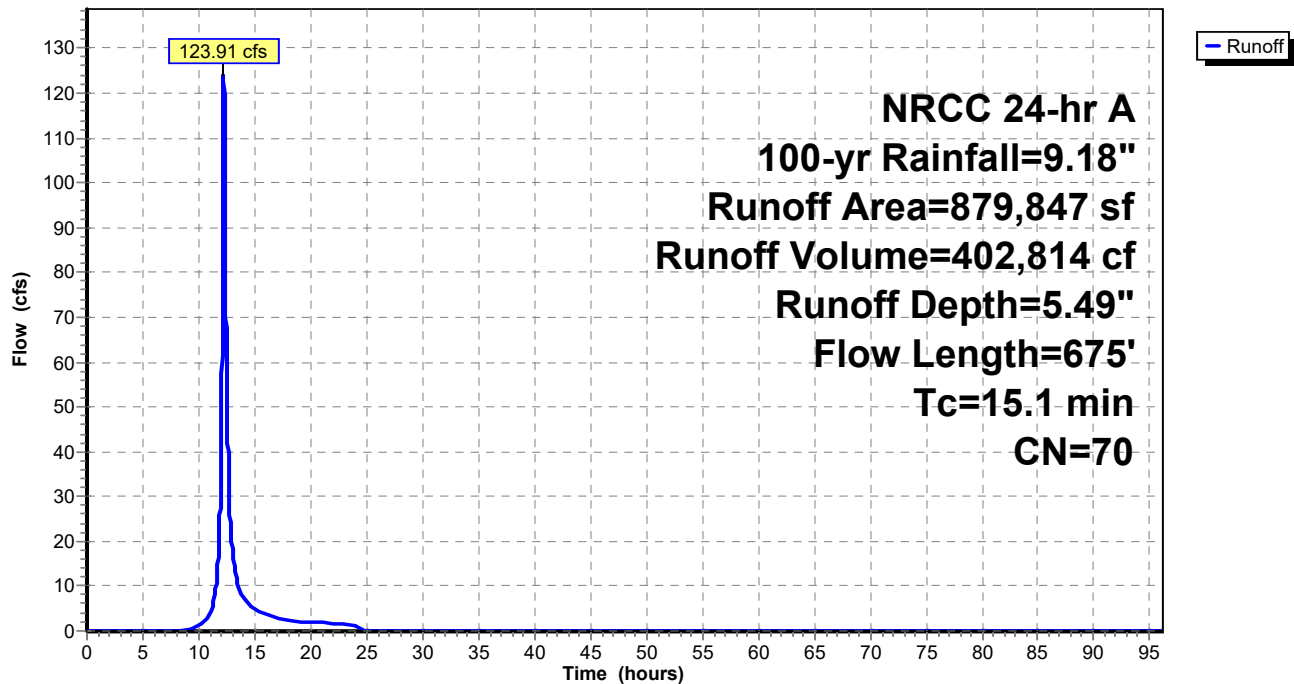
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
NRCC 24-hr A 100-yr Rainfall=9.18"

Area (sf)	CN	Description
19,672	61	>75% Grass cover, Good, HSG B
13,245	74	>75% Grass cover, Good, HSG C
16,422	55	Woods, Good, HSG B
810,443	70	Woods, Good, HSG C
20,065	70	Woods, Good, HSG C
879,847	70	Weighted Average
879,847		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0600	0.13		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.50"
1.9	575	0.0950	4.96		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	675	Total			

Subcatchment 42: Post B4

Hydrograph



N60 P1 Post-B 3-17-20

NRCC 24-hr A 100-yr Rainfall=9.18"

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Summary for Reach 43: Existing Stream B

Inflow Area = 2,628,278 sf, 22.30% Impervious, Inflow Depth > 6.69" for 100-yr event
Inflow = 170.89 cfs @ 12.22 hrs, Volume= 1,466,044 cf
Outflow = 169.27 cfs @ 12.24 hrs, Volume= 1,465,888 cf, Atten= 1%, Lag= 1.1 min

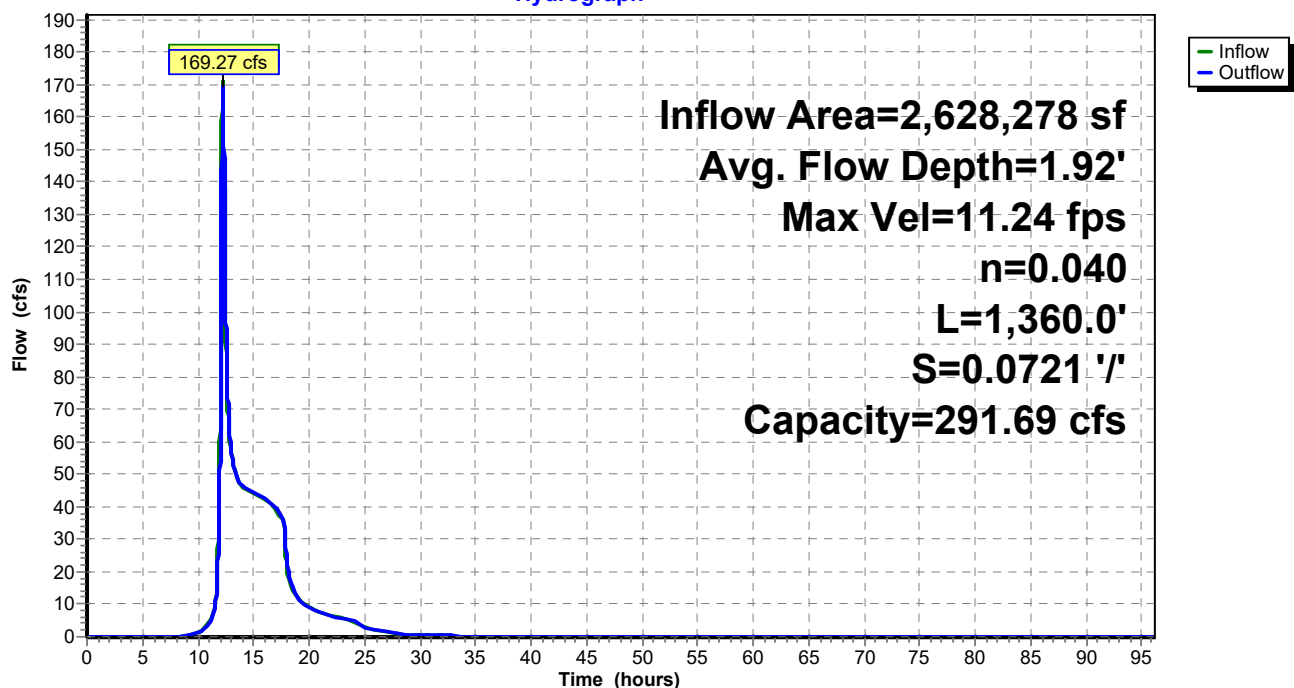
Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs
Max. Velocity= 11.24 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 2.02 fps, Avg. Travel Time= 11.2 min

Peak Storage= 20,484 cf @ 12.24 hrs
Average Depth at Peak Storage= 1.92'
Bank-Full Depth= 2.50' Flow Area= 22.5 sf, Capacity= 291.69 cfs

4.00' x 2.50' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 1,360.0' Slope= 0.0721 '/'
Inlet Invert= 312.00', Outlet Invert= 214.00'

**Reach 43: Existing Stream B**

Hydrograph



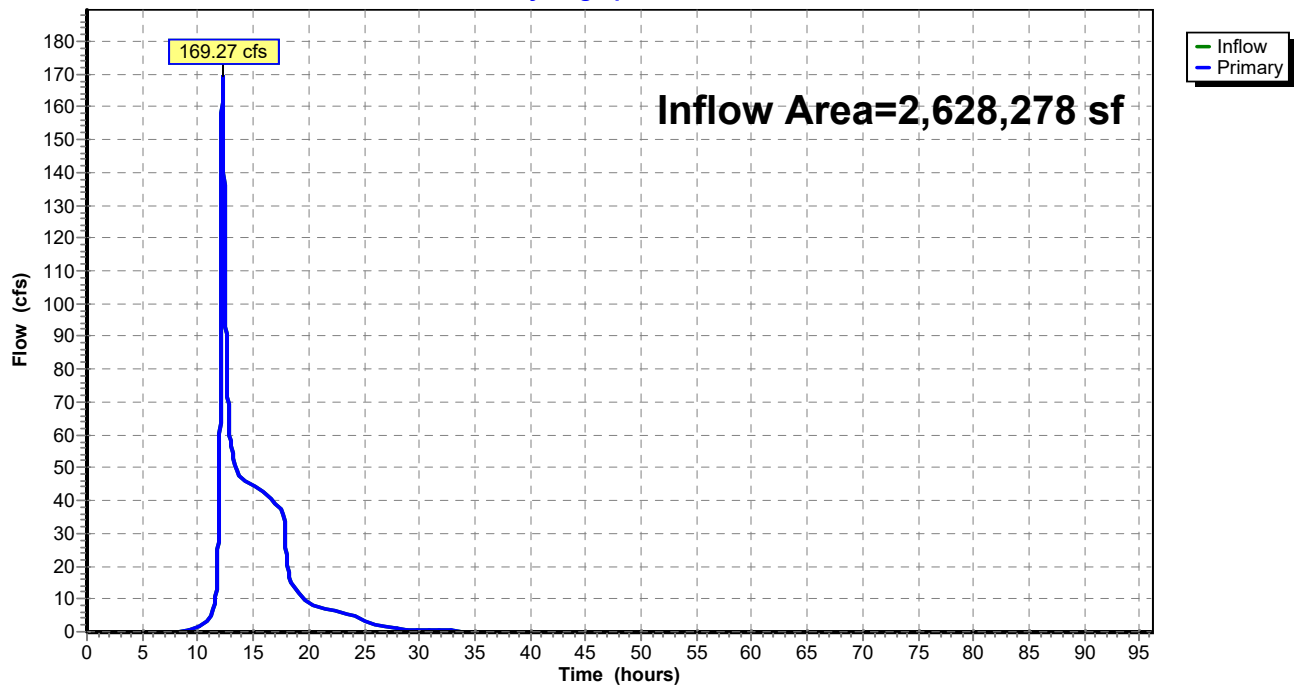
Summary for Link 44: Design Point B

Inflow Area = 2,628,278 sf, 22.30% Impervious, Inflow Depth > 6.69" for 100-yr event
 Inflow = 169.27 cfs @ 12.24 hrs, Volume= 1,465,888 cf
 Primary = 169.27 cfs @ 12.24 hrs, Volume= 1,465,888 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Link 44: Design Point B

Hydrograph





Appendix B:
Water Quality Volume &
Runoff Reduction Calculations

Project The North 60 - Phase 1**Water Quality Volume (WQv) Calculation**Basin ID: **Basin A****90% WQv:**

Subcatchment Area (A): 1,100,777 sq.ft.
Rainfall (P): 1.5 in.
Impervious Area 681,690 sq.ft.*
Percent Imperviousness(I): 61.93 %
 $R_v = .05 + .009(I)$ 0.60735
 $R_v =$ 0.6073527 **
 $WQv = (P) (R_v) (A) / 12$ 83,570 cu.ft.
or
1.9185 ac.ft.

** Minimum $R_v = 0.2$ **Area Reduced WQv:**

Subcatchment Area (A): 1,100,777 sq.ft.
Rainfall (P): 1.5 in.
Impervious Area 681,690 sq.ft.
Percent Imperviousness(I): 61.93 %
 $R_v = .05 + .009(I)$ 0.60735
 $R_v =$ 0.6073527 **
 $WQv = (P) (R_v) (A) / 12$ 83,570 cu.ft.
or
1.9185 ac.ft.

** Minimum $R_v = 0.2$



Project The North 60 - Phase 1

Specified Runoff Reduction Volume (S-RRv)

$$\text{RRv (in acre-feet of storage)} = [(P)(Rv)(Ai)] / 12$$

Basin ID: **Basin A**

HSG: **C**

P = Rainfall (inches)

1.5 in

Rv = 0.05+0.009(I) where I is 100% impervious

0.95

Aic = Total area of new impervious cover

681,690 ft²

S = Hydrologic Soil Group (HSG) Specific Reduction Factor (S)

0.30

HSG A = 0.55

HSG C = 0.30

HSG B = 0.40

HSG D = 0.20

Ai = (S)(Aic)

204,507 ft²

Ai = impervious cover targeted for runoff reduction

therefore:

RRv =

$$\begin{array}{ccccccc} [(P) & (Rv) & (Ai)] & & / & 12 \\ 1.5 & 0.95 & 204,507 & & / & 12 = \end{array}$$

24,285 cu-ft
0.5575 ac-ft



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Project The North 60 - Phase 1

Area Reduction Practices

Basin ID: **Basin A**

	<u>Total Area</u>	<u>Area of Impervious (AI)</u>
Original Drainage Area (DA):	1,100,777 sq.ft.	681,690 sq.ft.
Conservation of Natural Areas:	- 0 sq.ft.	- 0 sq.ft.
Riparian Buffers / Filter Strips:	- 0 sq.ft.	- 0 sq.ft.
Tree Planting / Tree Preservation:	- 0 sq.ft.	- 0 sq.ft.
Total Area Reduction:	= 0 sq.ft.	
Total AI Reduction:	=	0 sq.ft.
Remaining DA:	1,100,777 sq.ft.	-
Remaining AI:	-	681,690 sq.ft.
or	25.2704 Acres	15.6494 Acres



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Project The North 60 - Phase 1

Roof Top Disconnect

Basin ID: **Basin A**

Total Area of Roof To Be Disconnected:

Total Area:

0 sq.ft.

Recalculate WQv:

Subcatchment Area (A):	1,100,777 sq.ft.
Rainfall (P):	1.5 in.
Impervious Area	681,690 sq.ft.
Percent Imperviousness(I):	61.93 %
$R_v = .05 + .009(I)$	0.60735
$R_v =$	0.6073527
$WQ_v =$	83,570 cu.ft.
	or
	1.9185 ac.ft.



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Project The North 60 - Phase 1

Source Control Practices

Basin ID: Infiltrator System 1

HSG: C

Practice Type: I = Infiltration

(I)=Infiltration, (B)=Bioretention, (D)=Dry Swale, (V)=Vegetated Swale, (G)=Green Roof, (R)=Rain Garden,
(S)=Stormwater Planters, (C)=Cisterns/Rain Barrels, (P)=Porous Pavement

DA Tributary to Practice(s):

AI to Practice(s):

Total Area:

106,378 sq.ft.

91,392 sq.ft.

Subcatchment Area (A): 106,378 sq.ft.

Rainfall (P): 1.5 in.

Impervious Area 91,392 sq.ft.

Percent Imperviousness(I): 85.91 %

WQv 10,946 cu.ft.

or

0.2513 ac.ft.

Allowable Runoff Reduction Volume (RRv)

Practice Type: I = Infiltration

HSG: C

Allowable runoff reduction volume for Infiltration in C soil = 100% of WQv

10,946 x 1.00 = 10,946 cu.ft.

or

0.2513 ac.ft.



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Source Control Practices

Basin ID: Infiltrator System 2

HSG: C

Practice Type: I = Infiltration

(I)=Infiltration, (B)=Bioretention, (D)=Dry Swale, (V)=Vegetated Swale, (G)=Green Roof, (R)=Rain Garden,
(S)=Stormwater Planters, (C)=Cisterns/Rain Barrels, (P)=Porous Pavement

DA Tributary to Practice(s):

AI to Practice(s):

Total Area:

92,926 sq.ft.

92,926 sq.ft.

Subcatchment Area (A): 92,926 sq.ft.

Rainfall (P): 1.5 in.

Impervious Area 92,926 sq.ft.

Percent Imperviousness(I): 100.00 %

WQv 11,035 cu.ft.

or

0.2533 ac.ft.

Allowable Runoff Reduction Volume (RRv)

Practice Type: I = Infiltration

HSG: C

Allowable runoff reduction volume for Infiltration in C soil = 100% of WQv

11,035 x 1.00 = 11,035 cu.ft.

or

0.2533 ac.ft.



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Source Control Practices

Basin ID: Infiltration System 4

HSG: C

Practice Type: I = Infiltration

(I)=Infiltration, (B)=Bioretention, (D)=Dry Swale, (V)=Vegetated Swale, (G)=Green Roof, (R)=Rain Garden,
(S)=Stormwater Planters, (C)=Cisterns/Rain Barrels, (P)=Porous Pavement

DA Tributary to Practice(s):

AI to Practice(s):

Total Area:

33,825 sq.ft.

