Stormwater Pollution Prevention Plan

REGENERON

Building 81 Addition

35 Discovery Drive
Town of East Greenbush
Rensselear County, New York

October 1, 2019

Prepared by:

Hart Engineering
1969 Ferndale Rd
Castleton NY 12033
(518) 474-4014

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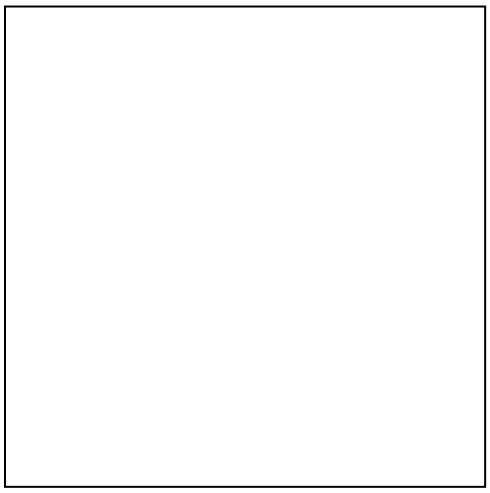
PREPARER OF THE SWPPP

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a Class A misdemeanor pursuant to Section 29.45 of the Penal Law."

Name[1]: Steve Hart, PE

Title: Owner

Date: October 2019



[1] *This is a signature of a New York State licensed Professional Engineer employed by Hart Engineering that is duly authorized to sign and seal Stormwater Pollution Prevention Plans (SWPPPs), NOIs, and NOTs prepared under their direct supervision.*

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1.0 EXECUTIVE SUMMARY

This Stormwater Pollution Prevention Plan (SWPPP) has been prepared for major activities associated with construction of a 10,025 sft office/warehouse Addition to Building 81. This SWPPP includes the elements necessary to comply with the national baseline general permit for construction activities enacted by the U.S. Environmental Protection Agency (EPA) under the National Pollutant Discharge Elimination System (NPDES) program and all local governing agency requirements. This SWPPP must be implemented at the start of construction.

This SWPPP has been developed in accordance with the "New York State Department of Environmental Conservation (NYSDEC) State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity" General Permit Number GP-0-15-002, effective January 29, 2015 through January 28, 2020. The SWPPP and accompanying plans identify and detail stormwater management, pollution prevention, and erosion and sediment control measures necessary during and following completion of construction.

This SWPPP and the accompanying plans entitled " Regeneron Building 81 Addition" have been submitted as a set. These engineering drawings are considered an integral part of this SWPPP. Therefore, this SWPPP is not considered complete without them. References made herein to "the plans" or to a specific "sheet" refer to these drawings.

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

1. Maintaining existing drainage patterns as much as possible while continuing the conveyance of upland watershed runoff;

2. Controlling increases in the rate of stormwater runoff resulting from the proposed development so as not to adversely alter downstream conditions; and

3. Mitigating potential stormwater quality impacts and preventing soil erosion and sedimentation resulting from stormwater runoff generated both during and after construction.

The analysis and design completed and documented in this report is intended to be part of the application made for a commercial redevelopment project completed on behalf of the Owner.

1.1 Project Description

Regeneron Pharmaceuticals is proposing redevelopment of an existing building including 10,000 sft addition and reconfiguration of the existing load area at building 81. A location map of the site has been provided in Appendix G, as Figure 1.

This type of of project is included in Table 2 of Appendix B of GP-0-15-002; and the project site is not located in one of the watersheds listed in Appendix C of GP-0-15-002.

Therefore, this SWPPP includes post-construction stormwater management practices, as well as erosion and sediment controls.

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

Runoff from the project site will discharge to theun-named stream, which is not included in the list of Section 303(d) water bodies included in Appendix E of GP-0-15-002.

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

1.2 Stormwater Pollution Controls

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

- New York State Stormwater Management Design Manual, dated January 2015 (Design Manual).
- New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016 (SSESC).

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

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

Storm water planters and underground detention will be used to manage and treat stormwater runoff generated by the proposed redevelopment.

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

The post-construction stormwater management practice(s) will be privately owned by the Regeneron Pharmaceuticals. Deed restrictions will be in place, which require operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

1.3 Conclusion

This project is subject to the requirements of the Town of East Greenbush regulated MS4, and this SWPPP has been prepared in conformance with the current Design Manual and SSESC. As such, GP-0-15-002 coverage will be effective five (5) business days from the date the NYSDEC receives the electronically submitted eNOI and signed "MS4 SWPPP Acceptance" form, or ten (10) business days from the date the NYSDEC receives the complete paper NOI and signed "MS4 SWPPP Acceptance" form.

2.0 SWPPP IMPLEMENTATION RESPONSIBILITIES

A summary of the responsibilities and obligations of all parties involved with compliance with the NYSDEC SPDES General Permit GP-0-15-002 conditions is outlined in the subsequent sections. For a complete listing of the definitions, responsibilities, and obligations, refer to the SPDES General Permit GP-0-15-002 presented in Appendix A.

2.1 Definitions

1. "General SPDES Permit" means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 authorizing a category of discharges.

2. "Owner" or "Operator" means the person, persons, or legal entity which owns or leases the property on which the *construction activity* is occurring; and/or an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications. There may be occasions during the course of a project in which there are multiple Owners/Operators, all of which will need to file and maintain the appropriate SWPPP documents and plans, including without limitation, the Notice of Intent (NOI) and Notice of Termination (NOT).

3. "Owner's/Operator's Engineer" means the person or entity retained by an Owner/Operator to design and oversee the implementation of the SWPPP.

4. "Contractor" means the person or entity identified as such in the construction contract with the Owner/Operator. The term "Contractor" shall also include the Contractor's authorized representative, as well as any and all subcontractors retained by the Contractor.

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

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

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

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

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

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

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

   The "Trained Contractor(s)" will be responsible for implementation of the SWPPP.

2.2 Owner's/Operator's Responsibilities

1. Ensure that control measures are selected, designed, installed, implemented and maintained to minimize the discharge of pollutants and prevent a violation of the water quality standards, meeting the non-numeric effluent limitations in Part I.B.1.(a)-(f) of the SPDES General Permit and in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005.

2. Ensure that practices are selected, designed, installed, and maintained to meet the performance criteria in the Design Manual. Practices must be designed to meet the applicable sizing criteria in Part I.C.2.a., b., c. or d. of GP-0-15-002.

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

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

5. Have an authorized corporate officer sign the completed NOI. A copy of the completed NOI is included in Appendix B.

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

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

   Town of East Greenbush
   225 Columbia Turnpike
   Rensselaer, NY 12144
   518-477-9710

7. Pay the required initial and annual fees upon receipt of invoices from NYSDEC. These invoices are generally issued in the fall of each year. The initial fee is calculated as $100.00 per acre disturbed plus $600.00 per acre of net increase in impervious cover, and the annual fee is $100.00.

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

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

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

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

12. Require the Contractor to fully implement the SWPPP prepared for the site by the Owner/Operator's Engineer to ensure that the provisions of the SWPPP are implemented from the commencement of construction activity until all areas of disturbance have achieved final stabilization and the Notice of Termination (NOT) has been submitted to the NYSDEC.

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

14. Maintain a copy of the General Permit (GP-0-15-002), NOI, NOI Acknowledgement Letter, SWPPP, MS4 SWPPP Acceptance Form, inspection reports, Spill Prevention, Countermeasures, Cleanup ("SPCC") Plan, and all documentation in accordance with Part I.F.8.a.-d of GP-0-15-002 necessary to demonstrate eligibility with the permit at the construction site, until all disturbed areas have achieved final stabilization and the NOT has been submitted to the NYSDEC. Place documents in a secure location that must be accessible during normal business hours to an individual performing a compliance inspection.

15. Prior to submitting a Notice of Termination, ensure

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

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

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

    Town of East Greenbush
    225 Columbia Turnpike
    Rensselaer, NY 12144
    518-477-9710

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

18. Implement the Post-Construction Inspections and Maintenance procedures outlined in Appendix F.

19. The NOI, SWPPP, and inspection reports required by GP-0-15-002 are public documents that the Owner/Operator must make available for review and copying by any person within five (5) business days of the Owner/Operator receiving a written request by any such person to review the NOI, SWPPP, or inspection reports. Copying of documents will be done at the requester's expense.

20. The Owner/Operator must keep the SWPPP current at all times. At a minimum, the Owner/Operator shall amend the SWPPP:

    a) Whenever the current provisions prove to be ineffective in minimizing pollutants in stormwater discharges from the project site;

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

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

2.3 Owner's/Operator's Engineer's Responsibilities

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

2. Prepare the Notice of Intent (NOI) form (see Appendix B), sign the "SWPPP Preparer Certification" section of the NOI, and forward to Owner/Operator for signature.

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

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

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

2.4 Contractor's Responsibilities

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

2. Identify at least one Trained Contractor that will be responsible for implementation of this SWPPP. Ensure that at least one Trained Contractor is on site on a daily basis when soil disturbance activities are being performed. The Trained Contractor shall inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating conditions at all times. If deficiencies are identified, the contractor shall begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.

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

4. Maintain a Spill Prevention and Response Plan in accordance with requirements outlined in Section 5.4 of this SWPPP. This plan shall be provided to the Owner's/Operator's Engineer for inclusion in the Site Log Book, prior to mobilization on-site.

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

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

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

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

activities performed. This information must be retained as part of the Site Log Book.

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

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

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

2.5 Qualified Inspector's/Qualified Professional's Responsibilities

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

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

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

4. Prepare an inspection report subsequent to each and every inspection that shall include/address the items listed in Part IV.C.4.a-k of GP-0-15-002. Sign all inspection reports and maintain on site with the SWPPP.

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

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

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

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

9. Conduct a final site assessment and prepare a certification letter to the Owner/Operator indicating that, upon review of the material testing and inspection reports prepared by the firm retained by the Owner/Operator, review of the completed topographic survey, and evaluation of the completed stormwater management facilities, the stormwater management facilities have been constructed substantially in accordance with the contract documents and should function as designed.

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

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

2.6 SWPPP Participants

1. Owner's/Operator's Engineer: Steven Hart
   Hart Engineering
   1969 Ferndale Rd
   Castleton NY 12033
   Phone: (518) 365-6572

2. Owner/Operator: Gerald Underwood
   Regeneron Pharmaceuticals Inc.
   81 Columbia Turnpike
   Rensselaer NY 12144
   Phone: (518) 488-6000

3. Contractor[2]: Name and Title: _____

Company Name: _____

Mailing Address: _____

_____

Phone: _____

Fax: _____

[2] *Contractor's information to be entered once the Contractor has been selected.*

3.0 SITE CHARACTERISTICS

3.1 Land Use and Topography

The project site is located within the OI (Corporate Office/Light Industrial) zoning district Office and Lab Buildings are a permitted use within this district.

The overall site is relatively flat, with slopes ranging from 5 to 10 percent. Site elevations range from approximately 195 feet above mean sea level (MSL) to 180 feet MSL. The proposed site generally drains from South to North, towards the Discovery Drive.

3.2 Soils and Groundwater

The United States Department of Agriculture (USDA) Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/) was used to obtain surficial soil conditions for the study area. Soil data as provided by the SCS is presented in Table 1.

Table 1: USDA Soil Data

Map Symbol & Description	Hydrologic Soil Group	Permeability (inches/hour)	Erosion Factor K	Depth to Water Table (feet)	Depth to Bedrock (inches)
NaB – Nassau-Manlius Complex undulating	D	0.00 – 0.06 in/hr	0.37	1.5 - 2.0	10” – 20”
HuB – Hudson silt loam, 3 to 8 percent slopes	C/D	0.06 – 0.20 in/hr	0.49	1.5 – 23.0	>80
ElB – Elmridge very fine sandy loam, 3 to 8 percent Slopes	B	0.06 – 0.20 in/hr	0.32	1.5 – 3.0	18” – 40”

Upon review of the soil data presented in Table 1, the project site contains soils with a soil slope phase of E or F.

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

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

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

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

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

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

3.3 Watershed Designation

The project site is not located in a restricted watershed identified in Appendix C of GP-0-15-002.

3.4 Receiving Water Bodies

The nearest natural classified water body into which runoff from the project site will discharge is an un-named stream that runs north west to east of the project site and bisects the Regeneron Campus.

3.5 Aquifer Designation

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

3.6 Wetlands

A search on the NYSDEC Environmental Resource Mapper on October 1, 2019, determined that no regulated wetlands are located on or in the vicinity of the project site.

3.7 Flood Plains

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

3.8 Listed, Endangered, or Threatened Species

A search was performed on the NYSDEC Environmental Resource Mapper on October , 2019, and determined that the project site does not contain any threatened or endangered species, or critical habitat. An Environmental Resource Map has been provided in Appendix G, as Figure 4.

3.9 Historic Places

A search on the New York State Cultural Resource Information System (CRIS) database, revealed the construction activity was not located within an archeologically sensitive area A printout of the historic places screening map is presented in Appendix G, as Figure 7.

As such, NYSOPRHP coordination has been completed. A copy of the NYSOPRHP documentation, dated June 28, 2018 in accordance with part I.F.8. of GP-0-15-002, is provided in Appendix G, as Figure 8.

3.10 Rainfall Data

Rainfall data utilized in the modeling and analysis were interpolated from maps presented in Chapter 4 of the Design Manual. Rainfall data specific to the portion of Renssealer County under consideration, for various 24-hour storm events, is presented in Table 2:

Table 2: Rainfall Data

Storm Event Return Period	24-Hour Rainfall (inches)
1-year	2.31
10-year	3.88
100-year	3.58

These values were used to evaluate the pre- and post-development stormwater runoff characteristics.

4.0 CONSTRUCTION SEQUENCE

This project encompasses less than five acres of land and disturbance of additional off-site properties to facilitate construction is not anticipated. Therefore, written approval from Town of East Greenbush allowing the disturbance of more than five acres of land at any one time is not required. If the Contractor's construction sequence requires the disturbance of more than five acres at any one time, written approval must be obtained from Town of East Greenbush prior to disturbing more than five acres at once.

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

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

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

5.0 CONSTRUCTION-PHASE POLLUTION CONTROL

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

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

- NYSDEC SPDES General Permit for Stormwater Discharges From Construction Activity, Permit No. GP-0-15-002 (effective January 29, 2015 through January 28, 2020)

- New York State Standards and Specifications for Erosion and Sediment Control, NYSDEC (November 2016)

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

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

1. Minimizing soil erosion and sedimentation by stabilization of disturbed areas and by removing sediment from construction site discharges.

2. Preservation of existing vegetation to the greatest extent practical. Following the completion of construction activities in any portion of the site, permanent vegetation shall be established on all exposed soils.

3. Site preparation activities to minimize the area and duration of soil disruption.

4. Establishment of permanent traffic corridors to ensure that “routes of convenience” are avoided.

5.1 Temporary Erosion and Sediment Control Measures

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

5.1.1 Stabilized Construction Entrance

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

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

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

5.1.2 Dust Control

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

5.1.3 Temporary Soil Stockpile

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

5.1.4 Silt Fencing

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

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

5.1.5 Temporary Seeding

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

5.1.6 Stone and Block Drop Inlet Protection

Concrete blocks surrounded by wire mesh and crushed stone will be placed around both existing catch basins, and proposed catch basins once they have been installed, to prevent sediment from entering the catch basins and storm sewer system. During construction, crushed stone shall be replaced as necessary to ensure proper function.

5.1.7 Filter Fabric Drop Inlet Protection

Install filter fabric or silt fence with wooden stakes at the perimeter of existing or proposed catch basins located in lawn areas, to prevent sediment from entering the catch basins and storm sewer system. Remove sediment accumulation and repair or replace fabric as necessary to ensure proper function.

5.1.8 Dewatering Operations

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

5.2 Permanent Erosion and Sediment Control Measures

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

5.2.1 Establishment of Permanent Vegetation

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

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

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

5.3 Other Pollutant Controls

Other necessary pollutant controls are listed below:

5.3.1 Solid and Liquid Waste Disposal

No solid or liquid waste materials, including building materials, shall be discharged from the site with stormwater. All solid waste, including disposable materials incidental to any construction activities, must be collected and placed in containers. The containers shall be emptied periodically by a licensed trash disposal service and hauled away from the site.

Substances that have the potential for polluting surface and/or groundwater must be controlled by whatever means necessary in order to ensure that they do not discharge from the site. As an example, special care must be exercised during equipment fueling and servicing operations. If a spill occurs, it must be contained and disposed of so that it will not flow from the site or enter groundwater, even if this requires removal, treatment, and disposal of soil. In this regard, potentially polluting substances should be handled in a manner consistent with the impact they represent.

5.3.2 Sanitary Facilities

Temporary sanitary facilities will be provided by the Contractor throughout the construction phase. They must be utilized by all construction personnel and will be serviced by a licensed commercial Contractor. These facilities must comply with state and local sanitary or septic system regulations.

5.3.3 Water Source

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

5.4 Construction Housekeeping Practices

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

5.4.1 Material Stockpiles

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

5.4.2 Equipment Cleaning and Maintenance

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

5.4.3 Detergents

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

5.4.4 Spill Prevention and Response

A Spill Prevention and Response Plan shall be developed for the site by the Contractor(s). The plan shall detail the steps required in the event of an accidental spill and shall identify contact names and phone numbers of people and agencies that must be notified.

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

5.4.5 Concrete Wash Areas

Concrete trucks will be allowed to wash out or discharge surplus concrete or drum wash water on the site, but only in specifically designated diked and impervious washout areas, which have been prepared to prevent contact between the concrete wash and stormwater. Waste generated from concrete wash water shall not be allowed to flow into drainage ways, inlets, receiving waters, or highway right of ways, or any location other than the designated concrete wash areas. Proper signage designating the "Concrete Wash Areas" shall be placed near the facility. Concrete wash areas shall be located at minimum 100 linear feet from drainage ways, inlets, and surface waters.

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

Sawcut Portland Cement Concrete (PCC) slurry shall not be allowed to enter drainage ways, inlets, and/or surface waters. Sawcut residue should not be left on the surface of pavement or be allowed to flow over and off pavement.

The Project may require the use of multiple concrete wash areas. All concrete wash areas will be located in an area where the likelihood of the area contributing to stormwater discharges is negligible. If required, additional BMPs must be implemented to prevent concrete wastes from contributing to stormwater discharges.

5.4.6 Material Storage

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

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

6.0 STORMWATER MANAGEMENT PLANNING

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

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

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

6.1 Step 1 – Site Planning

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

6.2 Step 2 - Determine Water Quality Treatment Volume (WQv)

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

6.2.1 NYSDEC Requirements for New Development

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

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

Where: P = 90% Rainfall Event Number
R_v = 0.05 + 0.009 (I), minimum R_v = 0.2
I = Impervious Cover (Percent)
A = Contributing Area in Acres

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

6.2.2 NYSDEC Requirements for Redevelopment Projects

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

According to Section 9.2.1.B.II., redevelopment activities can achieve the water quality treatment objective if 25% of the water quality volume associated with the disturbed, impervious area is captured and treated by implementation of standard SMPs or reduced by application of RR techniques. In this case, 100% of any new impervious area must be treated. This project will implement storm water planters to meet the water quality objective.

6.2.3 Methodology

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

6.3 Step 3 – Apply Runoff Reduction Techniques and Standard SMPs with RRv Capacity to Reduce Total WQv

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

6.3.1 NYSDEC Requirements for New Development

The Design Manual states that runoff reduction shall be achieved through infiltration, groundwater recharge, reuse, recycle, and/or evaporation/evapotranspiration of 100-percent of the post-development water quality volume to replicate pre-development

hydrology. Runoff control techniques provide treatment in a distributed manner before runoff reaches the collection system, by maintaining pre-construction infiltration, peak runoff flow, discharge volume, as well as minimizing concentrated flow. This can be accomplished by applying a combination of Runoff Reduction Techniques, standard Stormwater Management Practices (SMPs) with RRv capacity, and good operation and maintenance.