29,687 sq.ft.

Subcatchment Area (A): 33,825 sq.ft.

Rainfall (P): 1.5 in.

Impervious Area 29,687 sq.ft.

Percent Imperviousness(I): 87.77 %

WQv 3,551 cu.ft.

or

0.0815 ac.ft.

Allowable Runoff Reduction Volume (RRv)

Practice Type: I = Infiltration

HSG: C

Allowable runoff reduction volume for Infiltration in C soil = 100% of WQv

3,551 x 1.00 = 3,551 cu.ft.

or

0.0815 ac.ft.



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Source Control Practices

Basin ID: Infiltration Basin (SWP-3)

HSG: C

Practice Type: I = Infiltration

(I)=Infiltration, (B)=Bioretention, (D)=Dry Swale, (V)=Vegetated Swale, (G)=Green Roof, (R)=Rain Garden,
(S)=Stormwater Planters, (C)=Cisterns/Rain Barrels, (P)=Porous Pavement

DA Tributary to Practice(s):

AI to Practice(s):

Total Area:

488,414 sq.ft.

332,512 sq.ft.

Subcatchment Area (A): 488,414 sq.ft.

Rainfall (P): 1.5 in.

Impervious Area 332,512 sq.ft.

Percent Imperviousness(I): 68.08 %

WQv 40,460 cu.ft.

or

0.9288 ac.ft.

Allowable Runoff Reduction Volume (RRv)

Practice Type: I = Infiltration

HSG: C

Allowable runoff reduction volume for Infiltration in C soil = 100% of WQv

40,460 x 1.00 = 40,460 cu.ft.

or

0.9288 ac.ft.



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Source Control Practices

Basin ID: Infiltration Basin (SWP-2)

HSG: C

Practice Type: I = Infiltration

(I)=Infiltration, (B)=Bioretention, (D)=Dry Swale, (V)=Vegetated Swale, (G)=Green Roof, (R)=Rain Garden,
(S)=Stormwater Planters, (C)=Cisterns/Rain Barrels, (P)=Porous Pavement

DA Tributary to Practice(s):

AI to Practice(s):

Total Area:

147,528 sq.ft.

91,430 sq.ft.

Subcatchment Area (A): 147,528 sq.ft.

Rainfall (P): 1.5 in.

Impervious Area 91,430 sq.ft.

Percent Imperviousness(I): 61.97 %

WQv 11,208 cu.ft.

or

0.2573 ac.ft.

Allowable Runoff Reduction Volume (RRv)

Practice Type: I = Infiltration

HSG: C

Allowable runoff reduction volume for Infiltration in C soil = 100% of WQv

11,208 x 1.00 = 11,208 cu.ft.

or

0.2573 ac.ft.



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Project The North 60 - Phase 1

Total Runoff Reduction Volume

Basin ID: Post A

Total RRv provided:

				RRv
Original WQv - Area Reduced WQv:	83,570	-	83,570	= 0 cu.ft.
Roof Top Disconnection:				= 0 cu.ft.
Source Control WQv Treatment Practices:				
<u>Basin:</u>				
Infiltrator System 1		=		10,946 cu.ft.
Infiltrator System 2		=		11,035 cu.ft.
Infiltration System 4		=		3,551 cu.ft.
Infiltration Basin (SWP-3)		=		40,460 cu.ft.
Infiltration Basin (SWP-2)		=		11,208 cu.ft.

Total RRv provided: 77,201 cu.ft.
or
1.772 ac.ft.

Is RRv provided 1.772 ac. ft. $\geq$ Original WQv 1.919 ac. ft.

No

Is RRv provided 1.772 ac. ft. $\geq$ S-RRv (min. RRv) 0.558 ac. ft.

Yes

Total drainage area treated with runoff reduction / source control practices:

Area Reduction Practices:	0 sq.ft.	or	0.000 Acres
Source Control Practices:	233,129 sq.ft.	or	5.352 Acres
Total:			5.352 Acres

Project The North 60 - Phase 1**Water Quality Volume (WQv) Calculation**Basin ID: **Basin B****90% WQv:**

Subcatchment Area (A):	217,930 sq.ft.
Rainfall (P):	1.5 in.
Impervious Area	96,660 sq.ft.*
Percent Imperviousness(I):	44.35 %
$R_v = .05 + .009(I)$	0.44918
$R_v =$	0.4491832 **
$WQv = (P) (R_v) (A) / 12$	12,236 cu.ft.
	or
	0.2809 ac.ft.

** Minimum $R_v = 0.2$ **Area Reduced WQv:**

Subcatchment Area (A):	217,930 sq.ft.
Rainfall (P):	1.5 in.
Impervious Area	96,660 sq.ft.
Percent Imperviousness(I):	44.35 %
$R_v = .05 + .009(I)$	0.44918
$R_v =$	0.4491832 **
$WQv = (P) (R_v) (A) / 12$	12,236 cu.ft.
	or
	0.2809 ac.ft.

** Minimum $R_v = 0.2$



Project The North 60 - Phase 1

Specified Runoff Reduction Volume (S-RRv)

$$RRv \text{ (in acre-feet of storage)} = [(P)(Rv)(Ai)] / 12$$

Basin ID: **Basin B**

HSG: **C**

P = Rainfall (inches)

1.5 in

Rv = 0.05+0.009(I) where I is 100% impervious

0.95

Aic = Total area of new impervious cover

96,660 ft²

S = Hydrologic Soil Group (HSG) Specific Reduction Factor (S)

0.30

HSG A = 0.55

HSG C = 0.30

HSG B = 0.40

HSG D = 0.20

Ai = (S)(Aic)

28,998 ft²

Ai = impervious cover targeted for runoff reduction

therefore:

RRv =

$$\begin{array}{ccccccc} [(P) & (Rv) & (Ai)] & & / & 12 \\ 1.5 & 0.95 & 28,998 & & / & 12 = \end{array}$$

3,444 cu-ft
0.0791 ac-ft

Project The North 60 - Phase 1**Area Reduction Practices**Basin ID: **Basin B**

	<u>Total Area</u>	<u>Area of Impervious (AI)</u>
<i>Original Drainage Area (DA):</i>	217,930 sq.ft.	96,660 sq.ft.
Conservation of Natural Areas:	- 0 sq.ft.	- 0 sq.ft.
Riparian Buffers / Filter Strips:	- 0 sq.ft.	- 0 sq.ft.
Tree Planting / Tree Preservation:	- 0 sq.ft.	- 0 sq.ft.
Total Area Reduction:	= 0 sq.ft.	
Total AI Reduction:	=	0 sq.ft.
<i>Remaining DA:</i>	217,930 sq.ft.	-
<i>Remaining AI:</i>	-	96,660 sq.ft.
or	5.0030 Acres	2.2190 Acres



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Roof Top Disconnect

Basin ID: **Basin B**

Total Area of Roof To Be Disconnected:

Total Area:

0 sq.ft.

Recalculate WQv:

Subcatchment Area (A):	217,930 sq.ft.
Rainfall (P):	1.5 in.
Impervious Area	96,660 sq.ft.
Percent Imperviousness(I):	44.35 %
$R_v = .05 + .009(I)$	0.44918
$R_v =$	0.4491832
$WQ_v =$	12,236 cu.ft.
	or
	0.2809 ac.ft.



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Project The North 60 - Phase 1

Source Control Practices

Basin ID: **Infiltrator System 3**

HSG: C

Practice Type: I = Infiltration

(I)=Infiltration, (B)=Bioretention, (D)=Dry Swale, (V)=Vegetated Swale, (G)=Green Roof, (R)=Rain Garden,
(S)=Stormwater Planters, (C)=Cisterns/Rain Barrels, (P)=Porous Pavement

DA Tributary to Practice(s):

AI to Practice(s):

Total Area:

133,020 sq.ft.

67,090 sq.ft.

Subcatchment Area (A): 133,020 sq.ft.

Rainfall (P): 1.5 in.

Impervious Area 67,090 sq.ft.

Percent Imperviousness(I): 50.44 %

WQv 8,379 cu.ft.

or

0.1924 ac.ft.

Allowable Runoff Reduction Volume (RRv)

Practice Type: I = Infiltration HSG: C

Allowable runoff reduction volume for Infiltration in C soil = 100% of WQv

8,379 x 1.00 = **8,379 cu.ft.**

or

0.1924 ac.ft.



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Project The North 60 - Phase 1

Total Runoff Reduction Volume

Basin ID: **Basin B**

Total RRv provided:

				RRv
Original WQv - Area Reduced WQv:	12,236	-	12,236	= 0 cu.ft.
Roof Top Disconnection:				= 0 cu.ft.
Source Control WQv Treatment Practices:				
<u>Basin:</u>				
Infiltrator System 3				= 8,379 cu.ft.
				= cu.ft.
				= cu.ft.
				= cu.ft.

Total RRv provided: 8,379 cu.ft.
or
0.192 ac.ft.

Is RRv provided 0.192 ac. ft. $\geq$ Original WQv 0.281 ac. ft.

No

Is RRv provided 0.192 ac. ft. $\geq$ S-RRv (min. RRv) 0.079 ac. ft.

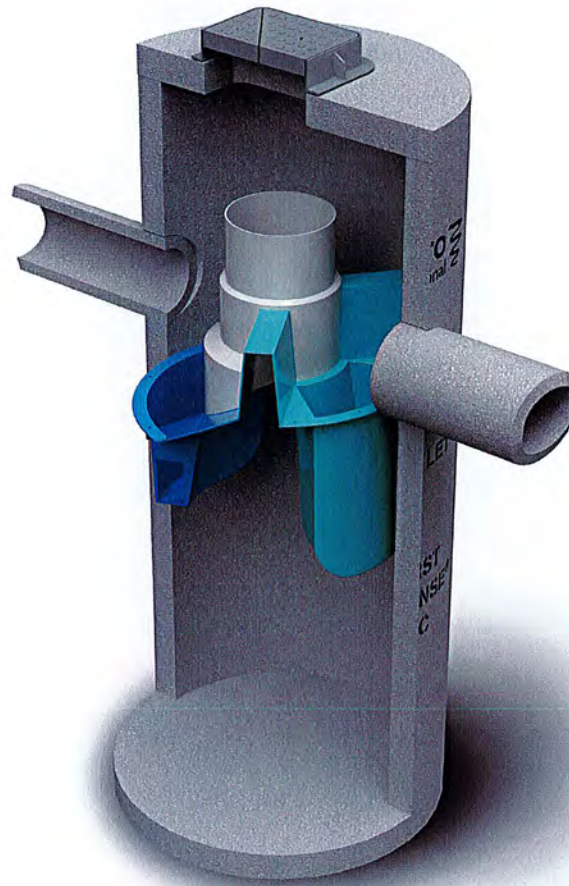
Yes

Total drainage area treated with runoff reduction / source control practices:

Area Reduction Practices:	0 sq.ft.	or	0.000 Acres
Source Control Practices:	133,020 sq.ft.	or	3.054 Acres
Total:			3.054 Acres



Appendix C:
First Defense Stormwater Treatment
Chamber Information



Operation and Maintenance Manual

First Defense® and First Defense® High Capacity

Vortex Separator for Stormwater Treatment

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I. First Defense® by Hydro International

Introduction

The First Defense® is an enhanced vortex separator that combines an effective and economical stormwater treatment chamber with an integral peak flow bypass. It efficiently removes total suspended solids (TSS), trash and hydrocarbons from stormwater runoff without washing out previously captured pollutants. The First Defense® is available in several model configurations (refer to Section II, Model Sizes & Configurations, page 4) to accommodate a wide range of pipe sizes, peak flows and depth constraints.

Operation

The First Defense® operates on simple fluid hydraulics. It is self-activating, has no moving parts, no external power requirement and is fabricated with durable non-corrosive components. No manual procedures are required to operate the unit and maintenance is limited to monitoring accumulations of stored pollutants and periodic clean-outs. The First Defense® has been designed to allow for easy and safe access for inspection, monitoring and clean-out procedures. Neither entry into the unit nor removal of the internal components is necessary for maintenance, thus safety concerns related to confined-space entry are avoided.

Pollutant Capture and Retention

The internal components of the First Defense® have been designed to optimize pollutant capture. Sediment is captured and retained in the base of the unit, while oil and floatables are stored on the water surface in the inner volume (Fig.1).

The pollutant storage volumes are isolated from the built-in bypass chamber to prevent washout during high-flow storm events. The sump of the First Defense® retains a standing water level between storm events. This ensures a quiescent flow regime at the onset of a storm, preventing resuspension and washout of pollutants captured during previous events.

Accessories such as oil absorbent pads are available for enhanced oil removal and storage. Due to the separation of the oil and floatable storage volume from the outlet, the potential for washout of stored pollutants between clean-outs is minimized.

Applications

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

Advantages

- Inlet options include surface grate or multiple inlet pipes
- Integral high capacity bypass conveys large peak flows without the need for "offline" arrangements using separate junction manholes
- Proven to prevent pollutant washout at up to 500% of its treatment flow
- Long flow path through the device ensures a long residence time within the treatment chamber, enhancing pollutant settling
- Delivered to site pre-assembled and ready for installation

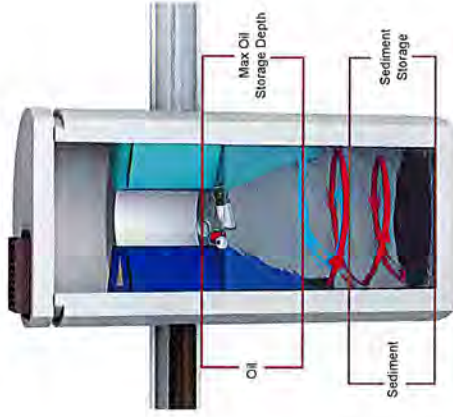


Fig 1 Pollutant storage volumes in the First Defense®.

II. Model Sizes & Configurations

The First Defense® inlet and internal bypass arrangements are available in several model sizes and configurations. The components of the First Defense®-4HC and First Defense®-6HC have modified geometries as to allow greater design flexibility needed to accommodate various site constraints.

All First Defense® models include the internal components that are designed to remove and retain total suspended solids (TSS), gross solids, floatable trash and hydrocarbons (Fig.2a - 2b). First Defense® model parameters and design criteria are shown in Table 1.

First Defense® Components

1. Built-In Bypass
2. Inlet Pipe
3. Inlet Chute
4. Floatables Draw-off Port
5. Outlet Pipe
6. Floatables Storage
7. Sediment Storage
8. Inlet Grate or Cover

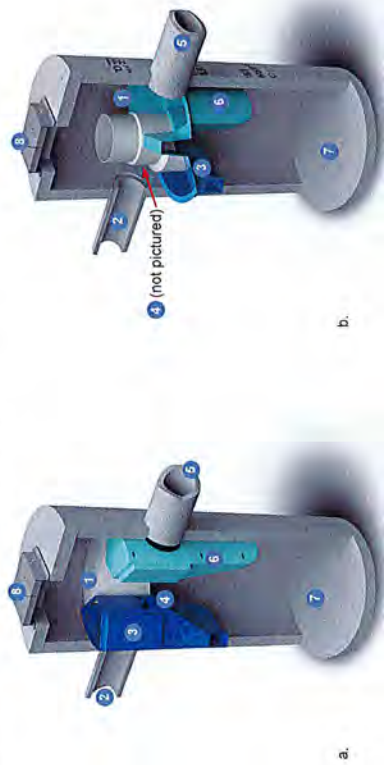


Fig.2a) First Defense®-4 and First Defense®-6; b) First Defense®-4HC and First Defense®-6HC, with higher capacity dual internal bypass and larger maximum pipe diameter.