6.3.2 NYSDEC Requirements for Redevelopment

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

Although not required, Stormwater Planters are proposed for this project and will provide both WQv and RRv at the site.

6.3.3 Methodology In order to reduce the required WQv, a site specific evaluation must be performed to determine the most practical means of reducing runoff volume. The Design Manual strongly encourages implementation of a combination of RR techniques and standard SMPs with RRv capacity. The following Table demonstrates a summary of the RRv practices being applied, and both the water quality and runoff reduction volumes they provide. The RR Technique(s) have been designed in accordance with Chapter 5 of the Design Manual. The standard SMP(s) with RRv capacity have been designed in accordance with Chapter 6 of the Design Manual. Refer to the contract drawings for practice dimensions, material specifications, and installation details. Practice specific calculations are presented in Table E of Appendix K.

Table 3: Summary of RR Techniques and Standard SMPs with RRv Capacity

RR Technique or Standard SMP with RRv Capacity	NYSDEC Design Variant	Pretreatment Volume Required (% of WQv)	Pretreatment Volume Provided (CF)	WQv Required (CF)	WQv Provided (CF)	RRv Capacity	RRv Provided (CF)
Stormwater Planter (HSG C)	RR-7	0%	0	510	585 cf	100%	585
						Total WQv Provided (CF)	**585**
						Total RRv Provided (CF)	**585**

6.3.4 RRv Performance Summary

According to Section 3.6 of the Design Manual, "If the RRv calculated in this step is greater than or equal to the WQv calculated in Step 2, the designer has met the RRv requirement and may proceed to Step 6." A summary of the RRv provided is presented in the following table:

Table 4: Summary of RRv Provided

RRv Required = WQv Required (CF)	RRv Provided (CF)	% RRv Provided
510	585	114%

As indicated in the above table, the RRv provided is greater than the RRv required for the project site. As such, the design can proceed to Step 6.

6.4 Step 6 - Apply Volume and Peak Rate Control

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

6.4.1 NYSDEC Requirements for New Development

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

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

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

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

6.4.2 Methodology

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

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

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

1. Subcatchment: A relatively homogeneous area of land, which produces a volume and rate of runoff unique to that area.

2. Reach: Uniform streams, channels, or pipes that convey stormwater from one point to another.

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

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

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

Proposed stormwater management facilities were designed and evaluated in accordance with the Design Manual and local regulatory requirements. The hydrologic and hydraulic analysis considered the SCS, Type II 24-hour storm events identified in Table 8.

Table 5: Design Events

Facility	24-hour Storm Event
Storm Sewer	25-year
Underground Detention Basin	1-year
	10-year
	100-year
Flood Conditions	100-year

6.4.3 Description of Design Points

The study area consists of an overall watershed that encompasses approximately 2.389acres and contains the 0.5 acre project site. The overall watershed was broken down into smaller watersheds, or subcatchments, to allow for analysis of runoff conditions at several locations throughout the study area. Each of these locations was defined as a Design Point (DP) in order to compare the effects resulting from stormwater management facilities proposed as part of the project. Descriptions of each of the selected design points are provided below.

- Design Point 1: Design Point 1 is an existing storm sewer that bi-sects the proposed addition site. The sewer is being rerouted around the existing site.
- Design Point 2: I offsite flow that drains offsite towards discovery drive.

6.4.4 Pre-development Watershed Conditions

The pre-development project site is covered predominantly by grass, pavement, and building. Analysis of pre-development conditions considered existing drainage patterns, soil types, ground cover, and topography. The Pre-Development Watershed Delineation Map has been provided in Appendix G, as Figure 4.

The results of the computer modeling used to analyze the overall watershed under pre-development conditions are presented in Appendix I. A summary of the pre-development watershed runoff rates at each design point is presented in Table 9.

6.4.5 Post-development Watershed Conditions

The post-development project site is covered predominantly by grass, concrete and pavement. The analysis of post-development conditions considered existing drainage patterns, soil types, ground cover to remain, planned site development, site grading and, stormwater management facilities proposed as part of site improvements. The Post-Development Watershed Delineation Map has been provided in Appendix G, as Figure 5.

The results of the computer modeling used to analyze the overall watershed under post-development conditions are presented in Appendix J. A summary of the post-development watershed runoff rates at each design point is presented in Table 9.

Stormwater discharge from the project site is controlled by a single stormwater management practice. It has been designed to provide the above quantity controls by attenuating stormwater runoff and releasing runoff to off-site locations at a rate equal to or less than that which existed prior to development of the site. The design is detailed on the accompanying plans.

6.4.6 Performance Summary

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

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

Table 6: Summary of Pre- and Post-Development Peak Discharge Rates

Pre- vs. Post-Development Discharge Rate (cfs)						
Design Point (DP)	**1-year 24-hour storm event**		**10-year 24-hour storm event**		**100-year 24-hour storm event**	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**
1	1.02	1.02	2.20	2.14	4.35	4.17
2	2.78	2.80	5.37	5.24	9.79	9.37
Total	3.80	3.82	7.57	7.38	14.14	13.54

For each of the stormwater management facilities that provide detention, Table 10 presents the center of mass detention time for the 1-year 24-hour storm event.

Table 7: Center of Mass Detention Time for the 1-year, 24-hour Storm

SWM Practice ID	**NYSDEC Design Variant**	**Center of Mass Detention Time for the 1-year Storm (hours)**		**Diameter of the Extended Detention Orifice (inches)**	
		Required	**Provided**	**Maximum allowable to achieve the required center of mass detention time**	**Provided[3]**
UND-01	P-2	24	0.5	1.2	1.5

[3] *24-hour center of mass detention time is not required at sites where the resulting diameter of the extended detention orifice is too small to prevent clogging.*

7.0 INSPECTIONS, MAINTENANCE, AND REPORTING

7.1 Inspection and Maintenance Requirements

7.1.1 Pre-Construction Inspection and Certification

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

7.1.2 Construction Phase Inspections and Maintenance

A Qualified Inspector/Qualified Professional, as defined in Appendix A of the General Permit GP-0-15-002, shall conduct regular site inspections between the time this SWPPP is implemented and final site stabilization. Site inspections shall occur at an interval of at least once every seven (7) calendar days.

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

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

1. Locations where vehicles enter and exit the site must be inspected for evidence of off-site sediment tracking. A stabilized construction entrance will be constructed where vehicles enter and exit. This entrance will be maintained or supplemented as necessary to prevent sediment from leaving the site on vehicles.
2. Sediment barriers must be inspected and, if necessary, they must be enlarged or cleaned in order to provide additional capacity. All material from behind sediment barriers will be stockpiled on the up slope side. Additional sediment barriers must be constructed as needed.
3. Inspections will evaluate disturbed areas and areas used for storing materials that are exposed to rainfall for evidence of, or the potential for, pollutants entering the drainage system. If necessary, the materials must be covered or original covers must be repaired or supplemented. Also, protective berms must

be constructed, if needed, in order to contain runoff from material storage areas.

4. Grassed areas will be inspected to confirm that a healthy stand of grass is maintained. The site has achieved final stabilization once all areas are covered with building foundation or pavement, or have a stand of grass with at least 80 percent density. The density of 80 percent or greater must be maintained to be considered as stabilized. Areas must be watered, fertilized, and reseeded as needed to achieve this goal.
5. All discharge points must be inspected to determine whether erosion control measures are effective in preventing significant impacts to receiving waters.

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

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

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

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

7.1.3 Temporary Suspension of Construction Activities

For construction sites where soil disturbance activities have been temporarily suspended (e.g. Winter shutdown) and temporary stabilization measures have been applied to all disturbed areas, the frequency of Qualified Inspector/Qualified Professional inspections can be reduced to once every 30 calendar days. Prior to

reducing the frequency of inspections, the Owner/Operator shall notify the NYSDEC Region 4 stormwater contact person and the Town of East Greenbush in writing.

7.1.4 Partial Project Completion

For construction sites where soil disturbance activities have been shut down with partial project completion, all areas disturbed as of the project shutdown date have achieved final stabilization, and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational, the inspections by the Qualified Inspector/Qualified Professional can stop. Prior to the shutdown, the Owner/Operator shall notify the NYSDEC Region 4 stormwater contact person Town of East Greenbush in writing.

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

7.1.5 Post-Construction Inspections and Maintenance

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

7.2 Reporting Requirements

7.2.1 Inspection and Maintenance Reports

Inspection/maintenance reports shall be prepared prior to and during construction in accordance with the schedule outlined herein and in the SPDES General Permit GP-0-15-002 Part IV.C. The reports shall be prepared to identify and document the maintenance of the erosion and sediment control measures. A sample inspection form is provided in Appendix D.

Specifically, each inspection shall record the following information:

1. Date and time of inspection.

2. Name and title of person(s) performing inspection.

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

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

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

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

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

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

9. Indication of the current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards.

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

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

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

All inspection reports shall be signed by the *Qualified Inspector/Qualified Professional*. Pursuant to Part II.C.2 of GP-0-15-002, the inspection reports shall be maintained on site with the SWPPP.

7.2.2 Site Log Book

The Owner/Operator shall retain a copy of the SWPPP required by GP-0-15-002 at the construction site from the date of initiation of construction activities to the date of final stabilization.

During construction, the Owner's/Operator's Engineer shall maintain a record of all SWPPP inspection reports at the site in the Site Log Book. The Site Log Book shall be maintained on-site and made available to the permitting authority, if necessary.

7.2.3 Post Construction Records and Archiving

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

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

Appendix A:
NYSDEC SPDES General Permit GP-0-15-002

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NEW YORK
STATE OF
OPPORTUNITY

Department of
Environmental
Conservation

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

From

CONSTRUCTION ACTIVITY

Permit No. GP-0-15-002

Issued Pursuant to Article 17, Titles 7, 8 and Article 70
of the Environmental Conservation Law

Effective Date: January 29, 2015 Expiration Date: January 28, 2020

John J. Ferguson
Chief Permit Administrator

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Authorized Signature Date

Address: NYS DEC
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PREFACE

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

This general permit ("permit") is issued pursuant to Article 17, Titles 7, 8 and Article 70 of the ECL. An *owner or operator* may obtain coverage under this permit by submitting a Notice of Intent ("NOI") to the Department. Copies of this permit and the NOI for New York are available by calling (518) 402-8109 or at any New York State Department of Environmental Conservation ("the Department") regional office (see Appendix G).They are also available on the Department's website at:
http://www.dec.ny.gov/

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

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

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

Part I. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application

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

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

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

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

B. Effluent Limitations Applicable to Discharges from Construction Activities

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

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in the Stormwater Pollution Prevention Plan ("SWPPP") the reason(s) for the deviation or alternative design and provide information

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

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

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

   (ii) Control stormwater *discharge*s to *minimize* channel and streambank erosion and scour in the immediate vicinity of the *discharge* points;

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

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

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

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

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

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

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

c. **Dewatering**. *Discharge*s from dewatering activities, including *discharge*s

from dewatering of trenches and excavations, must be managed by appropriate control measures.

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

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

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

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

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

(i) Wastewater from washout of concrete;

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

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

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

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

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

at or below the outlet does not occur.

C. Post-construction Stormwater Management Practice Requirements

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

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

a. ***Sizing Criteria* for *New Development***

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

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

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 4.3 of the Design Manual. The remaining portion of the total WQv

that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume ("Cpv"): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

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

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

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

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

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

(ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.b.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or

standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

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

(iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

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

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

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

c. ***Sizing Criteria* for *Redevelopment Activity***

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

(1) Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the Design Manual must be applied to all newly created pervious areas, or
(2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRv capacity., or
(3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or
(4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

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

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

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

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

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

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

D. Maintaining Water Quality

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

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

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

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

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

If there is evidence indicating that despite compliance with the terms and conditions of this general permit it is demonstrated that the stormwater *discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or

if the Department determines that a modification of the permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

E. Eligibility Under This General Permit

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

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharge*s from *construction activities*.

3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater *discharges* may be authorized by this permit: *discharge*s from firefighting activities; fire hydrant flushings; waters to which cleansers or other components have not been added that are used to wash vehicles or control dust in accordance with the SWPPP, routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; uncontaminated *groundwater* or spring water; uncontaminated *discharge*s from construction site de-watering operations; and foundation or footing drains where flows are not contaminated with process materials such as solvents. For those entities required to obtain coverage under this permit, and who *discharge* as noted in this paragraph, and with the exception of flows from firefighting activities, these *discharge*s must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with *water quality standards* in Part I.D of this permit.

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

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

All of the following are **not** authorized by this permit:

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

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

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

4. *Construction activities* or *discharges* from *construction activities* that may adversely affect an endangered or threatened species unless the *owner or operator* has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.C.2 of this permit.

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

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

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

   b. Which disturb one or more acres of land with no existing *impervious cover*; and

   c. Which are undertaken on land with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the United States Department of Agriculture ("USDA") Soil Survey for the County where the disturbance will occur.

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

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

   b. Which disturb two or more acres of land with no existing *impervious cover*; and

   c. Which are undertaken on land with a Soil Slope Phase that is identified as an E or F, or the map unit name is inclusive of 25% or greater slope, on the USDA Soil Survey for the County where the disturbance will occur.

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

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

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

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

   c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:
      (i) No Affect
      (ii) No Adverse Affect

      (iii) Executed Memorandum of Agreement, or

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

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

Part II. OBTAINING PERMIT COVERAGE

A.Notice of Intent (NOI) Submittal

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed NOI form to the Department in order to be authorized to *discharge* under this permit. An *owner or operator* shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (http://www.dec.ny.gov/). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address.

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

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

   The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the address in Part II.A.1.

(Part II.A.2)

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

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

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

B. Permit Authorization

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

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

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

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

   c. the final SWPPP has been prepared, and

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

3. An *owner or operator* that has satisfied the requirements of Part II.B.2 above

(Part II.B.3)

will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

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

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

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

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

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

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

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

4. The Department may suspend or deny an *owner's or operator's* coverage

(Part II.B.4)

under this permit if the Department determines that the SWPPP does not meet the permit requirements. In accordance with statute, regulation, and the terms and conditions of this permit, the Department may deny coverage under this permit and require submittal of an application for an individual SPDES permit based on a review of the NOI or other information pursuant to Part II.

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

C. General Requirements For Owners or Operators With Permit Coverage

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

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-15-002), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, and all documentation necessary to demonstrate eligibility with this permit at the construction site until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

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

(Part II.C.3.a)

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

   b. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005.

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

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

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

4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

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

(Part II.D)

D. Permit Coverage for Discharges Authorized Under GP-0-10-001

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-10-001), an *owner or operator* of *a construction activity* with coverage under GP-0-10-001, as of the effective date of GP-0-15-002, shall be authorized to *discharge* in accordance with GP-0-15-002, unless otherwise notified by the Department.

   An *owner or operator* may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-15-002.

E. Change of *Owner or Operator*

2. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, in writing, of the requirement to obtain permit coverage by submitting a NOI with the Department. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.A.1. of this permit. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or operator* was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

(Part III)

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

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

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

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

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

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

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

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

5. The Department may notify the *owner or operator* at any time that the

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

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

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

   > "I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater *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"

   In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the

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

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

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

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

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

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

   d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other

activity at the site that results in soil disturbance;

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

f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;

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

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

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005;

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

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

l. Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated August 2005. Include the reason for the deviation or alternative design

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

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

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

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

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

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

c. A Stormwater Modeling and Analysis Report that includes:

(i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points;

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

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

(iv) Summary table, with supporting calculations, which demonstrates

that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;

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

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

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

e. Infiltration test results, when required; and

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

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

C. Required SWPPP Components by Project Type

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

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

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

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

B. Contractor Maintenance Inspection Requirements

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

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

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

C. Qualified Inspector Inspection Requirements

(Part IV.C)

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

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

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

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

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

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

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

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

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

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

   b. For construction sites where soil disturbance activities are on-going and

(Part IV.C.2.b)

the *owner or operator* has received authorization in accordance with Part II.C.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

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

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

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

be separated by a minimum of two (2) full calendar days.

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

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

a. Date and time of inspection;

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

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

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

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

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

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

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

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

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

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

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

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

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

Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

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

(Part V.A.2)

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

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

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

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

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

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

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

(Part V.A.5)

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

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

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

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

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

Part VI. REPORTING AND RETENTION OF RECORDS

A. Record Retention

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

B. Addresses

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

Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply

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

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

B. Continuation of the Expired General Permit

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

C. Enforcement

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

D. Need to Halt or Reduce Activity Not a Defense

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

E. Duty to Mitigate

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

F. Duty to Provide Information

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

G. Other Information

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

H. Signatory Requirements

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

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

      (i) a president, secretary, treasurer, or vice-president of the

corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

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

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

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

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

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

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

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

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

individual or any individual occupying a named position) and,

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

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

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

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

I. Property Rights

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

J. Severability

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

K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any *owner or operator* authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any *discharge*r authorized by a general permit to apply for an individual SPDES permit, it shall notify the *discharge*r in writing that a permit application is required. This notice shall include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the *owner or operator* to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from *owner or operator* receipt of the notification letter, whereby the authorization to

discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

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

L. Proper Operation and Maintenance

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

M. Inspection and Entry

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

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

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

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

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

N. Permit Actions

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

O. Definitions

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

P. Re-Opener Clause

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

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

Q. Penalties for Falsification of Forms and Reports

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

R. Other Permits

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

VIII. **APPENDIX A**

Definitions

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

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

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

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

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

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

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

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

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied

on all disturbed areas that are not covered by permanent structures, concrete or pavement.

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

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

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

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

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

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

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

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

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters,

ditches, man-made
channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State*;*

(ii) Designed or used for collecting or conveying stormwater;

(iii) Which is not a *combined sewer*; and

(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

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

New Development – means any land disturbance that does meet the definition of Redevelopment Activity included in this appendix.

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

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; and/or an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications.

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

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

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

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

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

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

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

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

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is required to gain coverage under New York State DEC's SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s).

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

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

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

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

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

Steep Slope – means land area with a Soil Slope Phase that is identified as an E or F, or

the map unit name is inclusive of 25% or greater slope, on the United States Department of Agriculture (“USDA”) Soil Survey for the County where the disturbance will occur.

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

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

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

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

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

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

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

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part

621 of the Environmental Conservation Law (ECL), Article 70.

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

APPENDIX B

Required SWPPP Components by Project Type

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

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres: • Single family home not located in one of the watersheds listed in Appendix C or not *directly discharging* to one of the 303(d) segments listed in Appendix E • Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E • Construction of a barn or other agricultural building, silo, stock yard or pen.
The following construction activities that involve soil disturbances of one (1) or more acres of land: • Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains • Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects • Bike paths and trails • Sidewalk construction projects that are not part of a road/ highway construction or reconstruction project • Slope stabilization projects • Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics • Spoil areas that will be covered with vegetation • Land clearing and grading for the purposes of creating vegetated open space (i.e. recreational parks, lawns, meadows, fields), excluding projects that *alter hydrology from pre to post development* conditions • Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions • Demolition project where vegetation will be established and no redevelopment is planned • Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover* • Structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State", excluding projects that involve soil disturbances of less than five acres and construction activities that include the construction or reconstruction of impervious area
The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land: • All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

Table 2
CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

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

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other agricultural building(e.g. silo) and structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional, includes hospitals, prisons, schools and colleges
- Industrial facilities, includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW's and water treatment plants
- Office complexes
- Sports complexes
- Racetracks, includes racetracks with earthen (dirt) surface
- Road construction or reconstruction
- Parking lot construction or reconstruction
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover,* and constructed as part of an over-head electric transmission line project , wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
- All other construction activities that include the construction or reconstruction of *impervious area* or *alter the hydrology from pre to post development* conditions, and are not listed in Table 1

APPENDIX C

Watersheds Where Enhanced Phosphorus Removal Standards Are Required

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

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

Figure 1 - New York City Watershed East of the Hudson

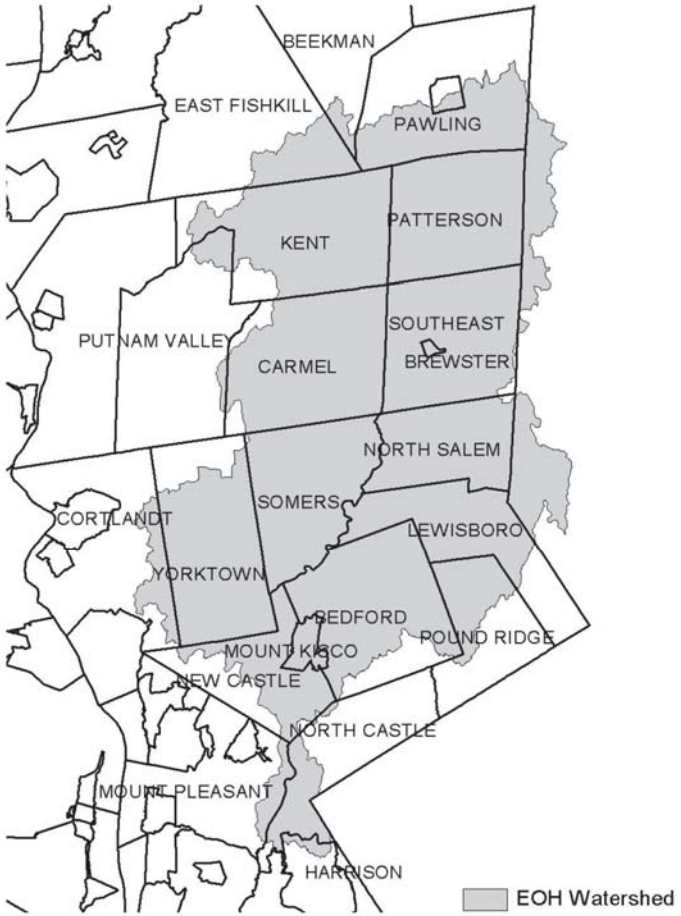


Figure 2 - Onondaga Lake Watershed

Figure 3 - Greenwood Lake Watershed

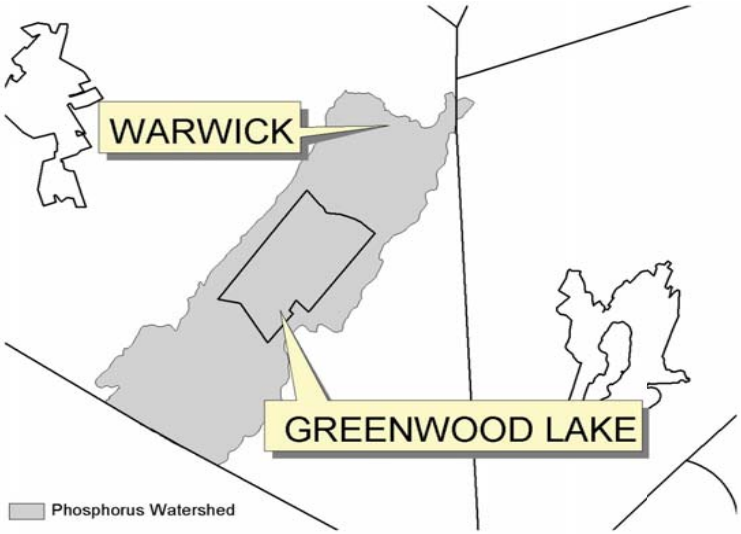


Figure 4 - Oscawana Lake Watershed

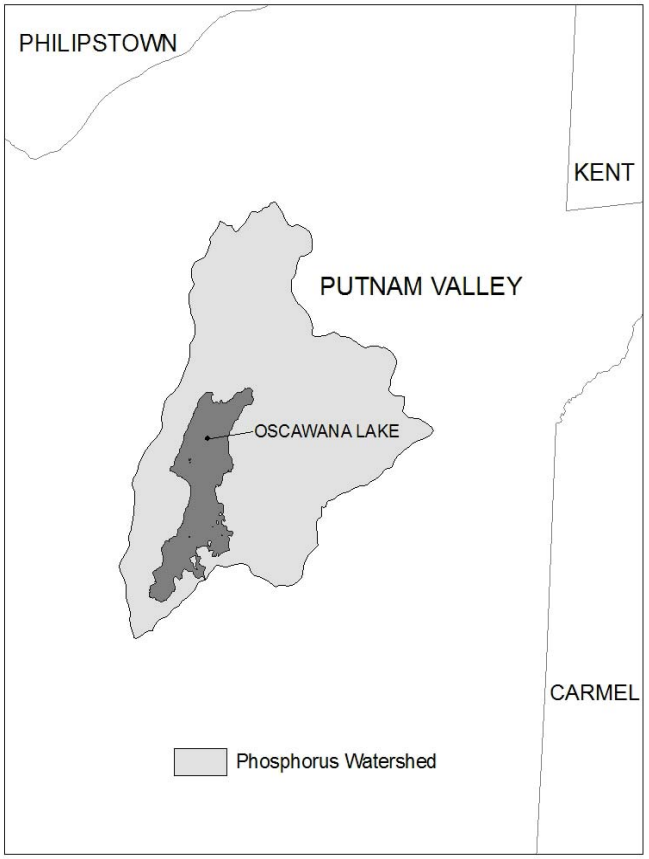
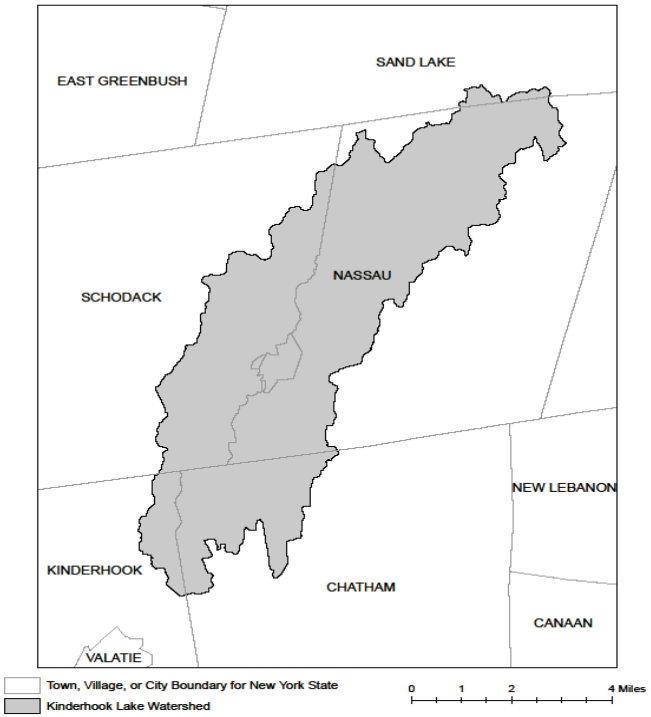


Figure 5: Kinderhook Lake Watershed



APPENDIX D

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

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

APPENDIX E

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

COUNTY	WATERBODY	COUNTY	WATERBODY
Albany	Ann Lee (Shakers) Pond, Stump Pond	Greene	Sleepy Hollow Lake
Albany	Basic Creek Reservoir	Herkimer	Steele Creek tribs
Allegheny	Amity Lake, Saunders Pond	Kings	Hendrix Creek
Bronx	Van Cortlandt Lake	Lewis	Mill Creek/South Branch and tribs
Broome	Whitney Point Lake/Reservoir	Livingston	Conesus Lake
Broome	Fly Pond, Deer Lake	Livingston	Jaycox Creek and tribs
Broome	Minor Tribs to Lower Susquehanna (north)	Livingston	Mill Creek and minor tribs
		Livingston	Bradner Creek and tribs
Cattaraugus	Allegheny River/Reservoir	Livingston	Christie Creek and tribs
Cattaraugus	Case Lake	Monroe	Lake Ontario Shoreline, Western
Cattaraugus	Linlyco/Club Pond	Monroe	Mill Creek/Blue Pond Outlet and tribs
Cayuga	Duck Lake	Monroe	Rochester Embayment - East
Chautauqua	Chautauqua Lake, North	Monroe	Rochester Embayment - West
Chautauqua	Chautauqua Lake, South	Monroe	Unnamed Trib to Honeoye Creek
Chautauqua	Bear Lake	Monroe	Genesee River, Lower, Main Stem
Chautauqua	Chadakoin River and tribs	Monroe	Genesee River, Middle, Main Stem
Chautauqua	Lower Cassadaga Lake	Monroe	Black Creek, Lower, and minor tribs
Chautauqua	Middle Cassadaga Lake	Monroe	Buck Pond
Chautauqua	Findley Lake	Monroe	Long Pond
Clinton	Great Chazy River, Lower, Main Stem	Monroe	Cranberry Pond
Columbia	Kinderhook Lake	Monroe	Mill Creek and tribs
Columbia	Robinson Pond	Monroe	Shipbuilders Creek and tribs
Dutchess	Hillside Lake	Monroe	Minor tribs to Irondequoit Bay
Dutchess	Wappinger Lakes	Monroe	Thomas Creek/White Brook and tribs
Dutchess	Fall Kill and tribs	Nassau	Glen Cove Creek, Lower, and tribs
Erie	Green Lake	Nassau	LI Tribs (fresh) to East Bay
Erie	Scajaquada Creek, Lower, and tribs	Nassau	East Meadow Brook, Upper, and tribs
Erie	Scajaquada Creek, Middle, and tribs	Nassau	Hempstead Bay
Erie	Scajaquada Creek, Upper, and tribs	Nassau	Hempstead Lake
Erie	Rush Creek and tribs	Nassau	Grant Park Pond
Erie	Ellicott Creek, Lower, and tribs	Nassau	Beaver Lake
Erie	Beeman Creek and tribs	Nassau	Camaans Pond
Erie	Murder Creek, Lower, and tribs	Nassau	Halls Pond
Erie	South Branch Smoke Cr, Lower, and tribs	Nassau	LI Tidal Tribs to Hempstead Bay
		Nassau	Massapequa Creek and tribs
Erie	Little Sister Creek, Lower, and tribs	Nassau	Reynolds Channel, east
Essex	Lake George (primary county: Warren)	Nassau	Reynolds Channel, west
Genesee	Black Creek, Upper, and minor tribs	Nassau	Silver Lake, Lofts Pond
Genesee	Tonawanda Creek, Middle, Main Stem	Nassau	Woodmere Channel
Genesee	Oak Orchard Creek, Upper, and tribs	Niagara	Hyde Park Lake
Genesee	Bowen Brook and tribs	Niagara	Lake Ontario Shoreline, Western
Genesee	Bigelow Creek and tribs	Niagara	Bergholtz Creek and tribs
Genesee	Black Creek, Middle, and minor tribs	Oneida	Ballou, Nail Creeks
Genesee	LeRoy Reservoir	Onondaga	Ley Creek and tribs
Greene	Schoharie Reservoir	Onondaga	Onondaga Creek, Lower and tribs

APPENDIX E

List of 303(d) segments impaired by pollutants related to construction activity, cont'd.

COUNTY	WATERBODY	COUNTY	WATERBODY
Onondaga	Onondaga Creek, Middle and tribs	Suffolk	Great South Bay, West
Onondaga	Onondaga Creek, Upp, and minor tribs	Suffolk	Mill and Seven Ponds
Onondaga	Harbor Brook, Lower, and tribs	Suffolk	Moriches Bay, East
Onondaga	Ninemile Creek, Lower, and tribs	Suffolk	Moriches Bay, West
Onondaga	Minor tribs to Onondaga Lake	Suffolk	Quantuck Bay
Onondaga	Onondaga Creek, Lower, and tribs	Suffolk	Shinnecock Bay (and Inlet)
Ontario	Honeoye Lake	Sullivan	Bodine, Montgomery Lakes
Ontario	Hemlock Lake Outlet and minor tribs	Sullivan	Davies Lake
Ontario	Great Brook and minor tribs	Sullivan	Pleasure Lake
Orange	Monhagen Brook and tribs	Sullivan	Swan Lake
Orange	Orange Lake	Tompkins	Cayuga Lake, Southern End
Orleans	Lake Ontario Shoreline, Western	Tompkins	Owasco Inlet, Upper, and tribs
Oswego	Pleasant Lake	Ulster	Ashokan Reservoir
Oswego	Lake Neatahwanta	Ulster	Esopus Creek, Upper, and minor tribs
Putnam	Oscawana Lake		
Putnam	Palmer Lake	Ulster	Esopus Creek, Lower, Main Stem
Putnam	Lake Carmel	Ulster	Esopus Creek, Middle, and minor tribs
Queens	Jamaica Bay, Eastern, and tribs (Queens)		
Queens	Bergen Basin	Warren	Lake George
Queens	Shellbank Basin	Warren	Tribs to L.George, Village of L George
Rensselaer	Nassau Lake		
Rensselaer	Snyders Lake	Warren	Huddle/Finkle Brooks and tribs
Richmond	Grasmere, Arbutus and Wolfes Lakes	Warren	Indian Brook and tribs
Rockland	Congers Lake, Swartout Lake	Warren	Hague Brook and tribs
Rockland	Rockland Lake	Washington	Tribs to L.George, East Shr Lk George
Saratoga	Ballston Lake		
Saratoga	Round Lake	Washington	Cossayuna Lake
Saratoga	Dwaas Kill and tribs	Washington	Wood Cr/Champlain Canal, minor tribs
Saratoga	Tribs to Lake Lonely		
Saratoga	Lake Lonely	Wayne	Port Bay
Schenectady	Collins Lake	Wayne	Marbletown Creek and tribs
Schenectady	Duane Lake	Westchester	Lake Katonah
Schenectady	Mariaville Lake	Westchester	Lake Mohegan
Schoharie	Engleville Pond	Westchester	Lake Shenorock
Schoharie	Summit Lake	Westchester	Reservoir No.1 (Lake Isle)
Schuyler	Cayuta Lake	Westchester	Saw Mill River, Middle, and tribs
St. Lawrence	Fish Creek and minor tribs	Westchester	Silver Lake
St. Lawrence	Black Lake Outlet/Black Lake	Westchester	Teatown Lake
Steuben	Lake Salubria	Westchester	Truesdale Lake
Steuben	Smith Pond	Westchester	Wallace Pond
Suffolk	Millers Pond	Westchester	Peach Lake
Suffolk	Mattituck (Marratooka) Pond	Westchester	Mamaroneck River, Lower
Suffolk	Tidal tribs to West Moriches Bay	Westchester	Mamaroneck River, Upp, and tribs
Suffolk	Canaan Lake	Westchester	Sheldrake River and tribs
Suffolk	Lake Ronkonkoma	Westchester	Blind Brook, Lower
Suffolk	Beaverdam Creek and tribs	Westchester	Blind Brook, Upper, and tribs
Suffolk	Big/Little Fresh Ponds	Westchester	Lake Lincolndale
Suffolk	Fresh Pond	Westchester	Lake Meahaugh
Suffolk	Great South Bay, East	Wyoming	Java Lake
Suffolk	Great South Bay, Middle	Wyoming	Silver Lake

Note: The list above identifies those waters from the final New York State "2014 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy", dated January 2015, that are impaired by silt, sediment or nutrients.

APPENDIX F

LIST OF NYS DEC REGIONAL OFFICES

Region	COVERING THE FOLLOWING COUNTIES:	DIVISION OF ENVIRONMENTAL PERMITS (DEP) PERMIT ADMINISTRATORS	DIVISION OF WATER (DOW) WATER (SPDES) PROGRAM
1	NASSAU AND SUFFOLK	50 CIRCLE ROAD STONY BROOK, NY 11790 TEL. (631) 444-0365	50 CIRCLE ROAD STONY BROOK, NY 11790-3409 TEL. (631) 444-0405
2	BRONX, KINGS, NEW YORK, QUEENS AND RICHMOND	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4997	1 HUNTERS POINT PLAZA, 47-40 21ST ST. LONG ISLAND CITY, NY 11101-5407 TEL. (718) 482-4933
3	DUTCHESS, ORANGE, PUTNAM, ROCKLAND, SULLIVAN, ULSTER AND WESTCHESTER	21 SOUTH PUTT CORNERS ROAD NEW PALTZ, NY 12561-1696 TEL. (845) 256-3059	100 HILLSIDE AVENUE, SUITE 1W WHITE PLAINS, NY 10603 TEL. (914) 428 - 2505
4	ALBANY, COLUMBIA, DELAWARE, GREENE, MONTGOMERY, OTSEGO, RENSSELAER, SCHENECTADY AND SCHOHARIE	1150 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2069	1130 NORTH WESTCOTT ROAD SCHENECTADY, NY 12306-2014 TEL. (518) 357-2045
5	CLINTON, ESSEX, FRANKLIN, FULTON, HAMILTON, SARATOGA, WARREN AND WASHINGTON	1115 STATE ROUTE 86, PO BOX 296 RAY BROOK, NY 12977-0296 TEL. (518) 897-1234	232 GOLF COURSE ROAD WARRENSBURG, NY 12885-1172 TEL. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROAD AVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVE. BUFFALO, NY 14203-2999 TEL. (716) 851-7070

Appendix B: NYSDEC Forms

-NOI (Notice of Intent)

-MS4 SWPPP Acceptance Form

-NOT (Notice of Termination)

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0806372691

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)
Regeneron Pharmaceutical Inc

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

Owner/Operator Contact Person First Name
Gerald

Owner/Operator Mailing Address
81 Columbia Turnpike

City
Rensselaer

State: NY Zip: 12144 -

Phone (Owner/Operator): 5184880000 Fax (Owner/Operator): - -

Email (Owner/Operator)
gerald.underwood@regeneron.com

FED TAX ID
13444067 (not required for individuals)

Project Site Information

Project/Site Name
Regeneron Building 81 Addition

Street Address (NOT P.O. BOX)
81 Discovery Drive

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

City/Town/Village (THAT ISSUES BUILDING PERMIT)
EAST GREENBUSH

State NY | Zip **12180**- | County RENSSELAER | DEC Region 4

Name of Nearest Cross Street
Columbia Turnpike

Distance to Nearest Cross Street (Feet)
1300

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

Tax Map Numbers
Section-Block-Parcel
122.00-02

Tax Map Numbers
4.131

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): 603625

Y Coordinates (Northing): 4772200005577

2. What is the nature of this construction project?

○ **New Construction**

● **Redevelopment with increase in impervious area**

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

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

Pre-Development Existing Land Use	Post-Development Future Land Use
○ FOREST	○ SINGLE FAMILY HOME
○ PASTURE/OPEN LAND	○ SINGLE FAMILY SUBDIVISION
○ CULTIVATED LAND	○ TOWN HOME RESIDENTIAL
○ SINGLE FAMILY HOME	○ MULTIFAMILY RESIDENTIAL
○ SINGLE FAMILY SUBDIVISION	○ INSTITUTIONAL/SCHOOL
○ TOWN HOME RESIDENTIAL	● INDUSTRIAL
○ MULTIFAMILY RESIDENTIAL	○ COMMERCIAL
○ INSTITUTIONAL/SCHOOL	○ MUNICIPAL
● INDUSTRIAL	○ ROAD/HIGHWAY
○ COMMERCIAL	○ RECREATIONAL/SPORTS FIELD
○ ROAD/HIGHWAY	○ BIKE PATH/TRAIL
○ RECREATIONAL/SPORTS FIELD	○ LINEAR UTILITY (water, sewer, gas, etc.)
○ BIKE PATH/TRAIL	○ PARKING LOT
○ LINEAR UTILITY	○ CLEARING/GRADING ONLY
○ PARKING LOT	○ DEMOLITION, NO REDEVELOPMENT
○ OTHER	○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
	○ OTHER

Number of Lots

***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
18.108.0	0.50.5	.2.2	.3.3

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

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

A	B	C	D
%	10%	90%	%

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

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

Start Date 12/01/2019 - **End Date** 12/01/2020

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

Name

UNNAMED TRIBUTARY TO THE HUDSON RIVER

9a. Type of waterbody identified in Question 9?