First Defense® High Capacity Model Number	Diameter (ft / m)	Typical Treatment Flow Rates		Peak Online Flow Rate	Maximum Pipe Diameter¹	Oil Storage Capacity	Typical Sediment Storage Capacity²	Minimum Distance from Outlet Invert to Top of Rim³	Chamber Depth
		(cfs / L/s)	(gals / L/s)						
FD-3HC	3 / 0.9	0.85 / 24.0	15 / 424	18 / 457	125 / 473	0.4 / 0.3	2.0 - 3.5 / 0.6 - 1.0	3.75 / 1.14	
FD-4HC	4 / 1.2	1.50 / 42.4	18 / 510	24 / 600	191 / 723	0.7 / 0.5	2.3 - 3.9 / 0.7 - 1.2	5.00 / 1.52	
FD-5HC	5 / 1.5	2.35 / 66.2	20 / 566	24 / 609	300 / 1135	1.1 / .84	2.5 - 4.5 / 0.7 - 1.3	5.25 / 1.60	
FD-6HC	6 / 1.8	3.38 / 95.7	32 / 905	30 / 750	496 / 1878	1.6 / 1.2	3.0 - 5.1 / 0.9 - 1.6	6.25 / 1.90	
FD-7HC	7 / 2.1	4.60 / 130.2	40 / 1133	42 / 1067	750 / 2839	2.1 / 1.9	3.0 - 5.5 / 0.9 - 1.7	7.25 / 2.20	
FD-8HC	8 / 2.4	6.00 / 169.9	50 / 1,415	48 / 1,219	1120 / 4239	2.8 / 2.1	3.0 - 6.0 / 0.9 - 1.8	8.00 / 2.43	

¹Contact Hydro International when larger pipe sizes are required.

²Contact Hydro International when custom sediment storage capacity is required.

³Minimum distance for models depends on pipe diameter.

III. Maintenance

Overview

The First Defense® protects the environment by removing a wide range of pollutants from stormwater runoff. Periodic removal of these captured pollutants is essential to the continuous, long-term functioning of the First Defense®. The First Defense® will capture and retain sediment and oil until the sediment and oil storage volumes are full to capacity. When sediment and oil storage capacities are reached, the First Defense® will no longer be able to store removed sediment and oil. Maximum pollutant storage capacities are provided in Table 1.

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

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

Maintenance Equipment Considerations

The internal components of the First Defense®-HC have a centrally located circular shaft through which the sediment storage sump can be accessed with a sump vac hose. The open diameter of this access shaft is 15 inches in diameter (Fig.3). Therefore, the nozzle fitting of any vactor hose used for maintenance should be less than 15 inches in diameter.



Fig.3 The central opening to the sump of the First Defense®-HC is 15 inches in diameter.

Determining Your Maintenance Schedule

The frequency of clean out is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. A simple probe such as a Sludge-Judge® can be used to determine the level of accumulated solids stored in the sump. This information can be recorded in the maintenance log (see page 9) to establish a routine maintenance schedule.

The vactor procedure, including both sediment and oil / floatables removal, for a 6-ft First Defense® typically takes less than 30 minutes and removes a combined water/oil volume of about 765 gallons.

Inspection Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.
2. Remove the grate or lid to the manhole.
3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities. Fig.4 shows the standing water level that should be observed.
4. Without entering the vessel, use the pole with the skimmer net to remove floatables and loose debris from the components and water surface.
5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel.
6. On the Maintenance Log (see page 9), record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components or blockages.
7. Securely replace the grate or lid.
8. Take down safety equipment.

9. Notify Hydro International of any irregularities noted during inspection.

Floatables and Sediment Clean Out

Floatables clean out is typically done in conjunction with sediment removal. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables (Fig.5).

Floatables and loose debris can also be netted with a skimmer and pole. The access port located at the top of the manhole provides unobstructed access for a vector hose and skimmer pole to be lowered to the base of the sump.

Scheduling

- Floatables and sump clean out are typically conducted once a year during any season.
- Floatables and sump clean out should occur as soon as possible following a spill in the contributing drainage area.

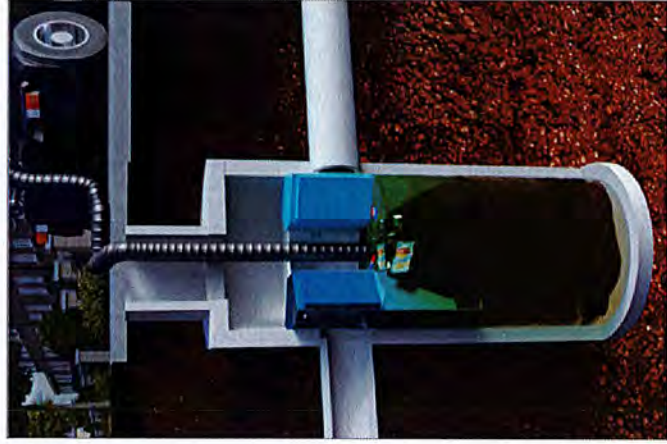


Fig.4 Floatables are removed with a vector hose (First Defense model FD-4, shown).

Recommended Equipment

- Safety Equipment (traffic cones, etc)
- Crow bar or other tool to remove grate or lid
- Pole with skimmer or net (if only floatables are being removed)
- Sediment probe (such as a Sludge Judge®)
- Vector truck (flexible hose recommended)
- First Defense® Maintenance Log

Floatables and sediment Clean Out Procedures

1. Set up any necessary safety equipment around the access port or grate of the First Defense® as stipulated by local ordinances. Safety equipment should notify passing pedestrian and road traffic that work is being done.
2. Remove the grate or lid to the manhole.
3. Without entering the vessel, look down into the chamber to inspect the inside. Make note of any irregularities.
4. Remove oil and floatables stored on the surface of the water with the vector hose (Fig.5) or with the skimmer or net (not pictured).
5. Using a sediment probe such as a Sludge Judge®, measure the depth of sediment that has collected in the sump of the vessel and record it in the Maintenance Log (page 9).
6. Once all floatables have been removed, drop the vector hose to the base of the sump. Vector out the sediment and gross debris off the sump floor (Fig.5).
7. Retract the vector hose from the vessel.
8. On the Maintenance Log provided by Hydro International, record the date, unit location, estimated volume of floatables and gross debris removed, and the depth of sediment measured. Also note any apparent irregularities such as damaged components, blockages, or irregularly high or low water levels.
9. Securely replace the grate or lid.

Maintenance at a Glance

Inspection	- Regularly during first year of installation - Every 6 months after the first year of installation
Oil and Floatables Removal	- Once per year, with sediment removal - Following a spill in the drainage area
Sediment Removal	- Once per year or as needed - Following a spill in the drainage area
NOTE: For most clean outs the entire volume of liquid does not need to be removed from the manhole. Only remove the first few inches of oils and floatables from the water surface to reduce the total volume of liquid removed during a clean out.	

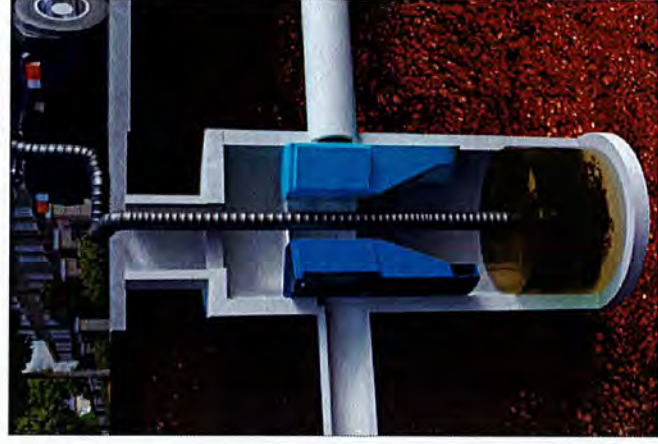


Fig.5 Sediment is removed with a vector hose (First Defense model FD-4, shown).

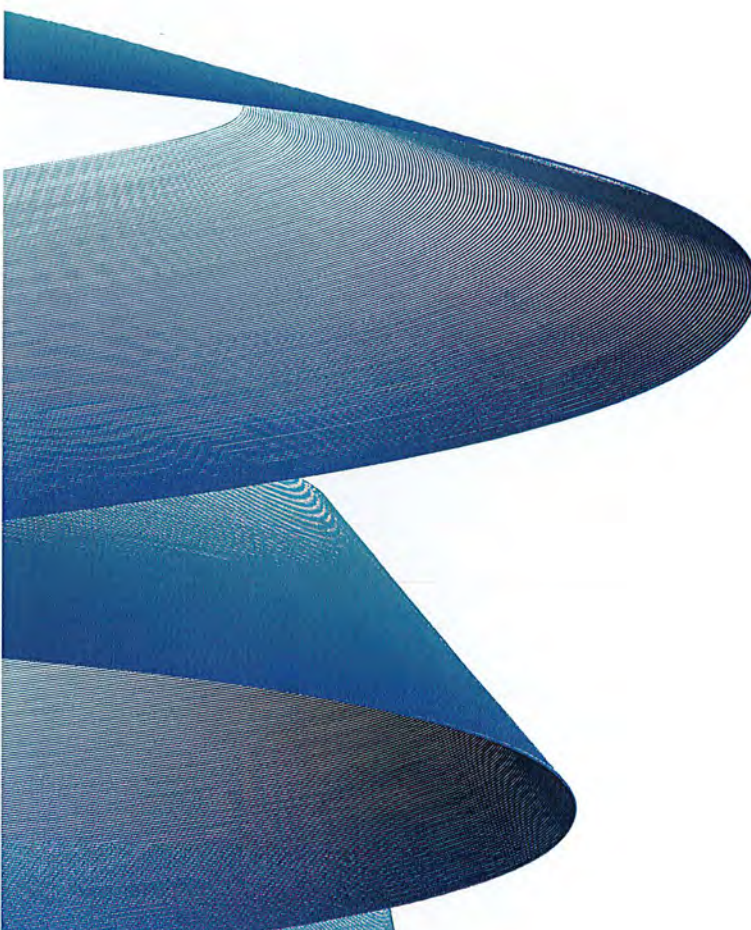


First Defense® Inspection and Maintenance Log

[illegible]

INLET (CIRCLE ALL THAT APPLY):	GRATED INLET (CATCH BASIN)	INLET PIPE (FLOW THROUGH)
☐ 1.0	☐ 1.0	☐ 1.0
☐ 2.0	☐ 2.0	☐ 2.0
☐ 3.0	☐ 3.0	☐ 3.0
☐ 4.0	☐ 4.0	☐ 4.0
☐ 5.0	☐ 5.0	☐ 5.0
☐ 6.0	☐ 6.0	☐ 6.0
☐ 7.0	☐ 7.0	☐ 7.0
☐ 8.0	☐ 8.0	☐ 8.0
☐ 9.0	☐ 9.0	☐ 9.0
☐ 10.0	☐ 10.0	☐ 10.0
☐ 11.0	☐ 11.0	☐ 11.0
☐ 12.0	☐ 12.0	☐ 12.0
☐ 13.0	☐ 13.0	☐ 13.0
☐ 14.0	☐ 14.0	☐ 14.0
☐ 15.0	☐ 15.0	☐ 15.0
☐ 16.0	☐ 16.0	☐ 16.0
☐ 17.0	☐ 17.0	☐ 17.0
☐ 18.0	☐ 18.0	☐ 18.0
☐ 19.0	☐ 19.0	☐ 19.0
☐ 20.0	☐ 20.0	☐ 20.0
☐ 21.0	☐ 21.0	☐ 21.0
☐ 22.0	☐ 22.0	☐ 22.0
☐ 23.0	☐ 23.0	☐ 23.0
☐ 24.0	☐ 24.0	☐ 24.0
☐ 25.0	☐ 25.0	☐ 25.0
☐ 26.0	☐ 26.0	☐ 26.0
☐ 27.0	☐ 27.0	☐ 27.0
☐ 28.0	☐ 28.0	☐ 28.0
☐ 29.0	☐ 29.0	☐ 29.0
☐ 30.0	☐ 30.0	☐ 30.0
☐ 31.0	☐ 31.0	☐ 31.0
☐ 32.0	☐ 32.0	☐ 32.0
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Hydro International (Stormwater), 94 Hutchins Drive, Portland ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212 Web: www.hydro-int.com



Stormwater Solutions

94 Hutchins Drive
Portland, ME 04102

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Fax: (207) 756-6212

stormwaterinquiry@hydro-int.com

www.hydro-int.com

Turning Water Around...®

FDHC_O+M_H_1703



State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bureau of Nonpoint Pollution Control
Division of Water Quality

401-02B

Post Office Box 420

Trenton, New Jersey 08625-0420

609-633-7021 Fax: 609-777-0432

http://www.state.nj.us/dep/dwq/bnpc_home.htm

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

March 9, 2017

Mr. Dave Scott
Technical Product Manager
Hydro International
94 Hutchins Drive
Portland, ME 04102

Re: MTD Lab Certification
First Defense® HC (FDHC) Stormwater Treatment Device by Hydro International
On-line Installation

TSS Removal Rate 50%

Dear Mr. Scott:

This revised certification letter supersedes the Department's prior certification dated April 4, 2016. This revision was completed to reflect the updated Manufactured Treatment Device (MTD) scaling methodology as agreed upon by the manufacturers' working group on September 19, 2016. In part, the updated scaling for hydrodynamic MTDs is based on the depth of the reference (tested) MTD from the top of the false floor utilized during removal efficiency testing, not from the physical bottom of the unit. Based on the above decision, Table A-2 of the NJCAT Technology Verification report located at <http://www.njcat.org/uploads/newDocs/FDHCVerificationReportFinal.pdf> has been revised, and Table 1 noted below has been updated as well.

The Stormwater Management rules under N.J.A.C. 7:8-5.5(b) and 5.7 (c) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Hydro International has requested an MTD Laboratory Certification for the First Defense® HC Stormwater Treatment Device.

The project falls under the "Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advance Technology" dated January 25, 2013. The applicable protocol is the "New Jersey Laboratory Testing Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device" dated January 25, 2013.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal rate and the required maintenance plan. The NJCAT Verification Report dated February 2016 (Revised

January 2017) with the Verification Appendix for this device is published online at <http://www.njcat.org/verification-process/technology-verification-database.html>.

The NJDEP certifies the use of the First Defense® HC Stormwater Treatment Device by Hydro International at a TSS removal rate of 50% when designed, operated and maintained in accordance with the information provided in the Verification Appendix and the following conditions:

1. The maximum treatment flow rate (MTFR) for the manufactured treatment device (MTD) is calculated using the New Jersey Water Quality Design Storm (1.25 inches in 2 hrs) in N.J.A.C. 7:8-5.5.
2. The First Defense® HC Stormwater Treatment Device shall be installed using the same configuration reviewed by NJCAT and shall be sized in accordance with the criteria specified in item 6 below.
3. This First Defense® HC Stormwater Treatment Device cannot be used in series with another MTD or a media filter (such as a sand filter), to achieve an enhance removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.
4. Additional design criteria for MTDs can be found in Chapter 9.6 of the New Jersey Stormwater Best Management Practices (NJ Stormwater BMP) Manual which can be found on-line at www.njstormwater.org.
5. The maintenance plan for a site using this device shall incorporate, at a minimum, the maintenance requirements for the First Defense® HC Stormwater Treatment Device, which is attached to this document. However, it is recommended to review the maintenance manual at <http://a2795.actonsoftware.com/acton/attachment/2795/f-0132/1/-/-/-/Hydro-International-First-Defense-Treatment-System.pdf> for any changes to the maintenance requirements.
6. Sizing Requirements:

The example below demonstrates the sizing procedure for the First Defense® HC Stormwater Treatment Device:

Example: A 0.25-acre impervious site is to be treated to 50% TSS removal using a First Defense® HC Stormwater Treatment Device. The impervious site runoff (Q) based on the New Jersey Water Quality Design Storm was determined to be 0.79 cfs.

Maximum Treatment Flow Rate (MTFR) Evaluation:

The site runoff (Q) was based on the following:

time of concentration = 10 minutes

i=3.2 in/hr (page 5-8, Fig. 5-3 of the NJ Stormwater BMP Manual)

c=0.99 (curve number for impervious)

$Q=ciA=0.99 \times 3.2 \times 0.25 = 0.79$ cfs

Given the site runoff is 0.79 cfs and based on Table 1 below, the First Defense® HC Model 3-ft with a MTFR of 0.85 cfs would be the smallest model approved that could be used for this site that could remove 50% of the TSS from the impervious area without exceeding the MTFR.

The sizing table corresponding to the available system models is noted below. Additional specifications regarding each model can be found in the Verification Appendix under Table A-1 and Table A-2.