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

9b. How was the wetland identified?

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

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-15-002? ○ **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?

Town of East Greenbush

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

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

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

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

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

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

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

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

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

SWPPP Preparer
Hart Engineering

Contact Name (Last, Space, First)
Hart, Steven

Mailing Address
1969 FERNALE RD

City
Castle-ton

State Zip
NY 12033-

Phone
5183056572

Fax

Email
steven.hart@hartengineer.com

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-15-002. 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
STEVEN

MI
P

Last Name
HART

Signature

Date
/ /

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

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

Temporary Structural

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

Biotechnical

- ○ Brush Matting
- ○ Wattling

Vegetative Measures

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

Permanent Structural

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

Other

Post-construction Stormwater Management Practice (SMP) Requirements

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

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

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

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

- ● All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).

- ○ Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

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

Total WQv Required

0.0012 **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)

	Total Contributing Area (acres)		Total Contributing Impervious Area(acres)
RR Techniques (Area Reduction)			
○ Conservation of Natural Areas (RR-1)		and/or	
○ Sheetflow to Riparian Buffers/Filters Strips (RR-2)		and/or	
○ Tree Planting/Tree Pit (RR-3)		and/or	
○ Disconnection of Rooftop Runoff (RR-4)		and/or	
RR Techniques (Volume Reduction)			
○ Vegetated Swale (RR-5)			
○ Rain Garden (RR-6)			
● Stormwater Planter (RR-7)	0.10433		
○ Rain Barrel/Cistern (RR-8)			
○ Porous Pavement (RR-9)			
○ Green Roof (RR-10)			
Standard SMPs with RRv Capacity			
○ Infiltration Trench (I-1)			
○ Infiltration Basin (I-2)			
○ Dry Well (I-3)			
○ Underground Infiltration System (I-4)			
○ Bioretention (F-5)			
○ Dry Swale (O-1)			
Standard SMPs			
○ Micropool Extended Detention (P-1)			
○ Wet Pond (P-2)			
○ Wet Extended Detention (P-3)			
○ Multiple Pond System (P-4)			
○ Pocket Pond (P-5)			
○ Surface Sand Filter (F-1)			
○ Underground Sand Filter (F-2)			
○ Perimeter Sand Filter (F-3)			
○ Organic Filter (F-4)			
○ Shallow Wetland (W-1)			
○ Extended Detention Wetland (W-2)			
○ Pond/Wetland System (W-3)			
○ Pocket Wetland (W-4)			
○ Wet Swale (O-2)			

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

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

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

Name

Manufacturer

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

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

Total RRv provided

.013013 **acre-feet**

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

● **Yes** ○ **No**

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

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

Minimum RRv Required

. **acre-feet**

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

● **Yes** ○ **No**

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

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

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

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

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

WQv Provided

[ ][ ][ ].[ ][ ][ ] **acre-feet**

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

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

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

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

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

CPv Required

0.001616 **acre-feet**

CPv Provided

0.001616 **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

7.577577 **CFS**

Post-development

7.378383 **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development

14.414144 **CFS**

Post-development

13.354344 **CFS**

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

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

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

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

REGENERON PHARMACEUTICALS INC.

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

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

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

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

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

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

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

MI:

Print Last Name: UNDERWOOD

Owner/Operator Signature:

Date: / /

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

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

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

I. Project Owner/Operator Information
1. Owner/Operator Name: Regeneron Pharmaceuicals Inc.
2. Contact Person: Gerald Underwood
3. Street Address: 81 Columbia Turnpike
4. City/State/Zip: Rensselaer, NY 12180
II. Project Site Information
5. Project/Site Name: Regeneron Building 81 Addition
6. Street Address: 85 Discovery Drive
7. City/State/Zip: East Greenbush, NY 12180
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information
8. SWPPP Reviewed by:
9. Title/Position:
10. Date Final SWPPP Reviewed and Accepted:
IV. Regulated MS4 Information
11. Name of MS4:
12. MS4 SPDES Permit Identification Number: NYR20A _____
13. Contact Person:
14. Street Address:
15. City/State/Zip:
16. Telephone Number:

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Additional Information

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

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

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

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

I. Owner or Operator Information

1. Owner/Operator Name: Regeneron Pharmaceuticals Inc.

2. Street Address: 81 Columbia Turnpike

3. City/State/Zip: East Greenbush

4. Contact Person: Gerald Underwood | 4a.Telephone: 518-488-6000

4b. Contact Person E-Mail: gerald.underwood@regeneron.com

II. Project Site Information

5. Project/Site Name: Regeneron Building 81 Addition

6. Street Address: 85 Discovery Drive

7. City/Zip: East Greenbush, Ny 12180

8. County: Rensselaer County

III. Reason for Termination

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

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

9c. □ Other (Explain on Page 2)

IV. Final Site Information:

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

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

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

_____

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

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

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

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

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

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

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

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

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

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

V. Additional Information/Explanation:

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

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

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

Printed Name:

Title/Position:

Signature:	Date:

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

VII. Qualified Inspector Certification - Final Stabilization:

I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the general permit, and that all temporary, structural erosion and sediment control measures have been removed. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name:	
Title/Position:	
Signature:	Date:

VIII. Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):

I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name:	
Title/Position:	
Signature:	Date:

IX. Owner or Operator Certification

I hereby certify that this document was prepared by me or under my direction or supervision. My determination, based upon my inquiry of the person(s) who managed the construction activity, or those persons directly responsible for gathering the information, is that the information provided in this document is true, accurate and complete. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name:	
Title/Position:	
Signature:	Date:

(NYS DEC Notice of Termination - January 2015)

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Appendix C:
Contractor's Certification Form
Subcontractor's Certification Form

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

Regeneron Building 81 Addition
85 Discovery Drive, Town of East Greenbush, Rensselaer County, New York

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

Contracting Firm Information

Name: _____

Address: _____

Telephone & Fax: _____

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

_____

_____

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

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

Printed Name: _____

Title/Position: _____

Signature: _____ Date: _____

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

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

Printed Name: _____

Title/Position: _____

Signature: _____ Date: _____

[1] "Trained Contractor" means an employee from a contracting (construction) company that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the "trained contractor" shall receive four (4) hours of training every three (3) years. It can also mean an employee from the contracting (construction) company that meets the "qualified inspector" qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity). The "Trained Contractor" will be responsible for the day to day implementation of the SWPPP.

[2] Signatory Requirements:

a. For a corporation, this form shall be signed by (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principle business function, or any other person who performs similar policy or decision-making functions for the corporation; or (ii) the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

b. For a partnership or sole proprietorship, this form shall be signed by a general partner or the proprietor, respectively.

c. For a municipality, State, Federal, or other public agency, this form shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g. Regional Administrators of EPA).

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

Regeneron Building 81 Addition

85 Discovery Drive, Town of East Greenbush, Rensselaer County, New York

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

Subcontracting Firm Information

Name: _____

Address: _____

_____

Telephone & Fax: _____

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

_____

_____

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

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

Printed Name: _____

Title/Position: _____

Signature: _____ Date: _____

[2] "Trained Contractor" means an employee from a contracting (construction) company that has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the "trained contractor" shall receive four (4) hours of training every three (3) years. It can also mean an employee from the contracting (construction) company that meets the "qualified inspector" qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity). The "Trained Contractor" will be responsible for the day to day implementation of the SWPPP.

[2] Signatory Requirements:

a. For a corporation, this form shall be signed by (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principle business function, or any other person who performs similar policy or decision-making functions for the corporation; or (ii) the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

b. For a partnership or sole proprietorship, this form shall be signed by a general partner or the proprietor, respectively.

c. For a municipality, State, Federal, or other public agency, this form shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g. Regional Administrators of EPA).

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Appendix D:
SWPPP Inspection Report
(Sample Form)

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Stormwater Pollution Prevention Plan
Inspection Report

Regeneron Building 81 Addition

85 Discovery Drive, Town of East Greenbush, Rensselaer County, New York

A Qualified Inspector[1] shall prepare an inspection report subsequent to each and every inspection, as required in Part IV.C of the SPDES General Permit GP-0-15-002. All sections of this report are to be completed.

1. Inspection Information

Inspection number: _____

Date and Time of Inspection: _____

Weather Conditions: _____

Soil Conditions (e.g. dry, wet, saturated): _____

2. Inspector Information

Qualified Inspector[1]

Printed Name: _____ Date: _____

Signature: _____

Qualified Professional[1]

Printed Name _____ Date: _____

Signature: _____

3. On the included site plan, provide a sketch of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporary and/or final) since the last inspection. Provide additional descriptions below if necessary.

_____

_____

_____

_____

[1] *A Qualified Inspector means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, or other Department endorsed individual(s). It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years. It can also mean a person that meets the Qualified Professional qualifications in addition to the Qualified Inspector qualifications. Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.*

4. In the following table, provide a description of the condition of the runoff at all points of discharge from the construction site, including conveyance systems (pipes, culverts, ditches, etc.) and overland flow. Identify any discharges of sediment from the construction site. Use additional sheets if necessary.

Description of Discharge Point	Condition of Runoff	Sediment Discharge Noted
		yes / no Estimated Quantity:
		yes / no Estimated Quantity:
		yes / no Estimated Quantity:
		yes / no Estimated Quantity:

5. For all discharge points where sediment discharge has been noted in the above table, provide detailed corrective actions that are required. Use additional sheets if necessary.

6. **In the following table, provide checkmarks in the appropriate columns to indicate the condition of all erosion and sediment control practices at the site.**

Erosion & Sediment Control Practice	Not Applicable	Functioning as Designed	Needs Repair or Maintenance	Not Installed Properly	Date Deficiency First Reported (If Applicable)	Deficiency Corrected? Y/N (If Applicable)
Stabilized construction entrance						
Temporary parking areas						
Construction vehicle wash areas						
Silt fence						
Temporary swales and berms						
Stone check dams						
Slope protection measures						
Dewatering operations						
Sediment traps						
Inlet protection measures						
Soil stockpiles						
Dust control measures						
Pavement sweeping						
Other:						
Other:						

7. **For all erosion and sediment control practices identified in the above table as "needs repair or maintenance" or "not installed properly", provide detailed corrective actions that are required. Use additional sheets if necessary.**

8. In the following table, indicate the current phase of construction of all post-construction stormwater management practices and identify all construction that is not in conformance with the SWPPP and technical standards.

SWM Practice	Current Phase of Construction	Items not in conformance with the SWPPP

9. For all post-construction stormwater management practices which are identified in the above table as including "items not in conformance with the SWPPP", provide detailed corrective action(s) that are required to correct the deficiencies. Use additional sheets if necessary.

Photo Log

Date – Item in need of repair or maintenance:	*Date – Corrected Action:*
Date – Item in need of repair or maintenance:	*Date – Corrected Action:*

Photo Log

Date – Item in need of repair or maintenance:	*Date – Corrected Action:*
Date – Item in need of repair or maintenance:	*Date – Corrected Action:*

Appendix E:
NYSDEC “Deep-Ripping and Decompaction,” April 2008

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New York State
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water

Deep-Ripping and Decompaction

April 2008

Document Prepared by:

John E. Lacey,
Land Resource Consultant and Environmental Compliance Monitor
(Formerly with the Division of Agricultural Protection and Development Services,
NYS Dept. of Agriculture & Markets)

New York State
Department of Environmental Conservation

Alternative Stormwater Management
Deep-Ripping and Decompaction

Description

The two-phase practice of 1) “Deep Ripping;” and 2) “Decompaction” (deep subsoiling), of the soil material as a step in the cleanup and restoration/landscaping of a construction site, helps mitigate the physically induced impacts of soil compression; i.e.: soil compaction or the substantial increase in the bulk density of the soil material.

Deep Ripping and Decompaction are key factors which help in restoring soil pore space and permeability for water infiltration. Conversely, the physical actions of cut-and-fill work, land grading, the ongoing movement of construction equipment and the transport of building materials throughout a site alter the architecture and structure of the soil, resulting in: the mixing of layers (horizons) of soil materials, compression of those materials and diminished soil porosity which, if left unchecked, severely impairs the soil’s water holding capacity and vertical drainage (rainfall infiltration), from the surface downward.

In a humid climate region, compaction damage on a site is virtually guaranteed over the duration of a project. Soil in very moist to wet condition when compacted, will have severely reduced permeability. Figure 1 displays the early stage of the deep-ripping phase (Note that all topsoil was stripped prior to construction access, and it remains stockpiled until the next phase – decompaction – is complete). A heavy-duty tractor is pulling a three-shank ripper on the first of several series of incrementally deepening passes through the construction access corridor's densely compressed subsoil material. Figure 2 illustrates the approximate volumetric composition of a loam surface soil when conditions are good for plant growth, with adequate natural pore space for fluctuating moisture conditions.

Fig. 1. A typical deep ripping phase of this practice, during the first in a series of progressively deeper “rips” through severely compressed subsoil.

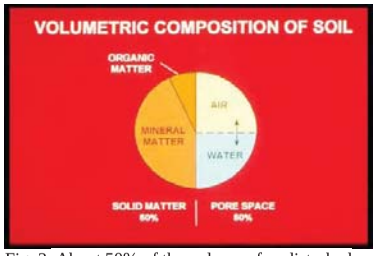

Fig. 2. About 50% of the volume of undisturbed loam surface soil is pore space, when soil is in good condition for plant growth. Brady, 2002.

Recommended Application of Practice

Fig. 3. Construction site with significant compaction of the deep basal till subsoil extends 24 inches below this exposed cut-and-fill work surface.

The objective of Deep Ripping and Decompaction is to effectively fracture (vertically and laterallly) through the thickness of the physically compressed subsoil material (see Figure 3), restoring soil porosity and permeability and aiding infiltration to help reduce runoff. Together with topsoil stripping, the “two-phase” practice of Deep Ripping and Decompaction first became established as a “best management practice” through ongoing success on commercial farmlands affected by heavy utility construction right-of-way projects (transmission pipelines and large power lines).

Soil permeability, soil drainage and cropland productivity were restored. For broader construction application, the two-phase practice of Deep Ripping and Decompaction is best adapted to areas impacted with significant soil compaction, on contiguous open portions of large construction sites and inside long, open construction corridors used as temporary access over the duration of construction. Each mitigation area should have minimal above-and-below-ground obstructions for the easy avoidance and maneuvering of a large tractor and ripping/decompacting implements. Conversely, the complete two-phase practice is not recommended in congested or obstructed areas due to the limitations on tractor and implement movement.

Benefits

Aggressive “deep ripping” through the compressed thickness of exposed subsoil before the replacement/respreading of the topsoil layer, followed by “decompaction,” i.e.: “sub-soiling,” through the restored topsoil layer down into the subsoil, offers the following benefits:

- Increases the project (larger size) area’s direct surface infiltration of rainfall by providing the open site’s mitigated soil condition and lowers the demand on concentrated runoff control structures
- Enhances direct groundwater recharge through greater dispersion across and through a broader surface than afforded by some runoff-control structural measures
- Decreases runoff volume generated and provides hydrologic source control
- May be planned for application in feasible open locations either alone or in

conjunction with plans for structural practices (e.g., subsurface drain line or infiltration basin) serving the same or contiguous areas

- Promotes successful long-term revegetation by restoring soil permeability, drainage and water holding capacity for healthy (rather than restricted) root-system development of trees, shrubs and deep rooted ground cover, minimizing plant drowning during wet periods and burnout during dry periods.

Feasibility/Limitations

The effectiveness of Deep Ripping and Decompaction is governed mostly by site factors such as: the original (undisturbed) soil's hydrologic characteristics; the general slope; local weather/timing (soil moisture) for implementation; the space-related freedom of equipment/implement maneuverability (noted above in **Recommended Application of Practice**), and by the proper selection and operation of tractor and implements (explained below in **Design Guidance**). The more notable site-related factors include:

Soil
In the undisturbed condition, each identified soil type comprising a site is grouped into one of four categories of soil hydrology, Hydrologic Soil Group A, B, C or D, determined primarily by a range of characteristics including soil texture, drainage capability when thoroughly wet, and depth to water table. The natural rates of infiltration and transmission of soil-water through the undisturbed soil layers for Group A is "high" with a low runoff potential while soils in Group B are moderate in infiltration and the transmission of soil-water with a moderate runoff potential, depending somewhat on slope. Soils in Group C have slow rates of infiltration and transmission of soil-water and a moderately high runoff potential influenced by soil texture and slope; while soils in Group D have exceptionally slow rates of infiltration and transmission of soil-water, and high runoff potential.

In Figure 4, the profile displays the undisturbed horizons of a soil in Hydrologic Soil Group C and the naturally slow rate of infiltration through the subsoil. The slow rate of infiltration begins immediately below the topsoil horizon (30 cm), due to the limited amount of macro pores, e.g.: natural subsoil fractures, worm holes and root channels. Infiltration after the construction-induced mixing and compression of such subsoil material is virtually absent; but can be restored back to this natural level with the two-phase practice of deep ripping and decompaction, followed by the permanent establishment of an appropriate, deep taproot

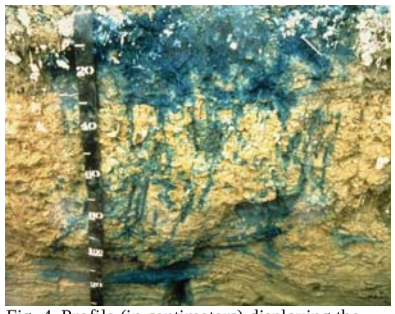

Fig. 4. Profile (in centimeters) displaying the infiltration test result of the natural undisturbed horizons of a soil in Hydrologic Soil Group C.

lawn/ground cover to help maintain the restored subsoil structure. Infiltration after construction-induced mixing and compression of such subsoil material can be notably rehabilitated with the Deep Ripping and Decompaction practice, which prepares the site for the appropriate long-term lawn/ground cover mix including deep taproot plants such as clover, fescue or trefoil, etc. needed for all rehabilitated soils.

Generally, soils in Hydrologic Soil Groups A and B, which respectively may include deep, well-drained, sandy-gravelly materials or deep, moderately well-drained basal till materials, are among the easier ones to restore permeability and infiltration, by deep ripping and decompaction. Among the many different soils in Hydrologic Soil Group C are those unique glacial tills having a natural fragipan zone, beginning about 12 to 18 inches (30 – 45cm), below surface. Although soils in Hydrologic Soil Group C do require a somewhat more carefully applied level of the Deep Ripping and Decompaction practice, it can greatly benefit such affected areas by reducing the runoff and fostering infiltration to a level equal to that of pre-disturbance.

Soils in Hydrologic Soil Group D typically have a permanent high water table close to the surface, influenced by a clay or other highly impervious layer of material. In many locations with clay subsoil material, the bulk density is so naturally high that heavy trafficking has little or no added impact on infiltration; and structural runoff control practices rather than Deep Ripping and Decompaction should be considered.