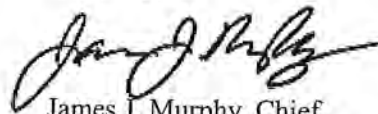
Table 1 First Defense® HC Models

First Defense® Model	Manhole Diameter (ft)	Maximum Treatment Flowrate, MTFR (cfs)
3-ft	3	0.85
4-ft	4	1.5
5-ft	5	2.35
6-ft	6	3.38
7-ft	7	4.60
8-ft	8	6.00

Be advised a detailed maintenance plan is mandatory for any project with a Stormwater BMP subject to the Stormwater Management Rules, N.J.A.C. 7:8. The plan must include all the items identified in the Stormwater Management Rules, N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance and Retrofit of Stormwater Management Measures.

If you have any questions regarding the above information, please contact Mr. Shashi Nayak of my office at (609) 633-7021.

Sincerely,



James J. Murphy, Chief
Bureau of Nonpoint Pollution Control

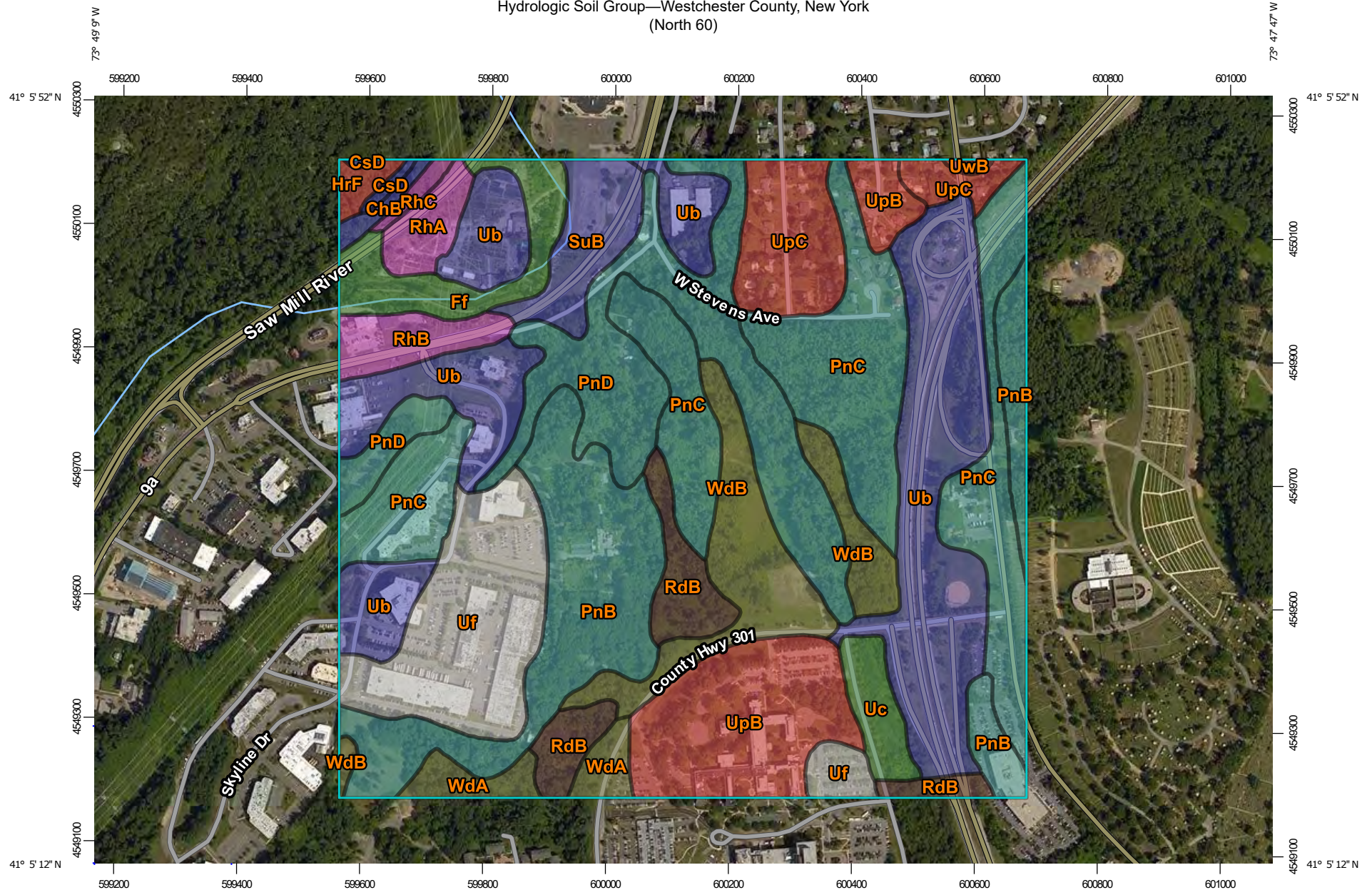
Attachment: Maintenance Plan

C: Chron File
Richard Magee, NJCAT
Vince Mazzei, NJDEP - DLUR
Ravi Patraju, NJDEP - BES
Gabriel Mahon, NJDEP - BNPC
Shashi Nayak, NJDEP - BNPC

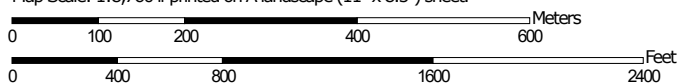


Appendix D:
NRCS Soil Map

Hydrologic Soil Group—Westchester County, New York (North 60)



Map Scale: 1:8,760 if printed on A landscape (11" x 8.5") sheet.



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



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

12/6/2017
Page 1 of 4

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 1:12,000.

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: Westchester County, New York
 Survey Area Data: Version 13, Oct 8, 2017

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

Date(s) aerial images were photographed: Jul 21, 2014—Aug 27, 2014

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
ChB	Charlton fine sandy loam, 3 to 8 percent slopes	B	1.2	0.4%
CsD	Chatfield-Charlton complex, 15 to 35 percent slopes, very rocky	B	0.6	0.2%
Ff	Fluvaquents-Udifuvents complex, frequently flooded	A/D	8.6	3.0%
HrF	Hollis-Rock outcrop complex, 35 to 60 percent slopes	D	1.4	0.5%
PnB	Paxton fine sandy loam, 3 to 8 percent slopes	C	32.3	11.3%
PnC	Paxton fine sandy loam, 8 to 15 percent slopes	C	47.3	16.5%
PnD	Paxton fine sandy loam, 15 to 25 percent slopes	C	31.1	10.9%
RdB	Ridgebury loam, 3 to 8 percent slopes	B/D	9.5	3.3%
RhA	Riverhead loam, 0 to 3 percent slopes	A	3.8	1.3%
RhB	Riverhead loam, 3 to 8 percent slopes	A	5.1	1.8%
RhC	Riverhead loam, 8 to 15 percent slopes	A	0.9	0.3%
SuB	Sutton loam, 3 to 8 percent slopes	B	7.7	2.7%
Ub	Udorthents, smoothed	B	51.7	18.0%
Uc	Udorthents, wet substratum	A/D	4.3	1.5%
Uf	Urban land		23.4	8.2%
UpB	Urban land-Paxton complex, 3 to 8 percent slopes	D	21.8	7.6%
UpC	Urban land-Paxton complex, 8 to 15 percent slopes	D	12.4	4.3%
UwB	Urban land-Woodbridge complex, 3 to 8 percent slopes	D	0.3	0.1%
WdA	Woodbridge loam, 0 to 3 percent slopes	C/D	5.0	1.7%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
WdB	Woodbridge loam, 3 to 8 percent slopes	C/D	18.3	6.4%
Totals for Area of Interest			286.9	100.0%

Description

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

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

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

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

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

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

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

Rating Options

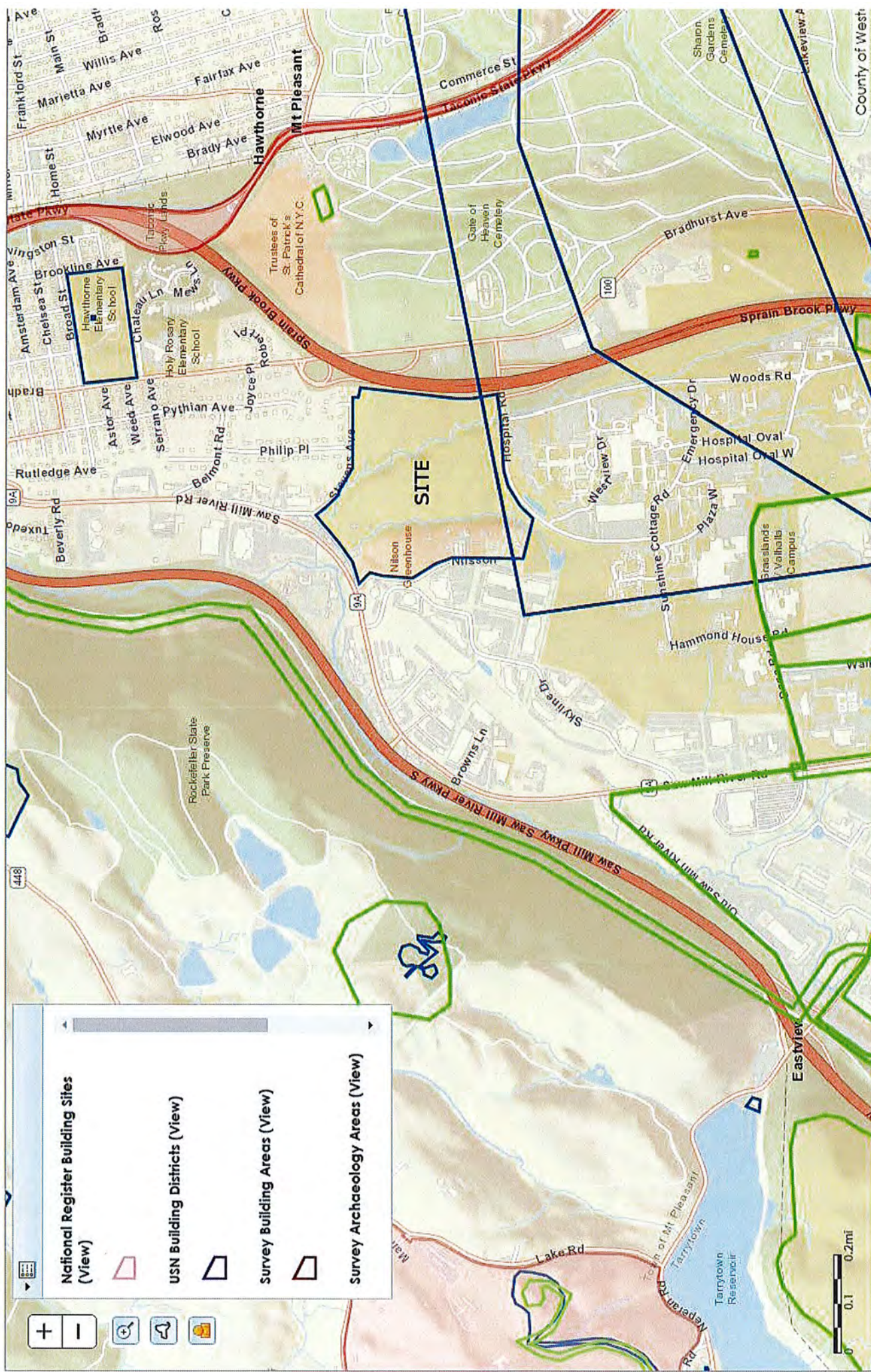
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



Appendix E:
Map of Historic Places
In Vicinity of Project





Appendix F:
NYSDEC Construction Site Log Book

APPENDIX F
CONSTRUCTION SITE INSPECTION
AND MAINTENANCE LOG BOOK

**STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION
ACTIVITIES**

SAMPLE CONSTRUCTION SITE LOG BOOK

Table of Contents

- I. Pre-Construction Meeting Documents
 - a. Preamble to Site Assessment and Inspections
 - b. Pre-Construction Site Assessment Checklist

- II. Construction Duration Inspections
 - a. Directions
 - b. Modification to the SWPPP

I. PRE-CONSTRUCTION MEETING DOCUMENTS

Project Name _____
Permit No. _____ **Date of Authorization** _____
Name of Operator _____
Prime Contractor _____

a. Preamble to Site Assessment and Inspections

The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified inspector¹ conduct an assessment of the site prior to the commencement of construction² and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements. A preconstruction meeting should be held to review all of the SWPPP requirements with construction personnel.

When construction starts, site inspections shall be conducted by the qualified inspector at least every 7 calendar days. The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified inspector perform a final site inspection. The qualified inspector shall certify that the site has undergone final stabilization³ using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 Refer to "Qualified Inspector" inspection requirements in the current SPDES General Permit for Stormwater Discharges from Construction Activity for complete list of inspection requirements.

2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.

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

b. Pre-construction Site Assessment Checklist

(NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA

- ☐ ☐ ☐ Has a Notice of Intent been filed with the NYS Department of Conservation?
- ☐ ☐ ☐ Is the SWPPP on-site? Where? _____
- ☐ ☐ ☐ Is the Plan current? What is the latest revision date? _____
- ☐ ☐ ☐ Is a copy of the NOI (with brief description) onsite? Where? _____
- ☐ ☐ ☐ Have all contractors involved with stormwater related activities signed a contractor's certification?

2. Resource Protection

Yes No NA

- ☐ ☐ ☐ Are construction limits clearly flagged or fenced?
- ☐ ☐ ☐ Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
- ☐ ☐ ☐ Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA

- ☐ ☐ ☐ Clean stormwater runoff has been diverted from areas to be disturbed.
- ☐ ☐ ☐ Bodies of water located either on site or in the vicinity of the site have been identified and protected.
- ☐ ☐ ☐ Appropriate practices to protect on-site or downstream surface water are installed.
- ☐ ☐ ☐ Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Access

Yes No NA

- ☐ ☐ ☐ A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
- ☐ ☐ ☐ Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
- ☐ ☐ ☐ Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Sediment Controls

Yes No NA

- ☐ ☐ ☐ Silt fence material and installation comply with the standard drawing and specifications.
- ☐ ☐ ☐ Silt fences are installed at appropriate spacing intervals
- ☐ ☐ ☐ Sediment/detention basin was installed as first land disturbing activity.
- ☐ ☐ ☐ Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA

- ☐ ☐ ☐ The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
- ☐ ☐ ☐ The plan is contained in the SWPPP on page _____
- ☐ ☐ ☐ Appropriate materials to control spills are onsite. Where? _____

II. CONSTRUCTION DURATION INSPECTIONS

a. Directions:

Inspection Forms will be filled out during the entire construction phase of the project.

Required Elements:

- 1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;
- 2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;
- 3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;
- 4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);
- 5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and
- 6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

SITE PLAN/SKETCH

Inspector (print name)

Date of Inspection

Qualified Inspector (print name)

Qualified Inspector Signature

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

Maintaining Water Quality**Yes No NA**

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

Housekeeping

1. General Site Conditions

Yes No NA

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

2. Temporary Stream Crossing

Yes No NA

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

3. Stabilized Construction Access

Yes No NA

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

Runoff Control Practices

1. Excavation Dewatering

Yes No NA

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

Runoff Control Practices (continued)

2. Flow Spreader

Yes No NA

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

3. Interceptor Dikes and Swales

Yes No NA

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

4. Stone Check Dam

Yes No NA

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

5. Rock Outlet Protection

Yes No NA

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

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes No NA

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

2. Revegetation

Yes No NA

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

Sediment Control Practices

1. Silt Fence and Linear Barriers

Yes No NA

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

Sediment Control Practices (continued)

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

Yes No NA

- ☐ ☐ ☐ Installed concrete blocks lengthwise so open ends face outward, not upward.
☐ ☐ ☐ Placed wire screen between No. 3 crushed stone and concrete blocks.
☐ ☐ ☐ Drainage area is 1acre or less.
☐ ☐ ☐ Excavated area is 900 cubic feet.
☐ ☐ ☐ Excavated side slopes should be 2:1.
☐ ☐ ☐ 2" x 4" frame is constructed and structurally sound.
☐ ☐ ☐ Posts 3-foot maximum spacing between posts.
☐ ☐ ☐ Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
☐ ☐ ☐ Posts are stable, fabric is tight and without rips or frayed areas.
☐ ☐ ☐ Manufactured insert fabric is free of tears and punctures.
☐ ☐ ☐ Filter Sock is not torn or flattened and fill material is contained within the mesh sock.

Sediment accumulation ____% of design capacity.