The information about Hydrologic Soil Groups is merely a general guideline. Site-specific data such as limited depths of cut-and-fill grading with minimal removal or translocation of the inherent subsoil materials (as analyzed in the county soil survey) or, conversely, the excavation and translocation of deeper, unconsolidated substratum or consolidated bedrock materials (unlike the analyzed subsoil horizons' materials referred to in the county soil survey) should always be taken into account.

Sites made up with significant quantities of large rocks, or having a very shallow depth to bedrock, are not conducive to deep ripping and decompation (subsoiling); and other measures may be more practical.

Slope
The two-phase application of 1) deep ripping and 2) decompaction (deep subsoiling), is most practical on flat, gentle and moderate slopes. In some situations, such as but not limited to temporary construction access corridors, inclusion areas that are moderately steep along a project's otherwise gentle or moderate slope may also be deep ripped and decompacted. For limited instances of moderate steepness on other projects, however, the post-construction land use and the relative alignment of the potential ripping and decompaction work in relation to the lay of the slope should be reviewed for safety and practicality. In broad construction areas predominated by moderately steep or steep slopes, the practice is generally not used.

Local Weather/Timing/Soil Moisture
Effective fracturing of compressed subsoil material from the exposed work surface, laterally and vertically down through the affected zone is achieved only when the soil material is moderately dry to moderately moist. Neither one of the two-phases, deep ripping nor decompaction (deep

subsoiling), can be effectively conducted when the soil material (subsoil or replaced topsoil) is in either a “plastic” or “liquid” state of soil consistency. Pulling the respective implements legs through the soil when it is overly moist only results in the “slicing and smearing” of the material or added “squeezing and compression” instead of the necessary fracturing. Ample drying time is needed for a “rippable” soil condition not merely in the material close to the surface, but throughout the material located down to the bottom of the physically compressed zone of the subsoil.

The “poor man’s Atterberg field test” for soil plasticity is a simple “hand-roll” method used for quick, on-site determination of whether or not the moisture level of the affected soil material is low enough for: effective deep ripping of subsoil; respreading of topsoil in a friable state; and final decompaction (deep subsoiling). Using a sample of soil material obtained from the planned bottom depth of ripping, e.g.: 20 - 24 inches below exposed subsoil surface, the sample is hand rolled between the palms down to a 1/8-inch diameter thread. (Use the same test for stored topsoil material before respreading on the site.) If the respective soil sample crumbles apart in segments no greater than 3/8 of an inch long, by the time it is rolled down to 1/8 inch diameter, it is low enough in moisture for deep ripping (or topsoil replacement), and decompaction. Conversely, as shown in Figure 5, if the rolled sample stretches out in increments greater than 3/8 of an inch long before crumbling, it is in a “plastic” state of soil consistency and is too wet for subsoil ripping (as well as topsoil replacement) and final decompaction.

Fig. 5. Augered from a depth of 19 inches below the surface of the replaced topsoil, this subsoil sample was hand rolled to a 1/8-inch diameter. The test shows the soil at this site stretches out too far without crumbling; it indicates the material is in a plastic state of consistence, too wet for final decompaction (deep subsoiling) at this time.

Design Guidance

Beyond the above-noted site factors, a vital requirement for the effective Deep Ripping and Decompaction (deep subsoiling), is implementing the practice in its distinct, two-phase process:

1) Deep rip the affected thickness of exposed subsoil material (see Figure 10 and 11), aggressively fracturing it before the protected topsoil is reapplied on the site (see Figure 12); and

2) Decompact (deep subsoil), simultaneously through the restored topsoil layer and the upper half of the affected subsoil (Figure 13). The second phase, “decompaction,” mitigates the partial recompaction which occurs during the heavy process of topsoil spreading/grading. Prior to deep ripping and decompacting the site, all construction activity, including construction equipment and material storage, site cleanup and trafficking (Figure 14), should be finished; and the site closed off to further disturbance. Likewise, once the practice is underway and the area’s soil permeability and

rainfall infiltration are being restored, a policy limiting all further traffic to permanent travel lanes is maintained.

The other critical elements, outlined below, are: using the proper implements (deep, heavy-duty rippers and subsoilers), and ample pulling-power equipment (tractors); and conducting the practice at the appropriate speed, depth and pattern(s) of movement.

Note that an appropriate plan for the separate practice of establishing a healthy perennial ground cover, with deep rooting to help maintain the restored soil structure, should be developed in advance. This may require the assistance of an agronomist or landscape horticulturist.

Implements

Avoid the use of all undersize implements. The small-to-medium, light-duty tool will, at best, only “scarify” the uppermost surface portion of the mass of compacted subsoil material. The term “chisel plow” is commonly but incorrectly applied to a broad range of implements. While a few may be adapted for the moderate subsoiling of non-impacted soils, the majority are less durable and used for only lighter land-fitting (see Figure 6).

Fig. 6. A light duty chisel implement, not adequate for either the deep ripping or decompaction (deep subsoiling) phase.

Fig. 7. One of several variations of an agricultural ripper. This unit has long, rugged shanks mounted on a steel V-frame for deep, aggressive fracturing through Phase 1.

Use a “heavy duty” agricultural-grade, deep ripper (see Figures 7,9,10 and 11) for the first phase: the lateral and vertical fracturing of the mass of exposed and compressed subsoil, down and through, to the bottom of impact, prior to the replacement of the topsoil layer. (Any oversize rocks which are uplifted to the subsoil surface during the deep ripping phase are picked and removed.) Like the heavy-duty class of implement for the first phase, the decompaction (deep subsoiling) of Phase 2 is conducted with the heavy-duty version of the deep subsoiler. More preferable is the angled-leg variety of deep subsoiler (shown in Figures 8 and 13). It minimizes the inversion of the subsoil and topsoil layers while laterally and vertically fracturing the upper half of the previously ripped subsoil layer and all of the topsoil layer by delivering a momentary, wave-like “lifting and shattering” action up through the soil layers as it is pulled.

Pulling-Power of Equipment
Use the following rule of thumb for tractor horsepower (hp) whenever deep ripping and decompacting a significantly impacted site: For both types of implement, have at least 40 hp of tractor pull available for each mounted shank/ leg.

Using the examples of a 3-shank and a 5-shank implement, the respective tractors should have 120 and 200 hp available for fracturing down to the final depth of 20-to-24 inches per phase. Final depth for the deep ripping in Phase 1 is achieved incrementally by a progressive series of passes (see Depth and Patterns of Movement, below); while for Phase 2, the full operating depth of the deep subsoiler is applied from the beginning.

The operating speed for pulling both types of implement should not exceed 2 to 3 mph. At this slow and managed rate of operating speed, maximum functional performance is sustained by the tractor and the implement performing the soil fracturing. Referring to Figure 8, the implement is the 6-leg version of the deep angled-leg subsoiler. Its two outside legs are "chained up" so that only four legs will be engaged (at the maximum depth), requiring no less than 160 hp, (rather than 240 hp) of pull. The 4-wheel drive, articulated-frame tractor in Figure 8 is 174 hp. It will be decompacting this unobstructed, former construction access area simultaneously through 11 inches of replaced topsoil and the upper 12 inches of the previously deep-ripped subsoil. In constricted areas of Phase 1) Deep Ripping, a medium-size tractor with adequate hp, such as the one in Figure 9 pulling a 3-shank deep ripper, may be more maneuverable.


Fig. 8. A deep, angled-leg subsoiler, ideal for Phase 2 decompaction of after the topsoil layer is graded on top of the ripped subsoil.


Fig. 9. This medium tractor is pulling a 3-shank deep ripper. The severely compacted construction access corridor is narrow, and the 120 hp tractor is more maneuverable for Phase 1 deep ripping (subsoil fracturing), here.

Some industrial-grade variations of ripping implements are attached to power graders and bulldozers. Although highly durable, they are generally not recommended. Typically, the shanks or "teeth" of these rippers are too short and stout; and they are mounted too far apart to achieve the well-distributed type of lateral and vertical fracturing of the soil materials necessary to restore soil permeability and infiltration. In addition, the power graders and bulldozers, as pullers, are far less maneuverable for turns and patterns than the tractor.

Depth and Patterns of Movement
As previously noted both Phase 1 Deep Ripping through significantly compressed, exposed subsoil and Phase 2 Decompaction (deep subsoiling) through the replaced topsoil and upper subsoil need to be performed at maximum capable depth of each implement. With an implement's guide wheels attached, some have a "normal" maximum operating depth of 18 inches, while others may go deeper. In many situations, however, the tractor/implement operator must first remove the guide wheels and other non essential elements from the implement. This adapts the ripper or the deep subsoiler for skillful pulling with its frame only a few inches above surface, while the shanks or legs, fracture the soil material 20-to-24 inches deep.

There may be construction sites where the depth of the exposed subsoil's compression is moderate, e.g.: 12 inches, rather than deep. This can be verified by using a ¾ inch cone penetrometer and a shovel to test the subsoil for its level of compaction, incrementally, every three inches of increasing depth. Once the full thickness of the subsoil's compacted zone is finally "pieced" and there is a significant drop in the psi measurements of the soil penetrometer, the depth/thickness of compaction is determined. This is repeated at several representative locations of the construction site. If the thickness of the site's subsoil compaction is verified as, for example, ten inches, then the Phase 1 Deep Ripping can be correspondingly reduced to the implement's minimum operable depth of 12 inches. However, the Phase 2 simultaneous Decompation (subsoiling) of an 11 inch thick layer of replaced topsoil and the upper subsoil should run at the subsoiling implements full operating depth.


Fig. 10. An early pass with a 3-shank deep ripper penetrating only 8 inches into this worksite's severely compressed subsoil.


Fig. 11. A repeat run of the 3-shank ripper along the same patterned pass area as Fig. 9; here, incrementally reaching 18 of the needed 22 inches of subsoil fracture.

Typically, three separate series (patterns) are used for both the Phase 1 Deep Ripping and the Phase 2 Decompaction on significantly compacted sites. For Phase 1, each series begins with a moderate depth of rip and, by repeat-pass, continues until full depth is reached. Phase 2 applies the full depth of Decompation (subsoiling), from the beginning.

Every separate series (pattern) consists of parallel, forward-and-return runs, with each progressive

pass of the implement's legs or shanks evenly staggered between those from the previous pass. This compensates for the shank or leg-spacing on the implement, e.g., with 24-to-30 inches between each shank or leg. The staggered return pass ensures lateral and vertical fracturing actuated every 12 to 15 inches across the densely compressed soil mass.

Large, Unobstructed Areas
For larger easy areas, use the standard patterns of movement:

- The first series (pattern) of passes is applied lengthwise, parallel with the longest spread of the site; gradually progressing across the site's width, with each successive pass.

- The second series runs obliquely, crossing the first series at an angle of about 45 degrees.

- The third series runs at right angle (or 90 degrees), to the first series to complete the fracturing and shattering on severely compacted sites, and avoid leaving large unbroken blocks of compressed soil material. (In certain instances, the third series may be optional, depending on how thoroughly the first two series loosen the material and eliminate large chunks/blocks of material as verified by tests with a ¾-inch cone penetrometer.)

Fig. 12. Moderately dry topsoil is being replaced on the affected site now that Phase 1 deep ripping of the compressed subsoil is complete.

Fig. 13. The same deep, angled-leg subsoiler shown in Fig. 7 is engaged at maximum depth for Phase 2, decompaction (deep soiling), of the replaced topsoil and the upper subsoil materials.

Corridors
In long corridors of limited width and less maneuverability than larger sites, e.g.: along compacted areas used as temporary construction access, a modified series of pattern passes are used.

- First, apply the same initial lengthwise, parallel series of passes described above.

- A second series of passes makes a broad "S" shaped pattern of rips, continually and gradually alternating the "S" curves between opposite edges inside the compacted corridor.

- The third and final series again uses the broad, alternating S pattern, but it is "flip-flopped" to continually cross the previous S pattern along the corridor's centerline. This final series of the S pattern curves back along the edge areas skipped by the second series.

Maintenance and Cost

Once the two-phase practice of Deep Ripping and Decompation is completed, two items are essential for maintaining a site's soil porosity and permeability for infiltration. They are: planting and maintaining the appropriate ground cover with deep roots to maintain the soil structure (see Figure 15); and keeping the site free of traffic or other weight loads.

Note that site-specific choice of an appropriate vegetative ground-cover seed mix, including the proper seeding ratio of one or more perennial species with a deep taproot system and the proper amount of lime and soil nutrients (fertilizer mix) adapted to the soil-needs, are basic to the final practice of landscaping, i.e: surface tillage, seeding/planting/fertilizing and culti-packing or mulching is applied. The "maintenance" of an effectively deep-ripped and decompacted area is generally limited to the successful perennial (long-term) landscape ground cover; as long as no weight-bearing force of soil compaction is applied.

Fig. 14. The severely compacted soil of a temporary construction yard used daily by heavy equipment for four months; shown before deep ripping, topsoil replacement, and decompaction.

Fig. 15. The same site as Fig. 14 after deep ripping of the exposed subsoil, topsoil replacement, decompaction through the topsoil and upper subsoil and final surface tillage and revegetation to maintain soil permeability and infiltration.

The Deep Ripping and Decompaction practice is, by necessity, more extensive than periodic subsoiling of farmland.The cost of deep ripping and decompacting (deep subsoiling), will vary according to the depth and severity of soil-material compression and the relative amount of tractor and implement time that is required. In some instances, depending on open maneuverability, two-to-three acres of compacted project area may be deep-ripped in one day. In other situations of more severe compaction and - or less maneuverability, as little as one acre may be fully ripped in a day. Generally, if the Phase 1) Deep Ripping is fully effective, the Phase 2) Decompaction should be completed in 2/3 to 3/4 of the time required for Phase 1.

Using the example of two acres of Phase 1) Deep Ripping in one day, at $1800 per day, the net cost is $900 per acre. If the Phase 2) Decompacting or deep subsoiling takes 3/4 the time as Phase 1, it costs $675 per acre for a combined total of $1575 per acre to complete the practice (these figures do not include the cost of the separate practice of topsoil stripping and replacement). Due to the many variables, it must be recognized that cost will be determined by the specific conditions or constraints of the site and the availability of proper equipment.

Resources

Publications:

- American Society of Agricultural Engineers. 1971. *Compaction of Agricultural Soils.* ASAE.
- Brady, N.C., and R.R. Weil. 2002. *The Nature and Properties of Soils. 13th ed.* Pearson Education, Inc.
- Baver, L.D. 1948. *Soil Physics.* John Wiley & Sons.
- Carpachi, N. 1987 (1995 fifth printing). *Excavation and Grading Handbook, Revised. 2nd ed.* Craftsman Book Company
- Ellis, B. (Editor). 1997. Safe & Easy Lawn Care: The Complete Guide to Organic Low Maintenance Lawn. Houghton Mifflin.
- Harpstead, M.I., T.J. Sauer, and W.F. Bennett. 2001. *Soil Science Simplified. 4th ed.* Iowa State University Press.
- Magdoff, F., and H. van Es. 2000. *Building Soils for Better Crops. 2nd ed.* Sustainable Agricultural Networks
- McCarthy, D.F. 1993. *Essentials of Soil Mechanics and Foundations, Basic Geotechnics 4th ed.* Regents/Prentice Hall.
- Plaster, E.J. 1992. *Soil Science & Management. 3rd ed.* Delmar Publishers.
- Union Gas Limited, Ontario, Canada. 1984. *Rehabilitation of Agricultural Lands, Dawn-Kerwood Loop Pipeline; Technical Report.* Ecological Services for Planning, Ltd.; Robinson, Merritt & Devries, Ltd. and Smith, Hoffman Associates, Ltd.
- US Department of Agriculture in cooperation with Cornell University Agricultural Experiment Station. Various years. *Soil Survey of (various names) County, New York.* USDA.

Internet Access:

- Examples of implements:

V-Rippers. Access by internet search of *John Deere Ag -New Equipment for 915* (larger-frame model) *V-Rippe*; and, *for 913* (smaller-frame model) *V-Ripper*. Deep, angled-leg subsoiler. Access by internet search of: B*igham Brothers Shear Bolt Paratill-Subsoiler.* http://salesmanual.deere.com/sales/salesmanual/en_NA/primary_tillage/2008/feature/rippers/915v_pattern_frame.html?sbu=ag&link=prodcat Last visited March 08.

- Soils data of USDA Natural Resources Conservation Service. *NRCS Web Soil Survey.* http://websoilsurvey.nrcs.usda.gov/app/ and *USDA-NRCS Official Soil Series Descriptions; View by Name.* http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdname.cgi . *Last visited Jan. 08.*
- Soil penetrometer information. Access by internet searches of: *Diagnosing Soil Compaction using a Penetrometer (soil compaction tester), PSU Extension;* as well as *Dickey-john Soil Compaction Tester.* http://www.dickey-johnproducts.com/pdf/SoilCompactionTest.pdf and http://cropsoil.psu.edu/Extension/Facts/uc178pdf Last visited Sept. 07

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Appendix F:
Post-Construction Inspections and Maintenance

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POST CONSTRUCTION INSPECTIONS AND MAINTENANCE

1. SITE COVER

a. Inspections

Site cover and associated structures and embankments should be inspected periodically for the first few months following construction and then on a biannual basis. Site inspections should also be performed following all major (i.e., intense storms, thunder storms, cloud burst, etc.) storm events. Items to check for include (but are not limited to):

i. Differential settlement of embankments, cracking or erosion.

ii. Lack of vigor and density of grass turf.

iii. Accumulation of sediments or litter on lawn areas, paved areas, or within catch basin sumps.

iv. Accumulation of pollutants, including oils or grease, in catch basin sumps.

v. Damage or fatigue of storm sewer structures or associated components.

b. Mowing and Sweeping

Vegetated areas and landscaping should be maintained to promote vigorous and dense growth. Lawn areas should be mowed at least three times a year (more frequent mowing may be desired for aesthetic reasons). Resultant yard waste shall be collected and disposed of off-site.

Paved areas should be swept at least twice a year. Additional sweeping may be appropriate in the early spring for removal of deicing materials

c. Debris and Litter Removal

Accumulation of litter and debris should be removed during each mowing or sweep operation.

d. Structural Repair or Replacement

Components of the system which require repair or replacement should be addressed immediately following identification.

e. Catch Basins

The frequency for cleanout of catch basin sumps will depend on the efficiency of mowing, sweeping, and debris and litter removal. Sumps should be cleaned when accumulation of sediments are within six inches of the catch basin outlet pipe.

Disposal of material from catch basins sumps, drainage manholes, and trench drains shall be in accordance with local, state, and federal guidelines.

f. Grassed Swales

Swale maintenance will include periodic mowing, occasional spot reseeding and weed control to keep grass cover dense and vigorous. Resultant yard waste shall be collected and disposed of off-site. Application of fertilizers and pesticides should be restricted or limited.

g. Winter Maintenance

To prevent impacts to storm water management facilities, the following winter maintenance limitations, restrictions, or requirements are recommended:

i. Remove snow and ice from inlet structures, basin inlet and outlet structures and away from culvert end sections.

ii. Snow removed from paved areas should not be piled at inlets/outlets of the storm water management basin.

iii. Use of deicing materials should be limited to sand and "environmentally friendly" chemical products. Use of salt mixtures should be kept to a minimum.

iv. Sand used for deicing should be clean, course material free of fines, silt, and clay.

v. Materials used for deicing should be removed during the early spring by sweeping and/ or vacuuming.

2. UNDERGROUND DETENTION SYSTEM

a. Inspections

Underground detention systems should be inspected periodically for the first few months after construction and then on an annual basis. Underground detention systems should be inspected after major storm events to ensure inlets and outlets remain clear. Items to check for include (but are not limited to):

i. Inspection Ports

(a) Remove/Open lid on NYLOPLAST inline drain.

(b) Using a flashlight and stadia rod measure depth of sediment and record on maintenance log.

(c) Lower a camera into isolator row for visual inspection of sediment levels

(d) If sediment is at, or above , 3" proceed to step ii. If not proceed to step iii.

ii. All Isolator Rows

(a) Temove cover from structure at upstream end of isolator row.

(b) Using a flashlight, inspect down the isolator row through outlet pipe.

(i) Mirrors on poles or cameras may be used to avoid a confined space entry.

(ii) Follow osha regulations for confined space entry if entering manhole.

b. Debris and Litter Control

Inlet and outlet structures should be cleared of all debris and litter.

c. Structural repairs and Replacement

Components of the detention basin, which require repair or replacement, should be addressed immediately following identification.

d. Sedimentation Control

Sources of sedimentation, specifically eroded areas in upland drainage areas, should be stabilized immediately upon identification. Stabilization should be with vegetative practices or other erosion control practices when vegetative measures do not prove effective.

e. Sediment removal

Sediments, which accumulate in the underground detention system basin, should be removed when it reaches 4% of the pipe diameter to prevent clogging of the outlet. A typical clean-out cycle should be between 5 to 10 years with more frequent cleanings near inlet and outlet structures. The unit may require cleaning in the event of a spill of a toxic or foreign substance. Disposal of material from the underground detention systems shall be in accordance with local, state, and federal guidelines.'

Clean out isolator row using the jetvac process. A fixed culvert cleaning nozzle with a rear facing spread of 45" or more is preferred. Apply multiple passes of jetvac until backflush water is clean. Vaumm structure sump as required.

Underground detention systems are confined space environment and only properly trained personnel possessing the necessary safety equipment should enter the systems to perform maintenance or inspection.

3. STORMWATER PLANTERS

a. Inspection

Stormwater Planters should be inspected periodically for the first few months and after construction and then on a monthly basis. Stormwater Planers should be inspected after all major storm events. Items to check for include (but are not limited to):

i. Check inlet(s) for erosion.

ii. Evidence of standing water (i.e. does it dewater between storms).

iii. Health and vigor of vegetation (shrubs, flowers, etc.).

iv. Condition of and in the vicinity of the outlet(s).

b. Debris, Trash and Litter Control

Removal of debris and litter shall be accomplished during maintenance operations. Inlets & outlets should be cleared of all debris or litter.

c. Structural Repairs and Replacement

Components of the stormwater planter, which require repair or replacement, should be addressed immediately following identification. This includes treating and or replacing diseased plants, fertilizing as necessary, and repairing inlet aprons.

d. Erosion and Sediment Control

Soil slumpage and/or erosion around inlets/outlets, should be stabilized and repaired immediately upon identification.

Appendix G:
Figures

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HART ENGINEERING

DRAWN BY:	CHECKED BY:	DATE ISSUED:	SCALE:	DRAWING NUMBER:
CHRISTIAN BERTRAM PE	STEVE HART PE	SEPT 2019	N.T.S.	APP G: FIGURE 1
PROJECT NAME:		DRAWING TITLE:	FILE NAME:	
REGENERON BUILDING 81 ADDDITION		SITE LOCATION MAP	SITE LOCATION MAP.DWG	

1969 FERNDALE ROAD // CASTLETON, NEW YORK 12033 // OFFICE: 518.479.4014

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United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Rensselaer County, New York

Regeneron Building 81

September 24, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


73° 44' 18" W
73° 44' 13" W
42° 37' 35" N
42° 37' 32" N
603450
603460
603470
603480
603490
603500
603510
603520
603530
603540
603550
603560
4720110
4720100
4720090
4720080
4720070
4720060
4720050
4720040
NaB
HuB
EIB
Soil Map may not be valid at this scale.
Map Scale: 1:550 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 5 10 20 30
Feet
0 25 50 100 150
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Rensselaer County, New York
Survey Area Data: Version 15, Sep 3, 2018

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

Date(s) aerial images were photographed: Jul 1, 2014—Sep 22, 2017

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ElB	Elmridge very fine sandy loam, 3 to 8 percent slopes	0.4	51.7%
HuB	Hudson silt loam, 3 to 8 percent slopes	0.1	19.2%
NaB	Nassau-Manlius complex, undulating	0.2	29.0%
Totals for Area of Interest		**0.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Rensselaer County, New York

ElB—Elmridge very fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9v1s
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 115 to 195 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Elmridge and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Elmridge

Setting

Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Loamy over clayey glaciolacustrine or marine deposits

Typical profile

H1 - 0 to 9 inches: very fine sandy loam
H2 - 9 to 36 inches: fine sandy loam
H3 - 36 to 60 inches: stratified silty clay to very fine sand to clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 40 inches to strongly contrasting textural stratification
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Available water storage in profile: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Shaker

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

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

Elmridge, nearly level
Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed soils, vfsl substratum
Percent of map unit: 2 percent
Hydric soil rating: No

HuB—Hudson silt loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 9v27
Elevation: 300 to 1,800 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 115 to 195 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Hudson and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hudson

Setting
Landform: Lake plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Clayey and silty glaciolacustrine deposits

Typical profile
H1 - 0 to 8 inches: silt loam
H2 - 8 to 16 inches: silty clay
H3 - 16 to 28 inches: silty clay
H4 - 28 to 60 inches: silty clay

Properties and qualities
Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Rhinebeck

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

Nassau

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed soils, gravelly or sandy surface

Percent of map unit: 2 percent
Hydric soil rating: No

NaB—Nassau-Manlius complex, undulating

Map Unit Setting

National map unit symbol: 9v2k
Elevation: 200 to 1,800 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 115 to 195 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Nassau and similar soils: 45 percent
Manlius and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nassau

Setting

Landform: Till plains, benches, ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Channery loamy till derived mainly from local slate or shale

Typical profile

H1 - 0 to 7 inches: very channery silt loam

H2 - 7 to 15 inches: very channery loam
H3 - 15 to 19 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Manlius

Setting

Landform: Benches, ridges, till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from local acid shale bedrock

Typical profile

H1 - 0 to 8 inches: channery silt loam
H2 - 8 to 23 inches: very channery silt loam
H3 - 23 to 30 inches: very channery silt loam
H4 - 30 to 34 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Bernardston

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

Scriba

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

Hudson

Percent of map unit: 4 percent
Hydric soil rating: No

Rhinebeck

Percent of map unit: 4 percent
Hydric soil rating: No

Palms

Percent of map unit: 1 percent
Landform: Swamps, marshes
Hydric soil rating: Yes

Carlisle

Percent of map unit: 1 percent
Landform: Swamps, marshes
Hydric soil rating: Yes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (Regeneron Building 81)

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.

Map—Hydrologic Soil Group (Regeneron Building 81)

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Rensselaer County, New York
Survey Area Data: Version 15, Sep 3, 2018

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

Date(s) aerial images were photographed: Jul 1, 2014—Sep 22, 2017

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

Table—Hydrologic Soil Group (Regeneron Building 81)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
ElB	Elmridge very fine sandy loam, 3 to 8 percent slopes	B	0.4	51.7%
HuB	Hudson silt loam, 3 to 8 percent slopes	C/D	0.1	19.2%
NaB	Nassau-Manlius complex, undulating	D	0.2	29.0%
Totals for Area of Interest			**0.8**	**100.0%**

Rating Options—Hydrologic Soil Group (Regeneron Building 81)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

HART ENGINEERING

DRAWN BY:	CHECKED BY:	DATE ISSUED:	SCALE:	DRAWING NUMBER:
CHRISTIAN BERTRAM PE	STEVE HART PE	SEPT 2019	N.T.S.	APP G: FIGURE 3
PROJECT NAME:		DRAWING TITLE:	FILE NAME:	
REGENERON BUILDING 81 ADDDITION		AERIAL MAP	AERIAL MAP.DWG	

1969 FERNDALE ROAD // CASTLETON, NEW YORK 12033 // OFFICE: 518.479.4014

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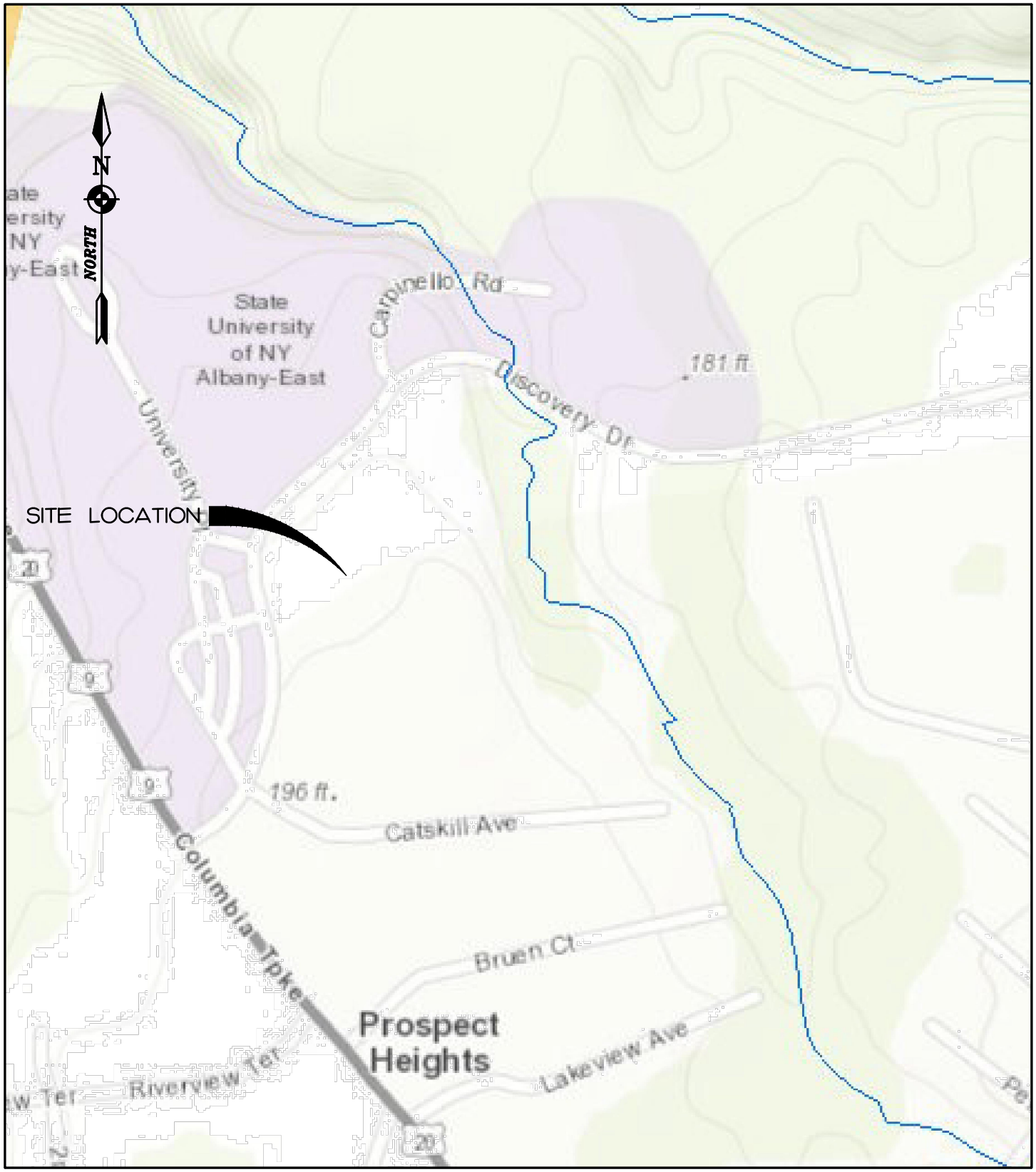
CHRISTIAN BERTRAM PE	STEVE HART PE	SEPT 2019	N.T.S.	APP G: FIGURE 4
PROJECT NAME:		DRAWING TITLE:	FILE NAME:	
REGENERON BUILDING 81 ADDDITION		NYSDEC WETLANDS MAP	WETLAND MAP.DWG	



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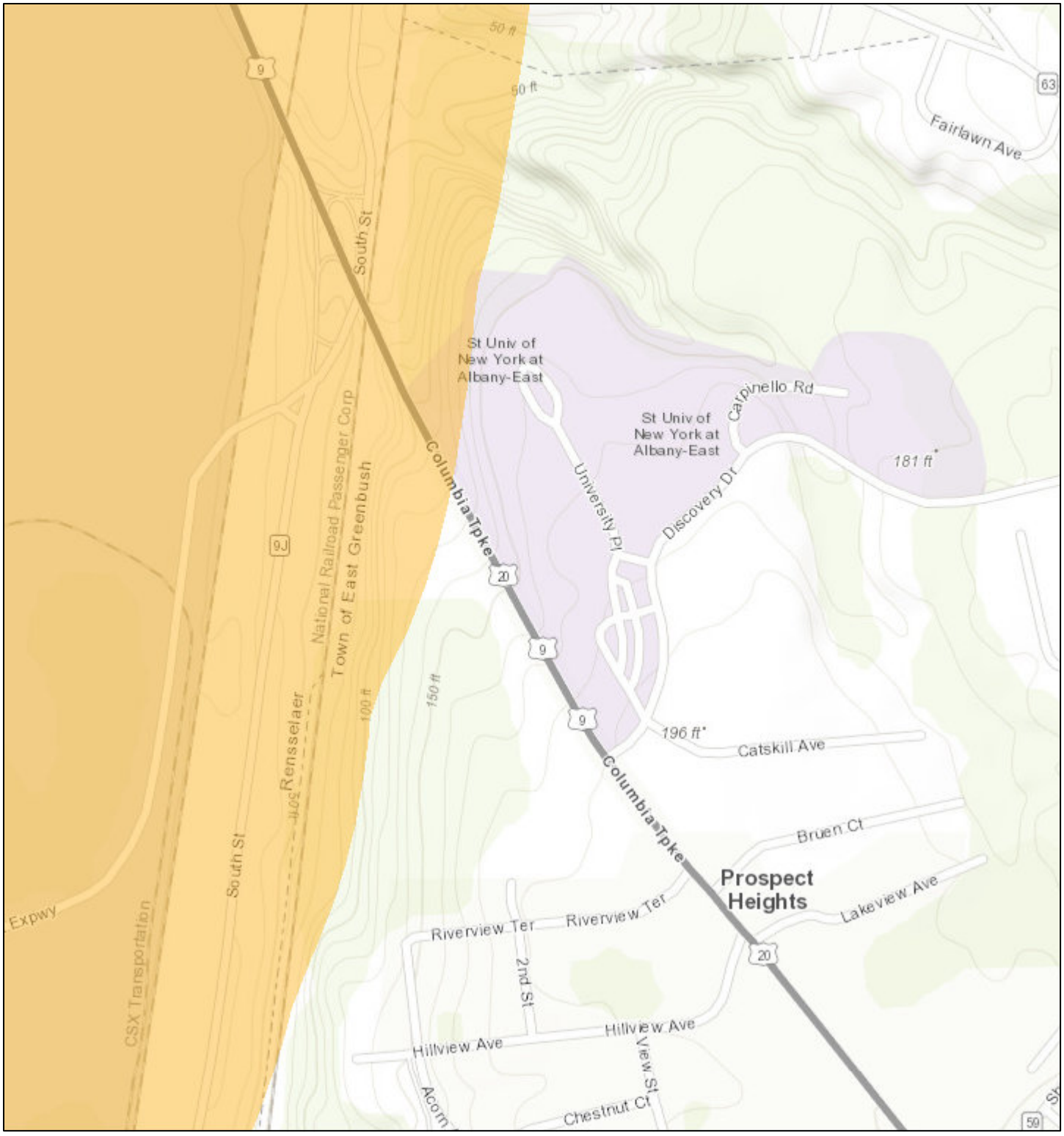
Regeneron Building Rare Plants & Animals



September 24, 2019

1:9,028

0 0.075 0.15 0.3 mi

0 0.1 0.2 0.4 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

NYS Department of Environmental Conservation
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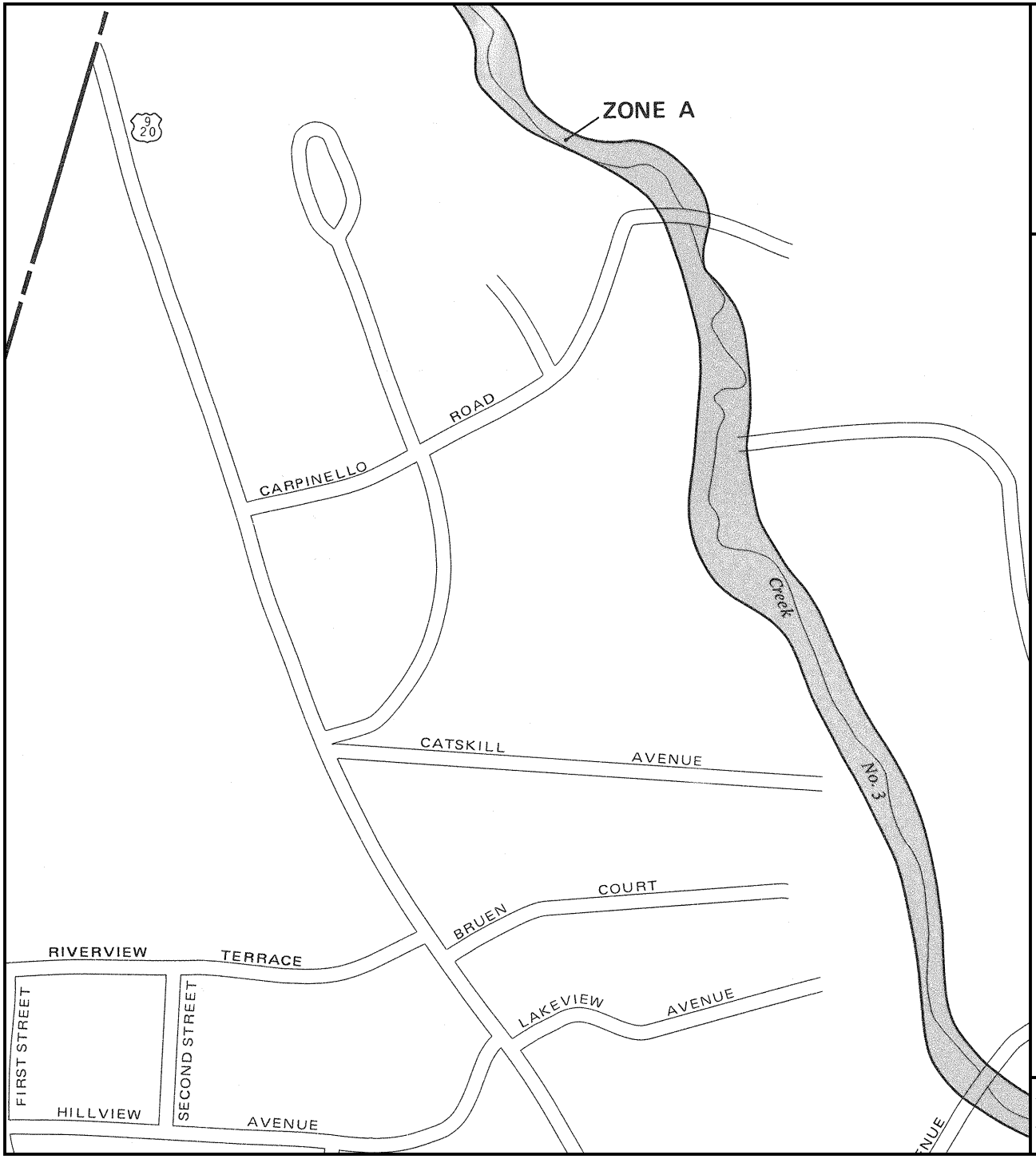