3. Temporary Sediment Trap

Yes No NA

- ☐ ☐ ☐ Outlet structure is constructed per the approved plan or drawing.
☐ ☐ ☐ Geotextile fabric has been placed beneath rock fill.
☐ ☐ ☐ Sediment trap slopes and disturbed areas are stabilized.

Sediment accumulation is ____% of design capacity.

4. Temporary Sediment Basin

Yes No NA

- ☐ ☐ ☐ Basin and outlet structure constructed per the approved plan.
☐ ☐ ☐ Basin side slopes are stabilized with seed/mulch.
☐ ☐ ☐ Drainage structure flushed and basin surface restored upon removal of sediment basin facility.
☐ ☐ ☐ Sediment basin dewatering pool is dewatering at appropriate rate.

Sediment accumulation is ____% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design. All practices shall be maintained in accordance with their respective standards.

Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

CONSTRUCTION DURATION INSPECTIONS

b. Modifications to the SWPPP (To be completed as described below)

The Operator shall amend the SWPPP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
 - a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
 - b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:This image shows a full page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook paper. There are no margins, text, or other markings on the page.



Appendix G:
New York State Stormwater Management Design Manual
Maintenance & Inspection Checklist

Stormwater Pond/Wetland Operation, Maintenance and Management Inspection Checklist

Project _____
Location: _____
Site Status: _____

Date: _____
Time: _____

Inspector: _____

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Embankment and emergency spillway (Annual, After Major Storms)		
1. Vegetation and ground cover adequate		
2. Embankment erosion		
3. Animal burrows		
4. Unauthorized planting		
5. Cracking, bulging, or sliding of dam		
a. Upstream face		
b. Downstream face		
c. At or beyond toe		
downstream		
upstream		
d. Emergency spillway		
6. Pond, toe & chimney drains clear and functioning		
7. Seeps/leaks on downstream face		
8. Slope protection or riprap failure		
9. Vertical/horizontal alignment of top of dam "As-Built"		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
10. Emergency spillway clear of obstructions and debris		
11. Other (specify)		
2. Riser and principal spillway (Annual)		
Type: Reinforced concrete _____ Corrugated pipe _____ Masonry _____		
1. Low flow orifice obstructed		
2. Low flow trash rack. a. Debris removal necessary		
b. Corrosion control		
3. Weir trash rack maintenance a. Debris removal necessary		
b. corrosion control		
4. Excessive sediment accumulation insider riser		
5. Concrete/masonry condition riser and barrels a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (rebars exposed)		
d. Joint failures		
e. Water tightness		
6. Metal pipe condition		
7. Control valve a. Operational/exercised		
b. Chained and locked		
8. Pond drain valve a. Operational/exercised		
b. Chained and locked		
9. Outfall channels functioning		
10. Other (specify)		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
3. Permanent Pool (Wet Ponds) (monthly)		
1. Undesirable vegetative growth		
2. Floating or floatable debris removal required		
3. Visible pollution		
4. Shoreline problem		
5. Other (specify)		
4. Sediment Forebays		
1. Sedimentation noted		
2. Sediment cleanout when depth < 50% design depth		
5. Dry Pond Areas		
1. Vegetation adequate		
2. Undesirable vegetative growth		
3. Undesirable woody vegetation		
4. Low flow channels clear of obstructions		
5. Standing water or wet spots		
6. Sediment and / or trash accumulation		
7. Other (specify)		
6. Condition of Outfalls (Annual , After Major Storms)		
1. Riprap failures		
2. Slope erosion		
3. Storm drain pipes		
4. Endwalls / Headwalls		
5. Other (specify)		
7. Other (Monthly)		
1. Encroachment on pond, wetland or easement area		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
2. Complaints from residents		
3. Aesthetics		
a. Grass growing required		
b. Graffiti removal needed		
c. Other (specify)		
4. Conditions of maintenance access routes.		
5. Signs of hydrocarbon build-up		
6. Any public hazards (specify)		
8. Wetland Vegetation (Annual)		
1. Vegetation healthy and growing Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed)		
2. Dominant wetland plants: Survival of desired wetland plant species Distribution according to landscaping plan?		
3. Evidence of invasive species		
4. Maintenance of adequate water depths for desired wetland plant species		
5. Harvesting of emergent plantings needed		
6. Have sediment accumulations reduced pool volume significantly or are plants "choked" with sediment		
7. Eutrophication level of the wetland.		
8. Other (specify)		

Comments:

Actions to be Taken:

Infiltration Trench Operation, Maintenance, and Management Inspection Checklist

Project:

Location:

Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Trench surface clear of debris		
Inflow pipes clear of debris		
Overflow spillway clear of debris		
Inlet area clear of debris		
2. Sediment Traps or Forebays (Annual)		
Obviously trapping sediment		
Greater than 50% of storage volume remaining		
3. Dewatering (Monthly)		
Trench dewaterers between storms		
4. Sediment Cleanout of Trench (Annual)		
No evidence of sedimentation in trench		
Sediment accumulation doesn't yet require cleanout		
5. Inlets (Annual)		

MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
Good condition		
No evidence of erosion		
6. Outlet/Overflow Spillway (Annual)		
Good condition, no need for repair		
No evidence of erosion		
7. Aggregate Repairs (Annual)		
Surface of aggregate clean		
Top layer of stone does not need replacement		
Trench does not need rehabilitation		

Comments:

Actions to be Taken:



Appendix H:
Soil Testing Results

STORMWATER SOIL TESTING RESULTS				
TEST PIT I.D.	DESCRIPTION	FULL DEPTH	DEPTH TO LEDGEROCK	DEPTH TO GROUNDWATER
#1	6" TOP SOIL, 36" FINE SANDY LOAM, 102" MED/FINE SANDS W/ BLDRS, 12" FINE GREY SAND	13'	-	-
#2	6" TOP SOIL, 36" FINE SANDY LOAM, 96" MED/FINE SANDS MODERATE COMPACTION, 30" MED SAND/GRAVEL	14'	-	SEEPAGE @ 11'
#3	6" TOP SOIL, 36" FINE SANDY LOAM, 96" MED/FINE SANDS, 30" MED SAND/GRAVEL LIGHT COMPACTION	13.5'	-	-
#4	6" TOP SOIL, 30" FINE SANDY LOAM, 96" MED/FINE SANDS MODERATE COMPACTION	11'	11'	-
#5	6" TOP SOIL, 30" FINE SANDY LOAM, 102" MED/COARSE SANDY LOAM, DECAYED ROCK	8'	8'	-
#6	24" TOP SOIL, 96" MISC FILL/ORGANIC MATERIAL	10'	-	-
#7	24" TOP SOIL, 96" MISC FILL/ORGANIC MATERIAL	10'	-	-
#8	6" TOP SOIL, 36" FINE SANDY LOAM, 102" MED/FINE SANDS W/ SILT MODERATE COMPACTION	12'	-	-
#9	6" TOP SOIL, 36" FINE SANDY LOAM, 102" MED/FINE SANDS W/ BLDRS MODERATE COMPACTION	12'	-	-
#10	6" TOP SOIL, 24" FINE SANDY LOAM, 90" FINE GREY SANDS HEAVY COMPACTION	10'	-	MOTTILING @ 9'
#11	6" TOP SOIL, 30" FINE SANDY LOAM, 96" MED/FINE GREY SANDS WITH SILT	11'	-	-
#12	12" TOP SOIL, 24" FINE SANDY LOAM W/ SILT, 96" FINE GREY SANDS MODERATE COMPACTION	11'	-	-
#13	6" TOP SOIL, 36" FINE SANDY LOAM, 102" MED/FINE SANDS W/ SOME SILT MODERATE COMPACTION	12'	-	-
#14	6" TOP SOIL, 36" FINE SANDY LOAM, 102" MED/FINE SANDS W/ SOME SILT MODERATE COMPACTION	12'	-	-
#15	6" TOP SOIL, 36" FINE SANDY LOAM, 114" MED/FINE SANDS W/ SOME SILT MODERATE COMPACTION	13'	-	-
#16	LEDGEROCK ENCOUNTERED AT SURFACE	1'	1'	-
#17	6" TOP SOIL, 54" RED/ORANGE SILTY LOAM, 60" MED YELLOW SANDS MODERATE COMPACTION	10'	-	-
#18	6" TOP SOIL, 150" SANDY LOAM LIGHT COMPACTION	13'	-	-
#19	6" TOP SOIL, 42" FINE SANDY LOAM, 108" MED SANDS W/ BLDRS MODERATE COMPACTION	13'	-	-
#20	6" TOP SOIL, 60" FINE SANDY LOAM W/ SILT, 90" MED YELLOW SANDS LIGHT COMPACTION	-	-	MOTTILING @ 7'
#21	6" TOP SOIL, 36" FINE SANDY LOAM, 90" MED/FINE SANDS MODERATE COMPACTION	11'	-	-
#22	6" TOP SOIL, 36" FINE SANDY LOAM, 90" FINE SANDS W/ SILT MODERATE COMPACTION	12.5'	-	MOTTILING @ 10'
#23	6" TOP SOIL, 42" FINE SANDY LOAM, 48" FINE GREY SANDS W/ SILT MODERATE COMPACTION, 60" MED/FINE YELLOW/BROWN SANDS	13'	-	-
#24	24" TOP SOIL, 108" MISC FILL/ORGANIC MATERIAL	10'	-	WATER @ 8'
#25	12" TOP SOIL, 36" FINE SANDY LOAM, 108" MISC FILL/ORGANIC MATERIAL	10'	-	SEEPAGE @ 8'
#26	6" TOP SOIL, 138" YELLOW/WHITE MED/FINE SANDS LOOSE COMPACTION	12'	-	-
#27	6" TOP SOIL, 42" BROWN FINE SANDY LOAM W/ BOULDERS, 102" YELLOW/WHITE MED/FINE SANDS LOOSE COMPACTION	12.5'	-	-
DEEP TEST PITS BY: JP NILSEN WITNESSED BY: BIBBO ASSOCIATES DATE OF TESTING: 01/16/2018 & 01/19/2018				

(SEE FIGURE 3 LOCATED AT THE END OF THE REPORT FOR SOIL TESTING LOCATIONS)

PRELIMINARY STORMWATER SOIL INFILTRATION RATES	
SW PRACTICE I.D.	INFILTRATION RATE (INCHES PER HOUR)
INF-1	12.0 IN/HR
INF-2	10.0 IN/HR
INF-3	10.0 IN/HR
INF-4	12.0 IN/HR
INF-5	10.0 IN/HR
INF-6	15.0 IN/HR
INF-7	10.0 IN/HR
INF-8	10.0 IN/HR
SWP-2	15.0 IN/HR
SWP-3	15.0 IN/HR
INFILTRATION RATES BASED ON PRELIMINARY TEST RUNS AND DEEP TEST SOIL OBSERVATIONS. FINAL TESTING SHALL BE PERFORMED TO CONFIRM THESE RATES AND THE INFILTRATION PRACTICES SHALL BE REVISED ACCORDINGLY.	



Appendix I:
Pocket Wetland Sizing Calculations

Project The North 60 - Phase 1**Pocket Wetland Design***Required Elements*

Practice ID	SWP-1
Area of Contributory Watershed: ACW (s.f.)	231,706
WQv (90% Storm) (cu.ft.)	6,369
Permanent Pool Volume required = 50% WQv (cu.ft.)	3,185
Provided (cu.ft.)	7,835
Forebay Volume Required = 10% WQv (cu.ft.)	637
Provided (cu.ft.)	1,811
Wetland Surface Area (Perm. Pool Surface Area) Required = 1% ACW (s.f.)	2,317
Total Provided (s.f.)	9,625
< 6" depth permanent pool required area = 35% Total	3,369
Area Provided (s.f.)	5,393
provided %	56
< 18" depth permanent pool required area = 65% Total	6,256
Area Provided (s.f.)	8,323
provided %	86

Basin ID: **Post A2**

90% WQv: Subcatchment Area (A): 231,706 sq.ft.
 Rainfall (P): 1.5 in.
 Impervious Area 43,743 sq.ft.*
 Percent Imperviousness(I): 18.88 %
 $R_v = .05 + .009(I)$ 0.21991
 $R_v = 0.219908$ **
 $WQv = (P)(R_v)(A) / 12$ 6,369 cu.ft.
 or
 0.1462 ac.ft.

** Minimum $R_v = 0.2$

N60 Phase 1 Drainage A 6-11-19

Prepared by Bibbo Associates, LLP

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Type III 24-hr 100-year storm Rainfall=9.00"

Printed 6/12/2019

Stage-Area-Storage for Pond 44P: Pocket Wetland

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
230.00	0	231.32	449	232.64	1,520	233.96	4,054
230.02	3	231.34	460	232.66	1,542	233.98	4,149
230.04	7	231.36	471	232.68	1,564	234.00	4,247
230.06	11	231.38	482	232.70	1,587	234.02	4,349
230.08	14	231.40	493	232.72	1,610	234.04	4,453
230.10	18	231.42	505	232.74	1,633	234.06	4,560
230.12	22	231.44	517	232.76	1,657	234.08	4,671
230.14	26	231.46	528	232.78	1,680	234.10	4,785
230.16	30	231.48	540	232.80	1,704	234.12	4,903
230.18	34	231.50	552	232.82	1,728	234.14	5,023
230.20	39	231.52	565	232.84	1,752	234.16	5,148
230.22	43	231.54	577	232.86	1,777	234.18	5,275
230.24	47	231.56	590	232.88	1,801	234.20	5,407
230.26	52	231.58	602	232.90	1,826	234.22	5,542
230.28	57	231.60	615	232.92	1,851	234.24	5,680
230.30	61	231.62	628	232.94	1,877	234.26	5,822
230.32	66	231.64	641	232.96	1,902	234.28	5,968
230.34	71	231.66	655	232.98	1,928	234.30	6,118
230.36	76	231.68	668	233.00	1,954	234.32	6,272
230.38	81	231.70	682	233.02	1,980	234.34	6,429
230.40	86	231.72	696	233.04	2,007	234.36	6,591
230.42	92	231.74	710	233.06	2,034	234.38	6,756
230.44	97	231.76	724	233.08	2,062	234.40	6,926
230.46	102	231.78	738	233.10	2,091	234.42	7,099
230.48	108	231.80	752	233.12	2,120	234.44	7,277
230.50	114	231.82	767	233.14	2,150	234.46	7,459
230.52	120	231.84	782	233.16	2,180	234.48	7,645
230.54	126	231.86	797	233.18	2,211	234.50	7,835
230.56	132	231.88	812	233.20	2,243	234.52	8,028
230.58	138	231.90	827	233.22	2,275	234.54	8,221
230.60	144	231.92	843	233.24	2,308	234.56	8,416
230.62	150	231.94	858	233.26	2,342	234.58	8,610
230.64	157	231.96	874	233.28	2,376	234.60	8,806
230.66	163	231.98	890	233.30	2,411	234.62	9,002
230.68	170	232.00	906	233.32	2,446	234.64	9,198
230.70	177	232.02	923	233.34	2,482	234.66	9,396
230.72	184	232.04	939	233.36	2,519	234.68	9,594
230.74	191	232.06	956	233.38	2,557	234.70	9,792
230.76	198	232.08	973	233.40	2,595	234.72	9,992
230.78	205	232.10	990	233.42	2,634	234.74	10,191
230.80	213	232.12	1,007	233.44	2,673	234.76	10,392
230.82	220	232.14	1,024	233.46	2,713	234.78	10,593
230.84	228	232.16	1,042	233.48	2,754	234.80	10,795
230.86	235	232.18	1,060	233.50	2,796	234.82	10,998
230.88	243	232.20	1,077	233.52	2,838	234.84	11,201
230.90	251	232.22	1,096	233.54	2,881	234.86	11,405
230.92	259	232.24	1,114	233.56	2,925	234.88	11,609
230.94	268	232.26	1,132	233.58	2,970	234.90	11,814
230.96	276	232.28	1,151	233.60	3,015	234.92	12,020
230.98	284	232.30	1,170	233.62	3,061	234.94	12,227
231.00	293	232.32	1,189	233.64	3,108	234.96	12,434
231.02	302	232.34	1,208	233.66	3,155	234.98	12,642
231.04	311	232.36	1,228	233.68	3,204	235.00	12,850
231.06	320	232.38	1,247	233.70	3,253	235.02	13,059
231.08	329	232.40	1,267	233.72	3,302	235.04	13,269
231.10	338	232.42	1,287	233.74	3,353	235.06	13,479
231.12	347	232.44	1,307	233.76	3,405	235.08	13,690
231.14	357	232.46	1,327	233.78	3,457	235.10	13,902
231.16	367	232.48	1,348	233.80	3,510	235.12	14,115
231.18	376	232.50	1,369	233.82	3,564	235.14	14,328
231.20	386	232.52	1,390	233.84	3,618	235.16	14,542
231.22	396	232.54	1,411	233.86	3,674	235.18	14,756
231.24	407	232.56	1,432	233.88	3,730	235.20	14,971
231.26	417	232.58	1,454	233.90	3,787	235.22	15,187
231.28	428	232.60	1,475	233.92	3,873	235.24	15,403
231.30	438	232.62	1,497	233.94	3,962	235.26	15,620