N

APPROXIMATE SCALE

400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

TOWN OF
EAST GREENBUSH, NEW YORK
RENSSELAER COUNTY

PANEL 3 OF 8
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
361133 0003 A

EFFECTIVE DATE:
MARCH 18, 1980

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

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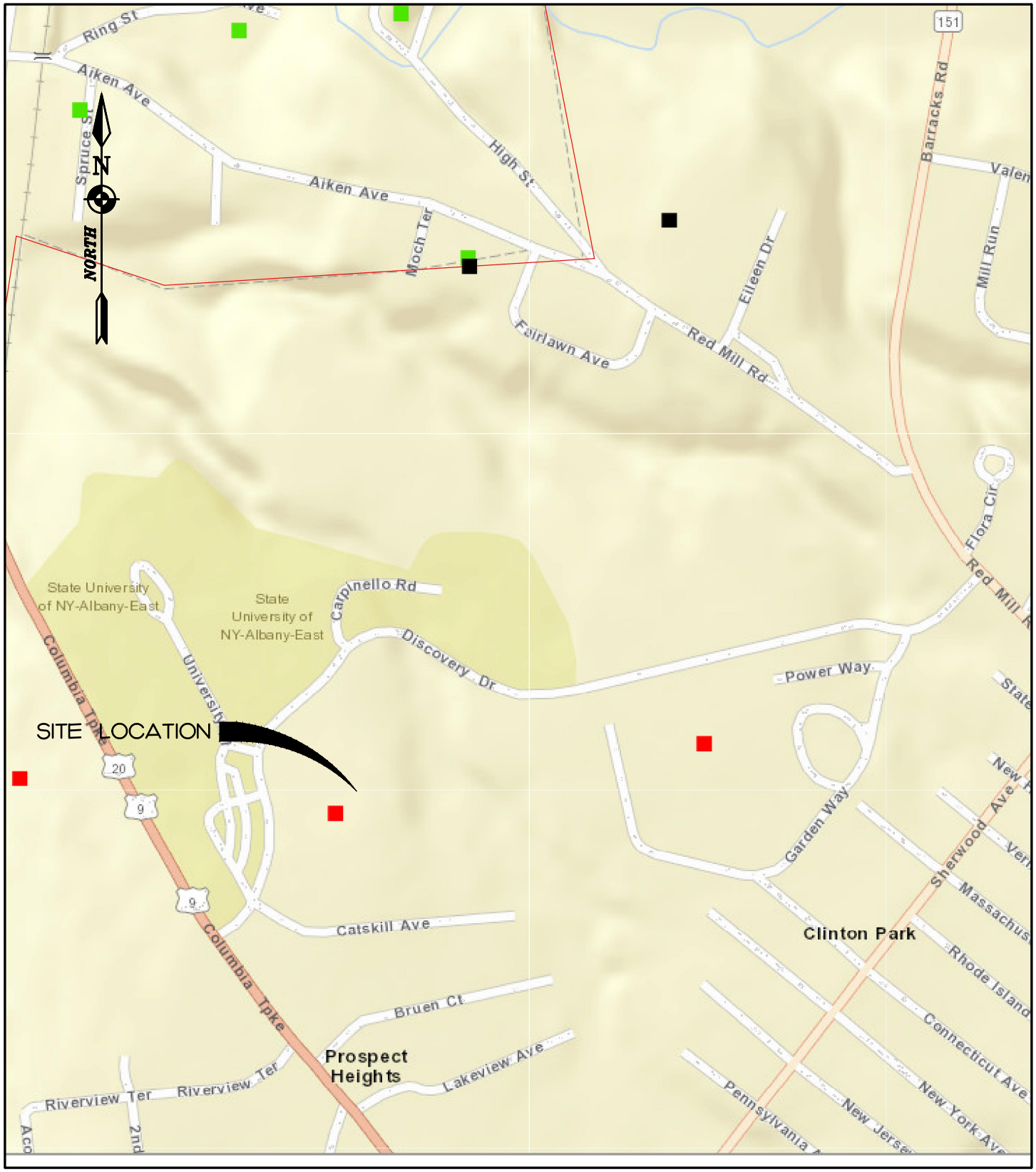
HART ENGINEERING

DRAWN BY:	CHECKED BY:	DATE ISSUED:	SCALE:	DRAWING NUMBER:
CHRISTIAN BERTRAM PE	STEVE HART PE	SEPT 2019	N.T.S.	APP G: FIGURE 7
PROJECT NAME:		DRAWING TITLE:	FILE NAME:	
REGENERON BUILDING 81 ADDDITION		SHPO MAP	SHPO MAP.DWG	



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

ANDREW M. CUOMO
Governor

ROSE HARVEY
Commissioner

June 28, 2018

Mrs. Jennifer Geraghty
Hartgen Archeological Associates
1744 Washington Avenue Ext
Rensselaer, NY 12144

Re: SEQRA
Regeneron Building 81 Expansion
18PR04016

Dear Mrs. Geraghty:

Thank you for requesting the comments of the Office of Parks, Recreation and Historic Preservation (OPRHP). We have reviewed the project in accordance with the New York State Historic Preservation Act of 1980 (Section 14.09 of the New York Parks, Recreation and Historic Preservation Law). These comments are those of the OPRHP and relate only to Historic/Cultural resources. They do not include potential environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the State Environmental Quality Review Act (New York Environmental Conservation Law Article 8) and its implementing regulations (6 NYCRR Part 617).

Based upon this review, it is the New York State Office of Parks, Recreation and Historic Preservation's opinion that your project will have no impact on archaeological and/or historic resources listed in or eligible for the New York State and National Registers of Historic Places.

If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above.

Sincerely,

Michael F. Lynch, P.E., AIA

Director, Division for Historic Preservation

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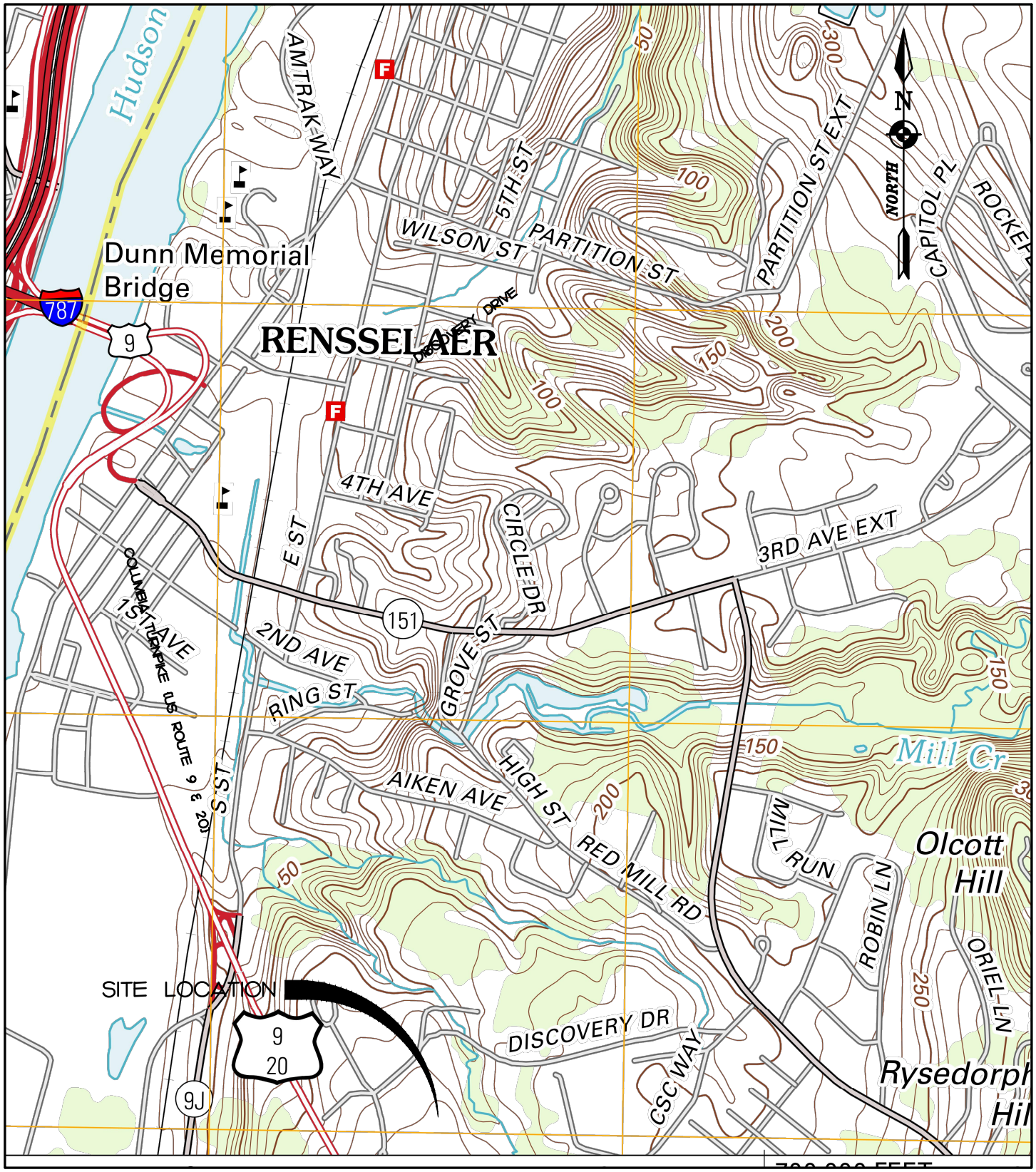
HART ENGINEERING

DRAWN BY:	CHECKED BY:	DATE ISSUED:	SCALE:	DRAWING NUMBER:
CHRISTIAN BERTRAM PE	STEVE HART PE	SEPT 2019	N.T.S.	APP G: FIGURE 9
PROJECT NAME:		DRAWING TITLE:	FILE NAME:	
REGENERON BUILDING 81 ADDDITION		USGS MAP	USGS MAP.DWG	



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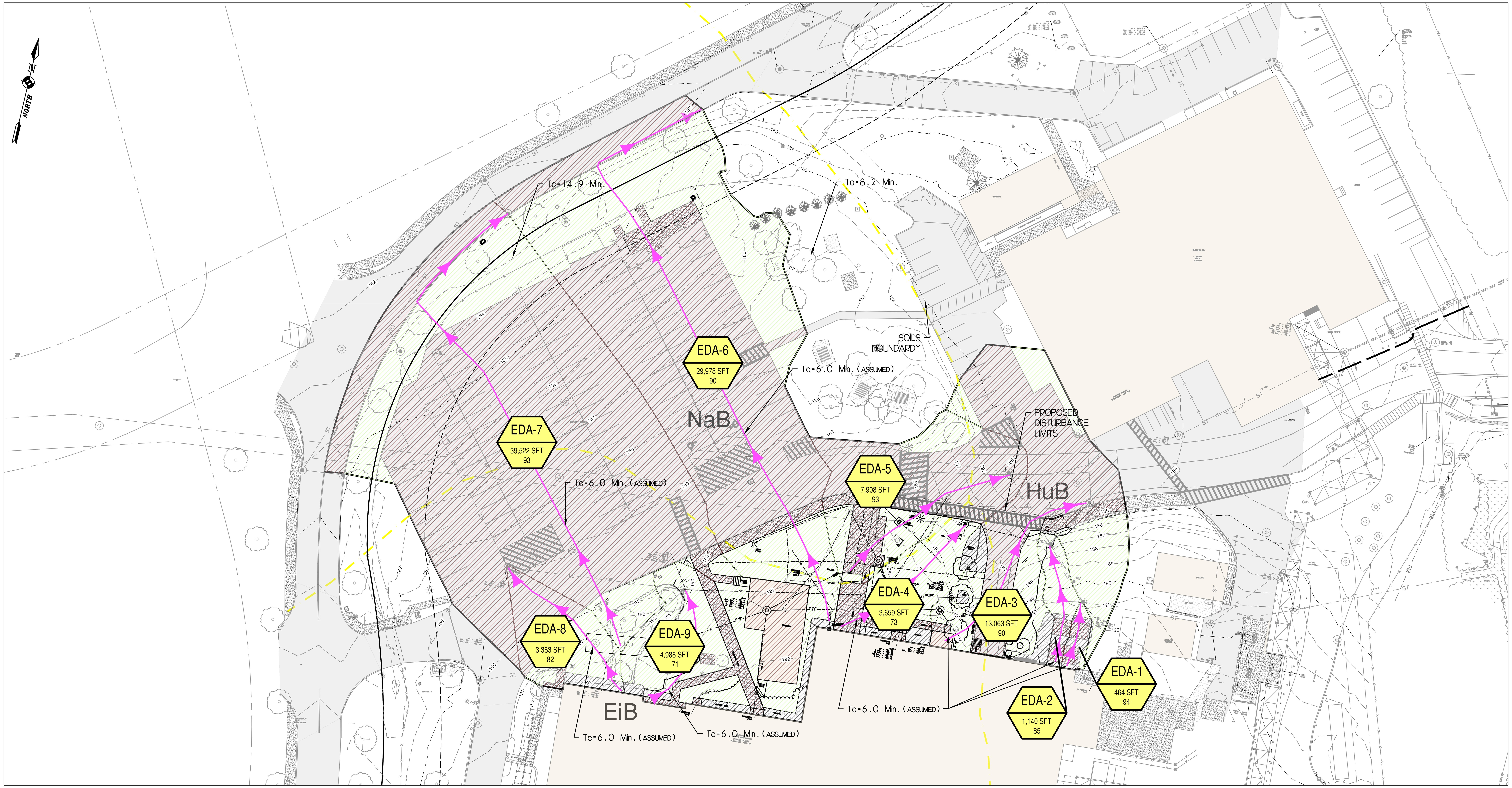


LEGEND

- X - STORMWATER BASIN
- X - REACH
- X / X AC / X - SUBCATCHMENT - TOTAL DRAINAGE AREA (ACRES) - WEIGHTED RUNOFF CURVE
- WATER FLOW PATH (TC)
- WATERSHED BOUNDARY

0 30 60 90 FT
1" = 30' SCALE BAR

TOWN OF EAST GREENBUSH PLANNING BOARD

BY DIRECTION OF
CHAIRMAN OF PLANNING BOARD
THESE PLANS ARE APPROVED.
SEE FIRST SHEET FOR
DATE & SIGNATURE.

HART ENGINEERING
1969 FERNDALE ROAD
CASTLETON NY, 12033
Phone: (518) 479-4014
Fax: (518) 477-6371

STEVEN P. HART, P.E. #069039

NO.	DATE	DESCRIPTION	REVD.	CK'D
1	10/7/19	REVISED PER TOWN COMMENTS	CMB	SPH

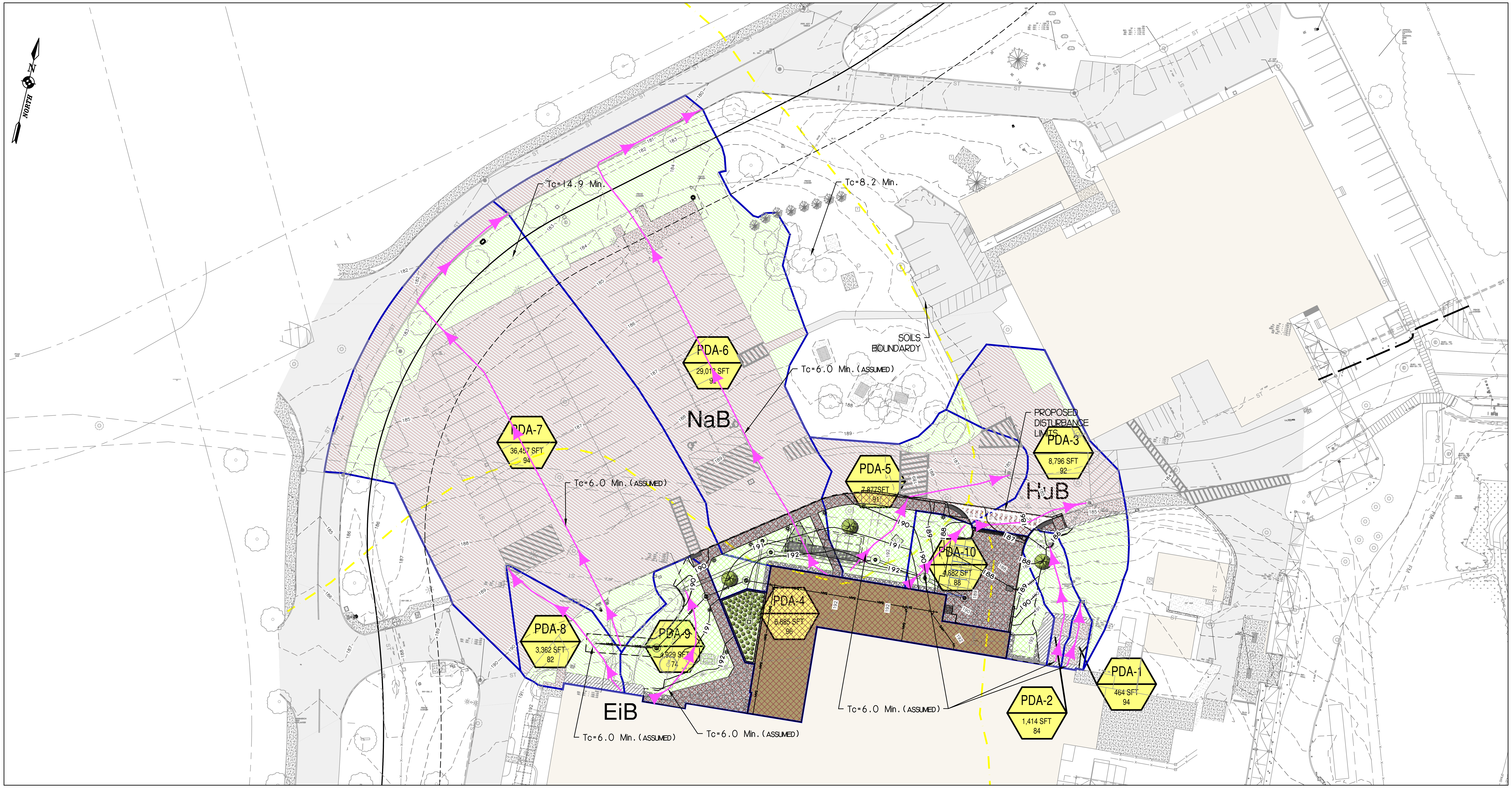
PRE DEVELOPMENT WATER SHED DELINEATION MAP

REGENERON PHARMACUETICALS
BUILDING 81 ADDITION
81 COLUMBIA TURNPIKE

TOWN: EAST GREENBUSH | COUNTY: RENNSELAER | STATE: NEW YORK

ENGINEER: CHRISTIAN BERTRAM PE
DRAWN BY: CHRISTIAN BERTRAM PE
DATE ISSUED: OCTOBER 1, 2019
SCALE: 1" = 30'
DRAWING NUMBER: FIGURE 10

1 OF 2



LEGEND

- STORMWATER BASIN
- REACH
- SUBCATCHMENT
- TOTAL DRAINAGE AREA (ACRES)
- WEIGHTED RUNOFF CURVE
- WATER FLOW PATH (TC)
- WATERSHED BOUNDARY

0 30 60 90 FT
1" = 30' SCALE BAR

TOWN OF EAST GREENBUSH PLANNING BOARD

BY DIRECTION OF
CHAIRMAN OF PLANNING BOARD
THESE PLANS ARE APPROVED.
SEE FIRST SHEET FOR
DATE & SIGNATURE.