N60 Phase 1 Drainage A 6-11-19

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Type III 24-hr 100-year storm Rainfall=9.00"

Printed 6/12/2019

Stage-Area-Storage for Pond 44P: Pocket Wetland (continued)

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
235.28	15,838	236.60	31,736	237.92	50,799
235.30	16,056	236.62	32,001	237.94	51,113
235.32	16,275	236.64	32,266	237.96	51,428
235.34	16,495	236.66	32,532	237.98	51,744
235.36	16,716	236.68	32,799	238.00	52,061
235.38	16,937	236.70	33,066	238.02	52,378
235.40	17,159	236.72	33,335	238.04	52,697
235.42	17,381	236.74	33,604	238.06	53,016
235.44	17,604	236.76	33,873	238.08	53,335
235.46	17,828	236.78	34,144	238.10	53,656
235.48	18,052	236.80	34,415	238.12	53,977
235.50	18,278	236.82	34,687	238.14	54,300
235.52	18,504	236.84	34,960	238.16	54,623
235.54	18,730	236.86	35,233	238.18	54,946
235.56	18,957	236.88	35,507	238.20	55,271
235.58	19,185	236.90	35,782	238.22	55,596
235.60	19,414	236.92	36,058	238.24	55,923
235.62	19,643	236.94	36,334	238.26	56,249
235.64	19,873	236.96	36,611	238.28	56,577
235.66	20,104	236.98	36,889	238.30	56,906
235.68	20,335	237.00	37,168	238.32	57,235
235.70	20,567	237.02	37,447	238.34	57,565
235.72	20,800	237.04	37,727	238.36	57,896
235.74	21,033	237.06	38,008	238.38	58,228
235.76	21,267	237.08	38,290	238.40	58,560
235.78	21,502	237.10	38,572	238.42	58,894
235.80	21,738	237.12	38,855	238.44	59,228
235.82	21,974	237.14	39,139	238.46	59,563
235.84	22,211	237.16	39,424	238.48	59,898
235.86	22,448	237.18	39,709	238.50	60,235
235.88	22,687	237.20	39,995	238.52	60,572
235.90	22,926	237.22	40,282	238.54	60,910
235.92	23,165	237.24	40,569	238.56	61,249
235.94	23,406	237.26	40,858	238.58	61,589
235.96	23,647	237.28	41,147	238.60	61,929
235.98	23,889	237.30	41,436	238.62	62,271
236.00	24,131	237.32	41,727	238.64	62,613
236.02	24,375	237.34	42,018	238.66	62,956
236.04	24,618	237.36	42,310	238.68	63,299
236.06	24,863	237.38	42,603	238.70	63,644
236.08	25,108	237.40	42,897	238.72	63,989
236.10	25,354	237.42	43,191	238.74	64,336
236.12	25,601	237.44	43,486	238.76	64,683
236.14	25,849	237.46	43,782	238.78	65,030
236.16	26,097	237.48	44,079	238.80	65,379
236.18	26,346	237.50	44,376	238.82	65,729
236.20	26,595	237.52	44,674	238.84	66,079
236.22	26,845	237.54	44,973	238.86	66,430
236.24	27,096	237.56	45,273	238.88	66,782
236.26	27,348	237.58	45,573	238.90	67,135
236.28	27,600	237.60	45,874	238.92	67,488
236.30	27,854	237.62	46,176	238.94	67,843
236.32	28,107	237.64	46,479	238.96	68,198
236.34	28,362	237.66	46,783	238.98	68,554
236.36	28,617	237.68	47,087	239.00	68,911
236.38	28,873	237.70	47,392		
236.40	29,130	237.72	47,698		
236.42	29,387	237.74	48,004		
236.44	29,645	237.76	48,312		
236.46	29,904	237.78	48,620		
236.48	30,164	237.80	48,929		
236.50	30,424	237.82	49,238		
236.52	30,685	237.84	49,549		
236.54	30,947	237.86	49,860		
236.56	31,209	237.88	50,172		
236.58	31,472	237.90	50,485		

N60 Phase 1 Drainage A 6-11-19

Prepared by Bibbo Associates, LLP

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Type III 24-hr 100-year storm Rainfall=9.00"

Printed 6/12/2019

Summary for Pond 44P: Pocket Wetland

Inflow Area = 231,706 sf, 20.73% Impervious, Inflow Depth = 6.20" for 100-year storm event
 Inflow = 27.13 cfs @ 12.24 hrs, Volume= 119,695 cf
 Outflow = 18.88 cfs @ 12.43 hrs, Volume= 95,883 cf, Atten= 30%, Lag= 11.3 min
 Primary = 18.88 cfs @ 12.43 hrs, Volume= 95,883 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.01 hrs

Starting Elev= 234.50' Surf.Area= 12,504 sf Storage= 7,835 cf

Peak Elev= 238.08' @ 12.43 hrs Surf.Area= 18,895 sf Storage= 53,363 cf (45,528 cf above start)

Plug-Flow detention time= 563.9 min calculated for 88,048 cf (74% of inflow)

Center-of-Mass det. time= 430.2 min (1,246.2 - 816.0)

Volume	Invert	Avail.Storage	Storage Description
#1	230.00'	1,811 cf	Forebay (Irregular) Listed below (Recalc)
#2	230.00'	1,976 cf	Micropool (Irregular) Listed below (Recalc)
#3	233.90'	65,123 cf	Marsh & Storage (Irregular) Listed below (Recalc)
		68,911 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	86	34.2	0	0	86
231.00	217	53.2	147	147	225
232.00	406	72.3	307	453	426
233.00	651	91.4	524	977	688
233.90	1,233	129.1	834	1,811	1,357

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
230.00	86	34.2	0	0	86
231.00	217	53.2	147	147	225
232.00	406	72.3	307	453	426
233.00	651	91.4	524	977	688
233.90	1,646	155.1	1,000	1,976	1,942

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
233.90	4,232	530.5	0	0	4,232
234.50	9,625	400.9	4,048	4,048	13,842
235.00	10,440	413.5	5,015	9,063	14,683
236.00	12,144	438.8	11,281	20,344	16,451
237.00	13,950	464.0	13,037	33,381	18,317
238.00	15,856	489.2	14,893	48,273	20,287
239.00	17,864	514.5	16,850	65,123	22,369

Device	Routing	Invert	Outlet Devices
#1	Primary	232.00'	21.0" Round Culvert L= 74.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 232.00' / 231.00' S= 0.0135 ' S= 0.0135 ' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 2.41 sf
#2	Device 1	234.50'	1.1" Vert. Orifice/Grate C= 0.600
#3	Device 1	237.50'	36.0" x 48.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=18.88 cfs @ 12.43 hrs HW=238.08' TW=0.00' (Dynamic Tailwater)

1=Culvert (Barrel Controls 18.88 cfs @ 7.85 fps)

2=Orifice/Grate (Passes < 0.06 cfs potential flow)

3=Orifice/Grate (Passes < 20.31 cfs potential flow)



Appendix J:
Draft NYSDEC Notice of Intent &
MS-4 SWPPP Acceptance Form

NOTICE OF INTENT



New York State Department of Environmental Conservation

Division of Water

625 Broadway, 4th Floor

Albany, New York 12233-3505

NYR

(for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-15-002

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

- IMPORTANT -**RETURN THIS FORM TO THE ADDRESS ABOVE**OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

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

Fareri Associates / North 80 LLC

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

Molnar

Owner/Operator Contact Person First Name

Kevin

Owner/Operator Mailing Address

2 Dearfield Drive Suite 3

City

Greenwich

State

CT

Zip

06831 -

Phone (Owner/Operator)

203 - 422 - 6700

Fax (Owner/Operator)

- - -

Email (Owner/Operator)

KMolnar@gatewaydev.com

FED TAX ID

- (not required for individuals)

Project Site Information

Project/Site Name

The North 60 - Phase 1

Street Address (NOT P.O. BOX)

48 Saw Mill River Road

Side of Street

☐ North ☒ South ☐ East ☐ West

City/Town/Village (THAT ISSUES BUILDING PERMIT)

Mount Pleasant

State

NY

Zip

10532

County

Westchester

DEC Region

3

Name of Nearest Cross Street

Old Saw Mill River Road

Distance to Nearest Cross Street (Feet)

100

Project In Relation to Cross Street

☐ North ☒ South ☐ East ☐ West

Tax Map Numbers

Section-Block-Parcel

116.8-1-9

Tax Map Numbers

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

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

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

X Coordinates (Easting)

600250

Y Coordinates (Northing)

4549709

2. What is the nature of this construction project?

☒ New Construction☐ Redevelopment with increase in impervious area☐ Redevelopment with no increase in impervious area

- SELECT ONLY ONE CHOICE FOR EACH

Post-Development Future Land Use

☐ SINGLE FAMILY HOME

Number of Lots

☐ SINGLE FAMILY SUBDIVISION

○ TOWN HOME RESIDENTIAL

○ MULTIFAMILY RESIDENTIAL

○ INSTITUTIONAL/SCHOOL

○ INDUSTRIAL

● COMMERCIAL

○ MUNICIPAL

○ ROAD/HIGHWAY

○ RECREATIONAL/SPORTS FIELD

○ BIKE PATH/TRAIL

○ LINEAR UTILITY (water, sewer, gas, etc.)

○ PARKING LOT

☐ CLEARING/GRADING ONLY

○ DEMOLITION, NO REDEVELOPMENT

○ OTHER

[illegible]

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

4. In accordance with the larger common plan of development or sale, enter the total project site area; the total area to be disturbed; existing impervious area to be disturbed (for redevelopment activities); and the future impervious area constructed within the disturbed area. (Round to the nearest tenth of an acre.)
- | Total Site Area | Total Area To Be Disturbed | Existing Impervious Area To Be Disturbed | Future Impervious Area Within Disturbed Area |
|---|---|--|---|
| <div><div></div><div></div><div>7</div><div>8</div><div>.</div><div>9</div></div> | <div><div></div><div></div><div>3</div><div>5</div><div>.</div><div>8</div></div> | <div><div></div><div></div><div></div><div>4</div><div>.</div><div>2</div></div> | <div><div></div><div></div><div>1</div><div>8</div><div>.</div><div>0</div></div> |

Future Impervious
Area Within
Disturbed Area

		1	8	.	0

6. Indicate the percentage of each Hydrologic Soil Group (HSG) at the site.
- | A | B | C | D |
|---|---|--|--|
| <div><div></div><div></div><div>0</div></div> % | <div><div></div><div></div><div>5</div></div> % | <div><div></div><div>7</div><div>0</div></div> % | <div><div></div><div>2</div><div>5</div></div> % |

L

	2	5	%

8. Enter the planned start and end dates of the disturbance activities.
- | Start Date | End Date |
|----------------|----------------|
| 09 / 01 / 2020 | 09 / 01 / 2025 |

End Date

$$\boxed{09} / \boxed{01} / \boxed{2020} - \boxed{09} / \boxed{01} / \boxed{2025}$$

[illegible]

9a. Type of waterbody identified in Question 9?

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

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	52

9b. How was the wetland identified?

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

[illegible]

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-15-002? ☒ Yes ☐ No

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-15-002? ☐ Yes ☒ No

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

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

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

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

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

T o w n o f M o u n t P l e a s a n t

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

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

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

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

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

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

If No, skip questions 23 and 27-39.

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

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

[illegible]

SWPPP Preparer

[illegible]

Contact Name (Last, Space, First)

[illegible]

Mailing Address

[illegible]

City

[illegible]

State Zip

N	Y	1	0	5	8	9	-				

Phone

9	1	4	-	2	7	7	-	5	8	0	5

Fax

9	1	4	-	2	7	7	-	8	2	1	0

Email

T	A	L	L	E	N	@	B	I	B	B	O	A	S	S	O	C	I	A	T	E	S	.	C	O	M

[illegible]

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-15-002. 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

[illegible]

MI

S

Last Name

[illegible]

Signature

Date _____

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

☒ Yes ☐ No

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

Temporary Structural

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

Biotechnical

- ☐ Brush Matting
- ☐ Wattling

Other

[illegible]

Vegetative Measures

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

Permanent Structural

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

Post-construction Stormwater Management Practice (SMP) Requirements

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

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

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

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

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

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

Total WQv Required

2 acre-feet

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

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

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

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

RR Techniques (Area Reduction)	Total Contributing Area (acres)	Total Contributing Impervious Area (acres)
☐ Conservation of Natural Areas (RR-1) ...	.	and/or .
☐ Sheetflow to Riparian Buffers/Filters Strips (RR-2)	.	and/or .
☐ Tree Planting/Tree Pit (RR-3)	.	and/or .
☐ Disconnection of Rooftop Runoff (RR-4) ..	.	and/or .
<u>RR Techniques (Volume Reduction)</u>		
☐ Vegetated Swale (RR-5)	.	.
☐ Rain Garden (RR-6)	.	.
☐ Stormwater Planter (RR-7)	.	.
☐ Rain Barrel/Cistern (RR-8)	.	.
☐ Porous Pavement (RR-9)	.	.
☐ Green Roof (RR-10)	.	.
<u>Standard SMPs with RRv Capacity</u>		
☐ Infiltration Trench (I-1)	.	.
☒ Infiltration Basin (I-2)	. 9 .	7 3 2
☐ Dry Well (I-3)	.	.
☒ Underground Infiltration System (I-4)	. 6 .	4 5 3
☐ Bioretention (F-5)	.	.
☐ Dry Swale (O-1)	.	.
<u>Standard SMPs</u>		
☐ Micropool Extended Detention (P-1)	.	.
☒ Wet Pond (P-2)	. 0 .	6 7 9
☐ Wet Extended Detention (P-3)	.	.
☐ Multiple Pond System (P-4)	.	.
☐ Pocket Pond (P-5)	.	.
☐ Surface Sand Filter (F-1)	.	.
☐ Underground Sand Filter (F-2)	.	.
☐ Perimeter Sand Filter (F-3)	.	.
☐ Organic Filter (F-4)	.	.
☐ Shallow Wetland (W-1)	.	.
☐ Extended Detention Wetland (W-2)	.	.
☐ Pond/Wetland System (W-3)	.	.
☒ Pocket Wetland (W-4)	. 1 .	0 0 4
☐ Wet Swale (O-2)	.	.

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

<u>Alternative SMP</u>	<u>Total Contributing Impervious Area (acres)</u>
☐ Hydrodynamic	<table border="1" style="width: 60px; height: 40px; margin-right: 5px;"></table> • <table border="1" style="width: 60px; height: 40px;"></table>
☐ Wet Vault	<table border="1" style="width: 60px; height: 40px; margin-right: 5px;"></table> • <table border="1" style="width: 60px; height: 40px;"></table>
☐ Media Filter	<table border="1" style="width: 60px; height: 40px; margin-right: 5px;"></table> • <table border="1" style="width: 60px; height: 40px;"></table>
☐ Other <table border="1" style="display: inline-table; width: 180px; height: 25px; vertical-align: middle;"></table>	<table border="1" style="width: 60px; height: 40px; margin-right: 5px;"></table> • <table border="1" style="width: 60px; height: 40px;"></table>

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

[illegible]

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

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

Total RRv provided

		1

.

9	6	4

acre-feet

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

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

☐ Yes ☒ No

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

Minimum RRv Required

		0	.	6	3	6

 acre-feet

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

☒ Yes ☐ No

If Yes, go to question 33.

Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQV required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQV required (#28) must also be included in the SWPPP.

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

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

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

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

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

WQv Provided

0 . 2 3 6 acre-feet

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

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

2 . 2 0 0

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

If Yes, go to question 36.

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

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

CPv Required

9 . 6 5 9 acre-feet

CPv Provided

9 . 6 5 9 acre-feet

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

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

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

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

Total Overbank Flood Control Criteria (Qp)

Pre-Development

2 2 0 . 4 9 CFS

Post-development

1 6 1 . 1 9 CFS

Total Extreme Flood Control Criteria (Qf)

Pre-Development

5 3 4 . 7 7 CFS

Post-development

4 3 7 . 3 1 CFS

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

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

- ☒ Yes ☐ No

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

[illegible]

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

☒ Yes ☐ No

☒ Yes ☐ No

☒ Yes ☐ No

N	Y	R					

Owner/Operator Certification

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

Print First Name

MI

Print Last Name

Owner/Operator Signature

Date

		/			/				



**Department of
Environmental
Conservation**

**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: Fareri Associates / North 80, LLC

2. Contact Person: Kevin Molnar, AIA

3. Street Address: 2 Dearfield Drive Suite 3

4. City/State/Zip: Greenwich, CT 06831

II. Project Site Information

5. Project/Site Name: The North 60

6. Street Address: Hospital Road, Route 9A, Old Saw Mill River Road

7. City/State/Zip: Hawthorne, NY 10532

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



Appendix K:
Contractor Certification Document

**Contact Information and Certification:**

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 this Stormwater Pollution Prevention Plan (SWPPP); and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices as shown on the Construction Plans 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 certification statement on the next page before they commence any construction activity.

In addition to signing the certification statement, 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.

CONTRACTOR'S CERTIFICATION

PROJECT NAME: THE NORTH 60

PROJECT ADDRESS: HOSPITAL ROAD & ROUTE 9A, MOUNT PLEASANT, NY

"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"

Name: _____

Business Name: _____

Address: _____

Phone: _____

Trained Contractor Signature

Date



CONTRACTOR'S RESPONSIBILITY CERTIFICATION

PROJECT NAME: THE NORTH 60
PROJECT ADDRESS: HOSPITAL ROAD & ROUTE 9A, MOUNT PLEASANT, NY

Name: _____
Title: _____
Business Name: _____
Address: _____
Phone: _____

Specific element of the SWPPP Responsible for: _____
(i.e. silt fence, stabilized construction entrance, inlet protection, post-construction stormwater management practices installation, etc.)

Contractor Signature

Date

Trained Contractor responsible for SWPPP implementation:
(Individual listed on certification page above)

Name: _____
Business Name: _____
Address: _____
Phone: _____

(MAKE ADDITIONAL COPIES AS NEEDED)



Appendix L:
Phase 1 Sequence of Construction



CONSTRUCTION SEQUENCING:

PRIOR TO THE COMMENCEMENT OF CONSTRUCTION, THE APPLICANT, APPLICANT'S ENGINEER, CONTRACTOR, AND REPRESENTATIVES OF ALL INVOLVED REGULATORY AGENCIES SHALL REVIEW ALL ASPECTS OF THE PROPOSED CONSTRUCTION IN A PRE-CONSTRUCTION MEETING AT THE PROJECT SITE.

PHASE 1A:

1. INSTALL ALL EROSION AND SEDIMENT CONTROL MEASURES FOR PHASE 1A IN THE LOCATIONS SHOWN ON THE PROPOSED EROSION AND SEDIMENT CONTROL PLANS. NOTE: INITIAL ACCESS FOR EQUIPMENT MOBILIZATION FOR PHASE 1A SHALL BE FROM THE EXISTING DRIVEWAY TO SAW MILL RIVER ROAD AT THE NORTHEAST CORNER OF THE PROJECT SITE.
2. BEGIN DEMOLITION / REMOVAL OPERATIONS OF EXISTING DWELLINGS AND ANCILLARY SITE FEATURES WITHIN LIMITS OF PHASE 1A. ALL EXCESS MATERIAL AND CONSTRUCTION DEBRIS GENERATED BY REMOVAL OPERATIONS SHALL BE REMOVED FROM SITE AND PROPERLY DISPOSED OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL GUIDELINES.
3. ESTABLISH CONTRACTOR STAGING AREA FOR CONSTRUCTION TRAILERS, EQUIPMENT MOBILIZATION AND STOCKPILES FOR FUTURE WEST ST. EXCAVATION.
4. ALL AREAS WITHIN PHASE 1A WHICH ARE NOT TO BE UTILIZED FOR STAGING OR STOCKPILE AREA SHALL BE IMMEDIATELY STABILIZED WITH SEED AND MULCH IN ACCORDANCE WITH THE SEEDING NOTES SPECIFIED HEREIN ON SHEET D-4.

PHASE 1B:

1. INSTALL ALL EROSION AND SEDIMENT CONTROL MEASURES FOR PHASE 1B IN THE LOCATIONS SHOWN ON THE PROPOSED EROSION AND SEDIMENT CONTROL PLANS.
2. CLEAR AND GRUB PHASE 1B WORK AREA. ALL STUMPS GENERATED DURING CLEARING OPERATIONS SHALL BE REMOVED FROM SITE AND LEGALLY DISPOSED OF. NO ONSITE BURIAL OF THIS MATERIAL SHALL BE PERMITTED.
3. STRIP AND STOCKPILE TOPSOIL FROM PROPOSED WORK AREA. TOPSOIL SHALL BE TRANSPORTED VIA THE EXISTING DRIVEWAY TO THE STOCKPILE/ STAGING AREA ESTABLISHED DURING PHASE 1A. STOCKPILED MATERIAL TO REMAIN UNUSED FOR (7) SEVEN DAYS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE TEMPORARY SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
4. BEGIN EARTHWORK OPERATIONS FOR FOR WEST ST. AND STORMWATER BASIN (SWP-1). BEGINNING AT OLD SAW MILL RIVER ROAD. AND CONSTRUCT RETAINING WALLS. ALL EXCESS MATERIAL RESULTING FROM WEST ST. EARTHWORK OPERATIONS SHALL BE TRANSPORTED VIA THE EXISTING DRIVEWAY TO THE STOCKPILE/STAGING AREA ESTABLISHED DURING PHASE 1A. STOCKPILE MATERIAL TO REMAIN UNUSED FOR (7) SEVEN DAYS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH TEMPORARY SEEDING SPECIFICATIONS.

NOTE: STABILIZED CONSTRUCTION ENTRANCES FROM OLD SAW MILL RIVER ROAD AND EXISTING DRIVEWAY SHALL BE UTILIZED FOR CONSTRUCTION VEHICLE ACCESS DURING



THIS PHASE. CONNECTION TO SAW MILL RIVER ROAD (ROUTE 9A) SHALL NOT BE UTILIZED UNTIL SUCH TIME THAT ALL NECESSARY PERMANENT TRAFFIC CONTROL MEASURES HAVE BEEN INSTALLED.

5. INSTALL PROPOSED DRAINAGE STRUCTURES, ASSOCIATED INLET PROTECTION, CONNECTED PIPING, SUBSURFACE UTILITIES AND CURBS WITHIN LIMITS OF PHASE 1B.
6. INSTALL ITEM-4 SUB-BASE FOR PROPOSED ROAD, CONSTRUCT SIDEWALKS, AND ASPHALT PAVEMENT TO BINDER COURSE WITHIN LIMITS OF PHASE 1B.
7. STABILIZE ALL DISTURBED AREAS WITH TOPSOIL, SEED AND MULCH IN ACCORDANCE WITH THE SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
8. REMOVE ANY ACCUMULATED SEDIMENT FROM STORMWATER BASIN (SWP-1) (TO BE UTILIZED AS TEMPORARY SEDIMENT BASIN DURING CONSTRUCTION), INSTALL PERMANENT BASIN PLANTINGS AND MAKE ANY MODIFICATIONS NECESSARY TO BASIN OUTLET STRUCTURE FOR CONVERSION FROM TEMPORARY SEDIMENT BASIN TO PERMANENT STORMWATER MANAGEMENT PRACTICE.
9. INSTALL REQUIRED TRAFFIC CONTROL MEASURES AT OLD SAW MILL RIVER ROAD AND SAW MILL RIVER ROAD (ROUTE 9A) IN ACCORDANCE WITH NYSDOT AND TOWN REQUIREMENTS.
10. ONCE FINAL STABILIZATION IS ACHIEVED ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES CAN BE REMOVED AND ALL DRAINAGE STRUCTURES SHALL BE INSPECTED AND ALL ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF.

PHASE 1C:

1. INSTALL ALL EROSION AND SEDIMENT CONTROL MEASURES FOR PHASE 1C IN THE LOCATIONS SHOWN ON THE PROPOSED EROSION AND SEDIMENT CONTROL PLANS.
2. CLEAR AND GRUB PHASE 1C WORK AREA. ALL STUMPS GENERATED DURING CLEARING OPERATIONS SHALL BE REMOVED FROM SITE AND LEGALLY DISPOSED OF. NO ONSITE BURIAL OF THIS MATERIAL SHALL BE PERMITTED.
3. STRIP AND STOCKPILE TOPSOIL FROM PROPOSED WORK AREA. TOPSOIL SHALL BE STOCKPILED IN THE STOCKPILE/ STAGING AREA ESTABLISHED DURING PHASE 1A. STOCKPILED MATERIAL TO REMAIN UNUSED FOR (7) SEVEN DAYS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE TEMPORARY SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
4. BEGIN EARTHWORK OPERATIONS FOR REMAINDER WEST ST. WITHIN LIMITS OF PHASE 1C. ALL EXCESS MATERIAL RESULTING FROM PHASE 1C EARTHWORK OPERATIONS SHALL BE STOCKPILED IN THE STOCKPILE/ STAGING AREA ESTABLISHED DURING PHASE 1A. STOCKPILED MATERIAL TO REMAIN UNUSED FOR (7) SEVEN DAYS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE TEMPORARY SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
5. INSTALL PROPOSED DRAINAGE STRUCTURES, ASSOCIATED INLET PROTECTION, CONNECTED PIPING, SUBSURFACE UTILITIES AND CURBS WITHIN LIMITS OF PHASE 1C.
6. INSTALL SUBSURFACE INFILTRATION SYSTEM #1. INFILTRATION SYSTEM SHALL REMAIN OFFLINE UNTIL FINAL STABILIZATION HAS BEEN ACHIEVED.



7. INSTALL ITEM 4 SUB-BASE FOR PROPOSED ROAD, CONSTRUCT SIDEWALKS AND ASPHALT PAVEMENT TO BINDER COURSE FOR REMAINDER OF WEST ST. WITHIN LIMITS OF PHASE 1C.
8. STABILIZE ALL DISTURBED AREAS WITH TOPSOIL, SEED AND MULCH IN ACCORDANCE WITH THE SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
9. ONCE FINAL STABILIZATION IS ACHIEVED ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES CAN BE REMOVED AND ALL DRAINAGE STRUCTURES SHALL BE INSPECTED AND ALL ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF.

PHASE 1D:

1. INSTALL ALL EROSION AND SEDIMENT CONTROL MEASURES FOR PHASE 1D IN THE LOCATIONS SHOWN ON THE PROPOSED EROSION AND SEDIMENT CONTROL PLANS.
2. CLEAR AND GRUB PHASE 1D WORK AREA. ALL STUMPS GENERATED DURING CLEARING OPERATIONS SHALL BE REMOVED FROM SITE AND LEGALLY DISPOSED OF. NO ONSITE BURIAL OF THIS MATERIAL SHALL BE PERMITTED.
3. STRIP AND STOCKPILE TOPSOIL FROM PROPOSED WORK AREA. TOPSOIL SHALL BE STOCKPILED IN THE LOCATIONS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLANS WITHIN THE LIMITS OF PHASE 1D. STOCKPILED MATERIAL TO REMAIN UNUSED FOR (7) SEVEN DAYS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE TEMPORARY SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
4. BEGIN EARTHWORK OPERATIONS FOR HOTEL DRIVE, STORMWATER BASIN (SWP-4) AND CONSTRUCT RETAINING WALLS. ALL EXCESS MATERIAL RESULTING FROM PHASE 1D EARTHWORK OPERATIONS SHALL BE STOCKPILED WITHIN LIMITS OF PHASE 1D AND ANY STOCKPILED MATERIAL WHICH REMAINS UNUSED FOR (7) DAYS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE TEMPORARY SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
5. BEGIN CONSTRUCTION OF HOTEL BUILDING.
6. INSTALL PROPOSED SUBSURFACE WATER AND SEWER MAINS FROM WEST ST. TO END OF HOTEL DRIVE.
7. INSTALL PROPOSED DRAINAGE STRUCTURES, ASSOCIATED INLET PROTECTION, CONNECTED PIPING, SUBSURFACE UTILITIES AND CURBS WITHIN LIMITS OF PHASE 1D.
8. INSTALL ITEM 4-SUB BASE FOR HOTEL DRIVE, CONSTRUCT SIDEWALKS AND ASPHALT PAVEMENT TO BINDER COURSE.
9. STABILIZE ALL DISTURBED AREAS WITH TOPSOIL, SEED AND MULCH IN ACCORDANCE WITH THE SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
10. REMOVE ANY ACCUMULATED SEDIMENT FROM STORMWATER BASIN (SWP-4) (TO BE UTILIZED AS TEMPORARY SEDIMENT BASIN DURING CONSTRUCTION), INSTALL PERMANENT BASIN PLANTINGS AND MAKE ANY MODIFICATIONS NECESSARY TO BASIN OUTLET STRUCTURE FOR CONVERSION FROM TEMPORARY SEDIMENT BASIN TO PERMANENT STORMWATER MANAGEMENT PRACTICE.
11. ONCE FINAL STABILIZATION IS ACHIEVED ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES CAN BE REMOVED AND ALL DRAINAGE STRUCTURES SHALL BE INSPECTED AND ALL ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF.



PHASE 1E:

1. INSTALL ALL EROSION AND SEDIMENT CONTROL MEASURES FOR PHASE 1E IN THE LOCATIONS SHOWN ON THE PROPOSED EROSION AND SEDIMENT CONTROL PLANS.
2. CLEAR AND GRUB PHASE 1E WORK AREA. ALL STUMPS GENERATED DURING CLEARING OPERATIONS SHALL BE REMOVED FROM SITE AND LEGALLY DISPOSED OF. NO ONSITE BURIAL OF THIS MATERIAL SHALL BE PERMITTED.
3. STRIP AND STOCKPILE TOPSOIL FROM PROPOSED WORK AREA. TOPSOIL SHALL BE STOCKPILED IN THE LOCATIONS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLANS WITHIN THE LIMITS OF PHASE 1E. STOCKPILED MATERIAL TO REMAIN UNUSED FOR (7) SEVEN DAYS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE TEMPORARY SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
4. BEGIN EARTHWORK OPERATIONS FOR HOTEL PARKING AREA. ALL EXCESS MATERIAL RESULTING FROM PHASE 1E EARTHWORK OPERATIONS SHALL BE STOCKPILED IN STOCKPILE/STAGING AREA ESTABLISHED DURING PHASE 1A. ANY STOCKPILED MATERIAL WHICH REMAINS UNUSED FOR (7) DAYS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE TEMPORARY SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
5. INSTALL PROPOSED DRAINAGE STRUCTURES, ASSOCIATED INLET PROTECTION, CONNECTED PIPING, SUBSURFACE UTILITIES AND CURBS WITHIN LIMITS OF PHASE 1E.
6. INSTALL SUBSURFACE INFILTRATION SYSTEM # 3. INFILTRATION SYSTEM SHALL REMAIN OFFLINE UNTIL FINAL STABILIZATION HAS BEEN ACHIEVED.
7. INSTALL ITEM 4-SUB BASE FOR HOTEL PARKING AREA, CONSTRUCT SIDEWALKS AND ASPHALT PAVEMENT FOR PARKING AREA AND TOP COURSE OF HOTEL DRIVE.
8. STABILIZE ALL DISTURBED AREAS WITH TOPSOIL, SEED AND MULCH IN ACCORDANCE WITH THE SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
9. ONCE FINAL STABILIZATION IS ACHIEVED ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES CAN BE REMOVED. ALL DRAINAGE STRUCTURES SHALL BE INSPECTED AND ALL ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF AND INFILTRATION SYSTEM CAN BE PLACED ONLINE.

PHASE 1F:

1. INSTALL ALL EROSION AND SEDIMENT CONTROL MEASURES FOR PHASE 1F IN THE LOCATIONS SHOWN ON THE PROPOSED EROSION AND SEDIMENT CONTROL PLANS.
2. CLEAR AND GRUB PHASE 1F WORK AREA. ALL STUMPS GENERATED DURING CLEARING OPERATIONS SHALL BE REMOVED FROM SITE AND LEGALLY DISPOSED OF. NO ONSITE BURIAL OF THIS MATERIAL SHALL BE PERMITTED.
3. STRIP AND STOCKPILE TOPSOIL FROM PROPOSED WORK AREA. TOPSOIL SHALL BE STOCKPILED IN THE LOCATIONS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLANS WITHIN THE LIMITS OF PHASE 1F. STOCKPILED MATERIAL TO REMAIN UNUSED FOR (7) SEVEN DAYS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE TEMPORARY SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
4. BEGIN EARTHWORK OPERATIONS FOR INFILTRATION BASIN (SWP-3). ALL EXCESS MATERIAL RESULTING FROM PHASE 1F EARTHWORK OPERATIONS SHALL BE



STOCKPILED IN LOCATION SHOWN HEREON WITHIN LIMITS OF PHASE 1F. ANY STOCKPILED MATERIAL WHICH REMAINS UNUSED FOR (7) DAYS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE TEMPORARY SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.

5. INSTALL PROPOSED DRAINAGE STRUCTURES, ASSOCIATED INLET PROTECTION AND CONNECTED PIPING WITHIN PHASE 1F.
6. STABILIZE ALL DISTURBED AREAS WITH TOPSOIL, SEED AND MULCH IN ACCORDANCE WITH THE SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
7. ONCE FINAL STABILIZATION HAS BEEN ACHIEVED ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES CAN BE REMOVED. ALL DRAINAGE STRUCTURES SHALL BE INSPECTED AND ALL ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF.

PHASE 1G:

1. INSTALL ALL EROSION AND SEDIMENT CONTROL MEASURES FOR PHASE 1G IN THE LOCATIONS SHOWN ON THE PROPOSED EROSION AND SEDIMENT CONTROL PLANS.
2. CLEAR AND GRUB PHASE 1G WORK AREA. ALL STUMPS GENERATED DURING CLEARING OPERATIONS SHALL BE REMOVED FROM SITE AND LEGALLY DISPOSED OF. NO ONSITE BURIAL OF THIS MATERIAL SHALL BE PERMITTED.
3. STRIP AND STOCKPILE TOPSOIL FROM PROPOSED WORK AREA. TOPSOIL SHALL BE STOCKPILED IN THE LOCATIONS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLANS WITHIN THE LIMITS OF PHASE 1G. STOCKPILED MATERIAL TO REMAIN UNUSED FOR (7) SEVEN DAYS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE TEMPORARY SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
4. BEGIN EARTHWORK OPERATIONS FOR MAIN ST. AND NORTH PARKING LOT. EXCESS MATERIAL STOCKPILED FROM PREVIOUS PHASES IN STAGING AREA ESTABLISHED DURING PHASE 1A SHALL BE UTILIZED FOR FILL IN NORTH PARKING LOT. ANY STOCKPILED MATERIAL WHICH REMAINS UNUSED FOR (7) SEVEN DAYS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE TEMPORARY SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
5. INSTALL PROPOSED DRAINAGE STRUCTURES, ASSOCIATED INLET PROTECTION, CONNECTED PIPING, SUBSURFACE UTILITIES AND CURBS WITHIN LIMITS OF PHASE 1G.
6. INSTALL SUBSURFACE INFILTRATION SYSTEM # 2. INFILTRATION SYSTEM SHALL REMAIN OFFLINE UNTIL FINAL STABILIZATION HAS BEEN ACHIEVED.
7. INSTALL ITEM 4-SUB BASE FOR MAIN ST. AND NORTH PARKING LOT, CONSTRUCT SIDEWALKS AND INSTALL ASPHALT PAVEMENT TO BINDER COURSE.
8. STABILIZE ALL DISTURBED AREAS WITH TOPSOIL, SEED AND MULCH IN ACCORDANCE WITH THE SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
9. ONCE FINAL STABILIZATION HAS BEEN ACHIEVED ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES CAN BE REMOVED. ALL DRAINAGE STRUCTURES SHALL BE INSPECTED AND ALL ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF.



PHASE 1H:

1. INSTALL ALL EROSION AND SEDIMENT CONTROL MEASURES FOR PHASE 1H IN THE LOCATIONS SHOWN ON THE PROPOSED EROSION AND SEDIMENT CONTROL PLANS.
2. CLEAR AND GRUB PHASE 1H WORK AREA. ALL STUMPS GENERATED DURING CLEARING OPERATIONS SHALL BE REMOVED FROM SITE AND LEGALLY DISPOSED OF. NO ONSITE BURIAL OF THIS MATERIAL SHALL BE PERMITTED.
3. STRIP AND STOCKPILE TOPSOIL FROM PROPOSED WORK AREA. TOPSOIL SHALL BE STOCKPILED IN THE STOCKPILE/ STAGING AREA ESTABLISHED DURING PHASE 1A. STOCKPILED MATERIAL TO REMAIN UNUSED FOR (7) SEVEN DAYS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE TEMPORARY SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
4. BEGIN EARTHWORK OPERATIONS FOR CENTRAL PARKING LOT. ALL EXCESS MATERIAL RESULTING FROM PHASE 1H EARTHWORK OPERATIONS SHALL BE STOCKPILED IN STOCKPILE/STAGING AREA ESTABLISHED DURING PHASE 1A. ANY STOCKPILED MATERIAL WHICH REMAINS UNUSED FOR (7) DAYS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE TEMPORARY SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
5. BEGIN CONSTRUCTION OF PHARMACY BUILDING.
6. INSTALL PROPOSED DRAINAGE STRUCTURES, ASSOCIATED INLET PROTECTION, CONNECTED PIPING, SUBSURFACE UTILITIES AND CURBS WITHIN LIMITS OF PHASE 1H.
7. INSTALL ITEM 4-SUB BASE FOR CENTRAL PARKING LOT, CONSTRUCT SIDEWALKS AND INSTALL ASPHALT PAVEMENT TO BINDER COURSE.
8. STABILIZE ALL DISTURBED AREAS WITH TOPSOIL, SEED AND MULCH IN ACCORDANCE WITH THE SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
9. ONCE FINAL STABILIZATION HAS BEEN ACHIEVED ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES CAN BE REMOVED. ALL DRAINAGE STRUCTURES SHALL BE INSPECTED AND ALL ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF.

PHASE 1I:

1. INSTALL ALL EROSION AND SEDIMENT CONTROL MEASURES FOR PHASE 1I IN THE LOCATIONS SHOWN ON THE PROPOSED EROSION AND SEDIMENT CONTROL PLANS.
2. CLEAR AND GRUB PHASE 1I WORK AREA. ALL STUMPS GENERATED DURING CLEARING OPERATIONS SHALL BE REMOVED FROM SITE AND LEGALLY DISPOSED OF. NO ONSITE BURIAL OF THIS MATERIAL SHALL BE PERMITTED.
3. STRIP AND STOCKPILE TOPSOIL FROM PROPOSED WORK AREA. TOPSOIL SHALL BE STOCKPILED IN THE STOCKPILE/ STAGING AREA ESTABLISHED DURING PHASE 1A. STOCKPILED MATERIAL TO REMAIN UNUSED FOR (7) SEVEN DAYS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE TEMPORARY SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
4. BEGIN EARTHWORK OPERATIONS FOR INFILTRATION BASIN (SWP-2). ALL EXCESS MATERIAL RESULTING FROM PHASE 1F EARTHWORK OPERATIONS SHALL BE STOCKPILED IN LOCATION SHOWN HEREON WITHIN LIMITS OF PHASE 1F. ANY STOCKPILED MATERIAL WHICH REMAINS UNUSED FOR (7) DAYS SHALL BE SEEDED AND



STABILIZED IN ACCORDANCE WITH THE TEMPORARY SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.

5. BEGIN EARTHWORK OPERATIONS FOR CROSS ST. AND WEST PARKING LOT.
6. INSTALL PROPOSED DRAINAGE STRUCTURES, ASSOCIATED INLET PROTECTION, CONNECTED PIPING, SUBSURFACE UTILITIES AND CURBS WITHIN LIMITS OF PHASE 1I.
7. INSTALL ITEM 4-SUB BASE FOR CROSS ST. AND WEST PARKING LOT, CONSTRUCT SIDEWALKS AND INSTALL ASPHALT PAVEMENT TO BINDER COURSE.
8. STABILIZE ALL DISTURBED AREAS WITH TOPSOIL, SEED AND MULCH IN ACCORDANCE WITH THE SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
9. ONCE FINAL STABILIZATION HAS BEEN ACHIEVED ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES CAN BE REMOVED. ALL DRAINAGE STRUCTURES SHALL BE INSPECTED AND ALL ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF.

PHASE 1J:

1. INSTALL ALL EROSION AND SEDIMENT CONTROL MEASURES FOR PHASE 1J IN THE LOCATIONS SHOWN ON THE PROPOSED EROSION AND SEDIMENT CONTROL PLANS.
2. CLEAR AND GRUB PHASE 1J WORK AREA. ALL STUMPS GENERATED DURING CLEARING OPERATIONS SHALL BE REMOVED FROM SITE AND LEGALLY DISPOSED OF. NO ONSITE BURIAL OF THIS MATERIAL SHALL BE PERMITTED.
3. STRIP AND STOCKPILE TOPSOIL FROM PROPOSED WORK AREA. TOPSOIL SHALL BE STOCKPILED IN THE STOCKPILE/ STAGING AREA ESTABLISHED DURING PHASE 1A. STOCKPILED MATERIAL TO REMAIN UNUSED FOR (7) SEVEN DAYS SHALL BE SEEDED AND STABILIZED IN ACCORDANCE WITH THE TEMPORARY SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
4. BEGIN CONSTRUCTION OF BIOTECH AND GROCERY BUILDINGS.
5. INSTALL PROPOSED DRAINAGE STRUCTURES, ASSOCIATED INLET PROTECTION, CONNECTED PIPING, SUBSURFACE UTILITIES AND CURBS WITHIN LIMITS OF PHASE 1J.
6. INSTALL ITEM 4-SUB BASE FOR PARKING AREAS, CONSTRUCT SIDEWALKS AND INSTALL ASPHALT PAVEMENT TO BINDER COURSE.
7. STABILIZE ALL DISTURBED AREAS WITH TOPSOIL, SEED AND MULCH IN ACCORDANCE WITH THE SEEDING SPECIFICATIONS PROVIDED ON SHEET D-4.
8. ONCE FINAL STABILIZATION HAS BEEN ACHIEVED ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES CAN BE REMOVED. ALL DRAINAGE STRUCTURES SHALL BE INSPECTED AND ALL ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF.



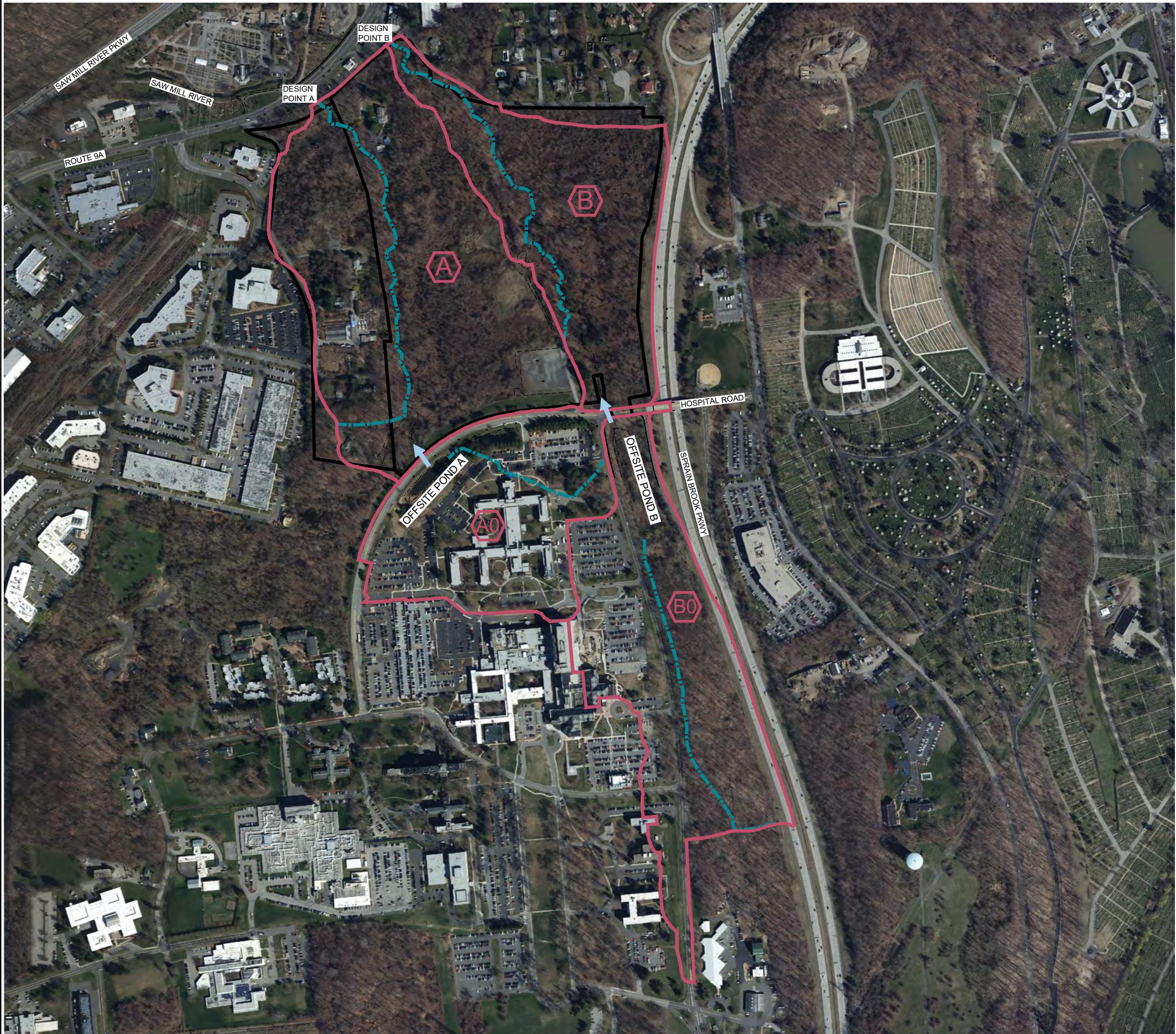
Figure 1:
Pre-Development Watershed Boundary Map



Figure 2:
Post-Development Watershed Boundary Map

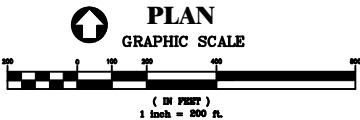


Figure 3:
Offsite Watershed Boundary Map



LEGEND

-  WATERSHED BOUNDARY LINE
-  WATERSHED IDENTIFICATION
-  TIME OF CONCENTRATION (T_c) PATH
-  LOCATION OF OFFSITE POND OUTLET ONTO PROJECT SITE



REVISIONS
DATE: DESCRIPTION BY/CHK DATE: DESCRIPTION BY/CHK

NOTE: OFFSITE CONTRIBUTING WATERSHED AREAS HAVE BEEN DELINEATED BASED ON INFORMATION PROVIDED FROM WESTCHESTER COUNTY DEPARTMENT OF PUBLIC WORKS, TOPOGRAPHY SUPPLIED BY WESTCHESTER COUNTY GIS MAPPING, AND FIELD OBSERVATIONS.

DATE:	DESCRIPTION	BY/CHK	DATE:	DESCRIPTION	BY/CHK
OFFSITE WATERSHED BOUNDARY MAP					
WESTCHESTER MEDICAL VILLAGE			DATE:	JUNE 3, 2019	
STREET ADDRESS			SCALE:	1" = 200'	
TOWN OF MOUNT PLEASANT, WESTCHESTER COUNTY			FILE:	12-D	
			DSGN /	NG/TA	
			CHK:		
			DRN. BY:	NG	
			SHT NO.	FIGURE 3	
 BIBBO ASSOCIATES, LLP			DWG NO.	OW	
293 ROUTE 100 SUITE 203					
SOMERS, NEW YORK 10589					
TEL: 914 277 5855					



Figure 4:
Soil Testing Map