HART ENGINEERING
1969 FERNDALE ROAD
CASTLETON NY, 12033
Phone: (518) 479-4014
Fax: (518) 477-6371
STEVEN P. HART, P.E. #069039

NO.	DATE	DESCRIPTION	REVD.	CK'D
1	10/7/19	REVISED PER TOWN COMMENTS	CMB	SPH

POST DEVELOPMENT WATER SHED DELINEATION MAP

REGENERON PHARMACUETICALS BUILDING 81 ADDITION
81 COLUMBIA TURNPIKE

TOWN:EAST GREENBUSH COUNTY:RENSSELAER STATE:NEW YORK

ENGINEER: CHRISTIAN BERTRAM PE
DRAWN BY: CHRISTIAN BERTRAM PE
DATE ISSUED: OCTOBER 1, 2019
SCALE: 1" = 30'
DRAWING NUMBER: FIGURE 11

2 OF 2

Appendix H:
Pre-Development Stormwater Modeling

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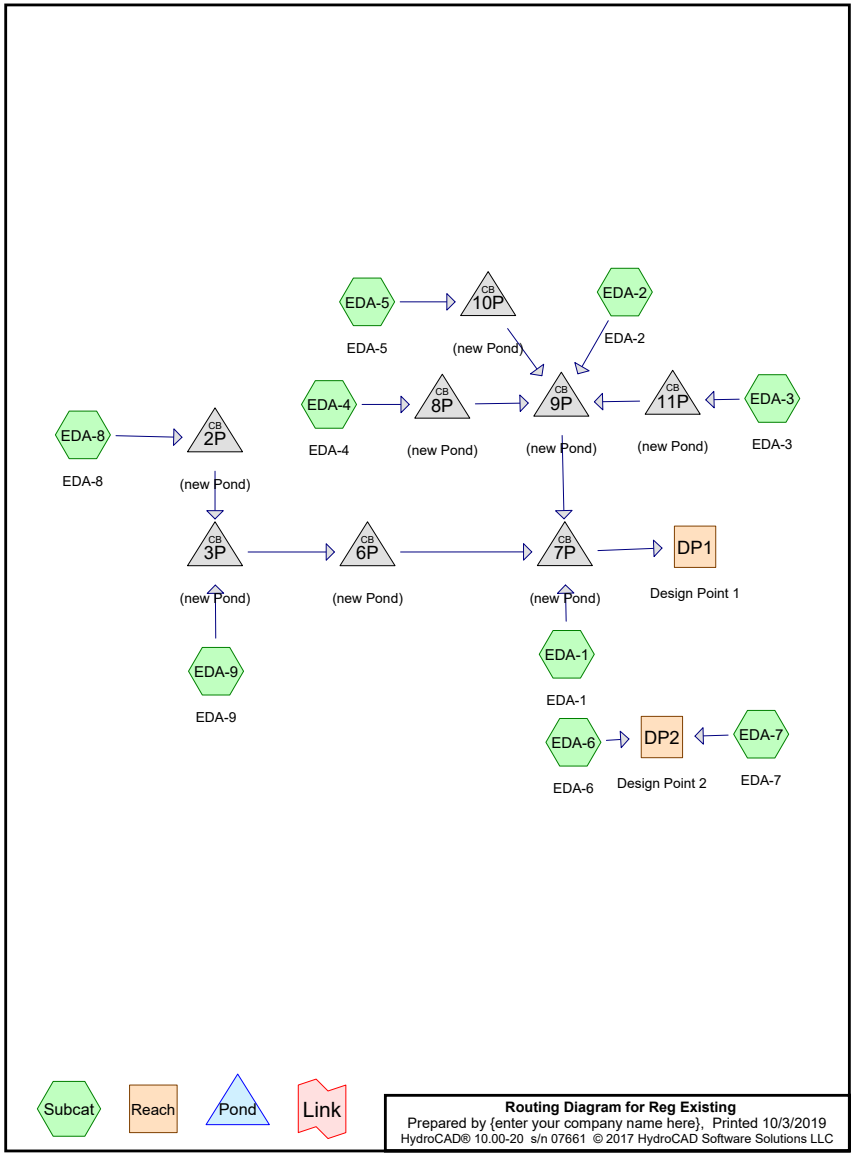


Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.271	61	>75% Grass cover, Good, HSG B (EDA-3, EDA-4, EDA-5, EDA-6, EDA-7, EDA-8, EDA-9)
0.524	80	>75% Grass cover, Good, HSG D (EDA-1, EDA-2, EDA-3, EDA-4, EDA-5, EDA-6, EDA-7)
0.053	96	Gravel surface, HSG D (EDA-1, EDA-2, EDA-3, EDA-4, EDA-6, EDA-7, EDA-8, EDA-9)
1.540	98	Paved parking, HSG D (EDA-1, EDA-2, EDA-3, EDA-4, EDA-5, EDA-6, EDA-7, EDA-8, EDA-9)
0.001	98	Unconnected roofs, HSG D (EDA-5)
2.389	**90**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.271	HSG B	EDA-3, EDA-4, EDA-5, EDA-6, EDA-7, EDA-8, EDA-9
0.000	HSG C	
2.118	HSG D	EDA-1, EDA-2, EDA-3, EDA-4, EDA-5, EDA-6, EDA-7, EDA-8, EDA-9
0.000	Other	
2.389		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.271	0.000	0.524	0.000	0.796	>75% Grass cover, Good	EDA-1, EDA-2, EDA-3, EDA-4, EDA-5, EDA-6, EDA-7, EDA-8, EDA-9
0.000	0.000	0.000	0.053	0.000	0.053	Gravel surface	EDA-1, EDA-2, EDA-3, EDA-4, EDA-6, EDA-7, EDA-8, EDA-9
0.000	0.000	0.000	1.540	0.000	1.540	Paved parking	EDA-1, EDA-2, EDA-3, EDA-4, EDA-5, EDA-6, EDA-7, EDA-8, EDA-9
0.000	0.000	0.000	0.001	0.000	0.001	Unconnected roofs	EDA-5
0.000	**0.271**	**0.000**	**2.118**	**0.000**	**2.389**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	2P	179.90	179.58	107.7	0.0030	0.013	12.0	0.0	0.0
2	3P	179.58	179.04	162.4	0.0033	0.013	18.0	0.0	0.0
3	6P	178.76	178.12	79.7	0.0080	0.013	24.0	0.0	0.0
4	7P	178.12	177.58	77.7	0.0069	0.013	24.0	0.0	0.0
5	8P	184.00	182.02	53.2	0.0372	0.013	15.0	0.0	0.0
6	9P	180.62	179.75	37.9	0.0230	0.013	12.0	0.0	0.0
7	10P	181.30	180.62	50.1	0.0136	0.013	12.0	0.0	0.0
8	11P	181.72	181.22	34.8	0.0144	0.013	12.0	0.0	0.0

Time span=1.00-38.00 hrs, dt=0.01 hrs, 3701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EDA-1: EDA-1 Runoff Area=464 sf 45.04% Impervious Runoff Depth=1.69"
Tc=6.0 min CN=94 Runoff=0.02 cfs 0.001 af

Subcatchment EDA-2: EDA-2 Runoff Area=1,139 sf 18.35% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=85 Runoff=0.03 cfs 0.002 af

Subcatchment EDA-3: EDA-3 Runoff Area=13,063 sf 56.47% Impervious Runoff Depth=1.36"
Tc=6.0 min CN=90 Runoff=0.48 cfs 0.034 af

Subcatchment EDA-4: EDA-4 Runoff Area=3,659 sf 21.02% Impervious Runoff Depth=0.47"
Tc=6.0 min CN=73 Runoff=0.04 cfs 0.003 af

Subcatchment EDA-5: EDA-5 Runoff Area=7,908 sf 75.19% Impervious Runoff Depth=1.60"
Tc=6.0 min CN=93 Runoff=0.34 cfs 0.024 af

Subcatchment EDA-6: EDA-6 Runoff Area=29,978 sf 61.16% Impervious Runoff Depth=1.36"
Tc=6.0 min CN=90 Runoff=1.10 cfs 0.078 af

Subcatchment EDA-7: EDA-7 Runoff Area=39,521 sf 79.60% Impervious Runoff Depth=1.60"
Tc=6.0 min CN=93 Runoff=1.68 cfs 0.121 af

Subcatchment EDA-8: EDA-8 Runoff Area=3,362 sf 51.16% Impervious Runoff Depth=0.86"
Tc=6.0 min CN=82 Runoff=0.08 cfs 0.006 af

Subcatchment EDA-9: EDA-9 Runoff Area=4,988 sf 21.85% Impervious Runoff Depth=0.40"
Tc=6.0 min CN=71 Runoff=0.04 cfs 0.004 af

Reach DP1: Design Point 1 Inflow=1.02 cfs 0.075 af
Outflow=1.02 cfs 0.075 af

Reach DP2: Design Point 2 Inflow=2.78 cfs 0.199 af
Outflow=2.78 cfs 0.199 af

Pond 2P: (new Pond) Peak Elev=180.08' Inflow=0.08 cfs 0.006 af
12.0" Round Culvert n=0.013 L=107.7' S=0.0030 '/' Outflow=0.08 cfs 0.006 af

Pond 3P: (new Pond) Peak Elev=179.77' Inflow=0.11 cfs 0.009 af
18.0" Round Culvert n=0.013 L=162.4' S=0.0033 '/' Outflow=0.11 cfs 0.009 af

Pond 6P: (new Pond) Peak Elev=178.90' Inflow=0.11 cfs 0.009 af
24.0" Round Culvert n=0.013 L=79.7' S=0.0080 '/' Outflow=0.11 cfs 0.009 af

Pond 7P: (new Pond) Peak Elev=178.59' Inflow=1.02 cfs 0.075 af
24.0" Round Culvert n=0.013 L=77.7' S=0.0069 '/' Outflow=1.02 cfs 0.075 af

Pond 8P: (new Pond) Peak Elev=184.10' Inflow=0.04 cfs 0.003 af
15.0" Round Culvert n=0.013 L=53.2' S=0.0372 '/' Outflow=0.04 cfs 0.003 af

Pond 9P: (new Pond) Peak Elev=181.17' Inflow=0.88 cfs 0.064 af
12.0" Round Culvert n=0.013 L=37.9' S=0.0230 '/' Outflow=0.88 cfs 0.064 af

Pond 10P: (new Pond) Peak Elev=181.62' Inflow=0.34 cfs 0.024 af
12.0" Round Culvert n=0.013 L=50.1' S=0.0136 '/' Outflow=0.34 cfs 0.024 af

Pond 11P: (new Pond) Peak Elev=182.11' Inflow=0.48 cfs 0.034 af
12.0" Round Culvert n=0.013 L=34.8' S=0.0144 '/' Outflow=0.48 cfs 0.034 af

Total Runoff Area = 2.389 ac Runoff Volume = 0.274 af Average Runoff Depth = 1.38"
35.52% Pervious = 0.849 ac 64.48% Impervious = 1.541 ac

Summary for Subcatchment EDA-1: EDA-1

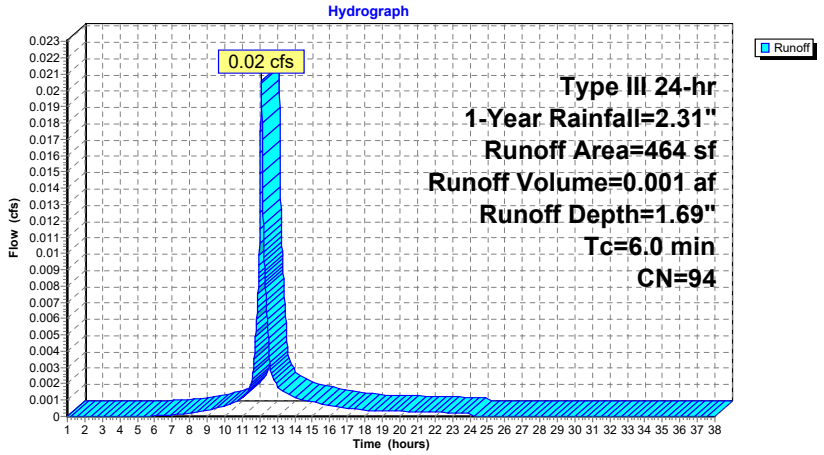
Runoff = 0.02 cfs @ 12.09 hrs, Volume= 0.001 af, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
209	98	Paved parking, HSG D
165	96	Gravel surface, HSG D
0	61	>75% Grass cover, Good, HSG B
90	80	>75% Grass cover, Good, HSG D
464	94	Weighted Average
255		54.96% Pervious Area
209		45.04% Impervious Area

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

Subcatchment EDA-1: EDA-1



Summary for Subcatchment EDA-2: EDA-2

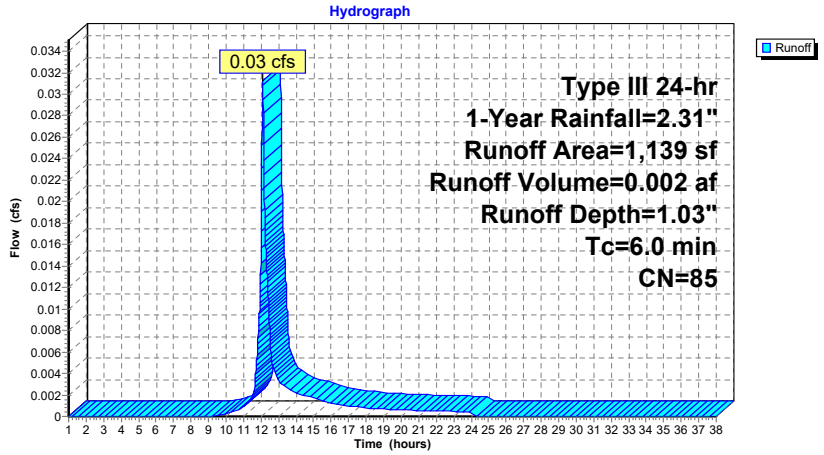
Runoff = 0.03 cfs @ 12.09 hrs, Volume= 0.002 af, Depth= 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
209	98	Paved parking, HSG D
115	96	Gravel surface, HSG D
0	61	>75% Grass cover, Good, HSG B
815	80	>75% Grass cover, Good, HSG D
1,139	85	Weighted Average
930		81.65% Pervious Area
209		18.35% Impervious Area

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

Subcatchment EDA-2: EDA-2



Summary for Subcatchment EDA-3: EDA-3

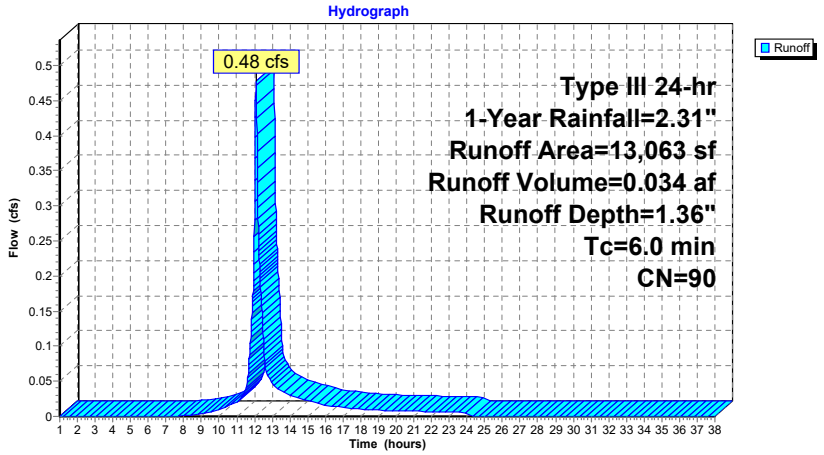
Runoff = 0.48 cfs @ 12.09 hrs, Volume= 0.034 af, Depth= 1.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
7,377	98	Paved parking, HSG D
676	96	Gravel surface, HSG D
812	61	>75% Grass cover, Good, HSG B
4,198	80	>75% Grass cover, Good, HSG D
13,063	90	Weighted Average
5,686		43.53% Pervious Area
7,377		56.47% Impervious Area

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

Subcatchment EDA-3: EDA-3



Summary for Subcatchment EDA-4: EDA-4

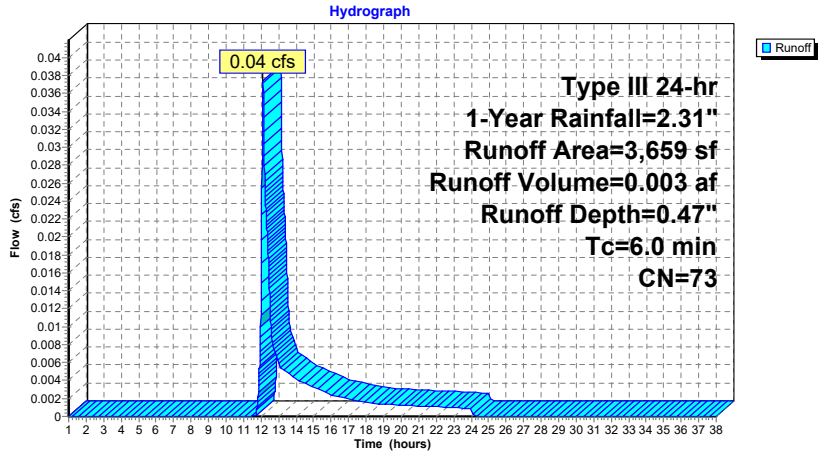
Runoff = 0.04 cfs @ 12.11 hrs, Volume= 0.003 af, Depth= 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
769	98	Paved parking, HSG D
415	96	Gravel surface, HSG D
2,345	61	>75% Grass cover, Good, HSG B
130	80	>75% Grass cover, Good, HSG D
3,659	73	Weighted Average
2,890		78.98% Pervious Area
769		21.02% Impervious Area

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

Subcatchment EDA-4: EDA-4



Summary for Subcatchment EDA-5: EDA-5

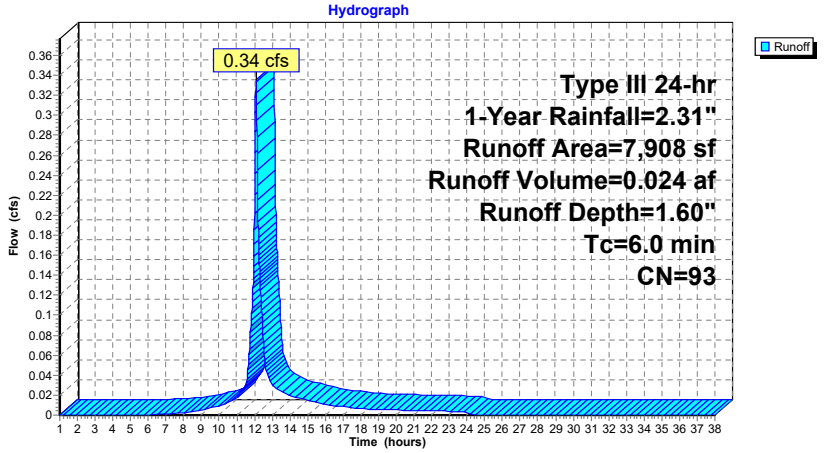
Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.024 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
5,914	98	Paved parking, HSG D
0	96	Gravel surface, HSG D
59	61	>75% Grass cover, Good, HSG B
1,903	80	>75% Grass cover, Good, HSG D
32	98	Unconnected roofs, HSG D
7,908	93	Weighted Average
1,962		24.81% Pervious Area
5,946		75.19% Impervious Area
32		0.54% Unconnected

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

Subcatchment EDA-5: EDA-5



Summary for Subcatchment EDA-6: EDA-6

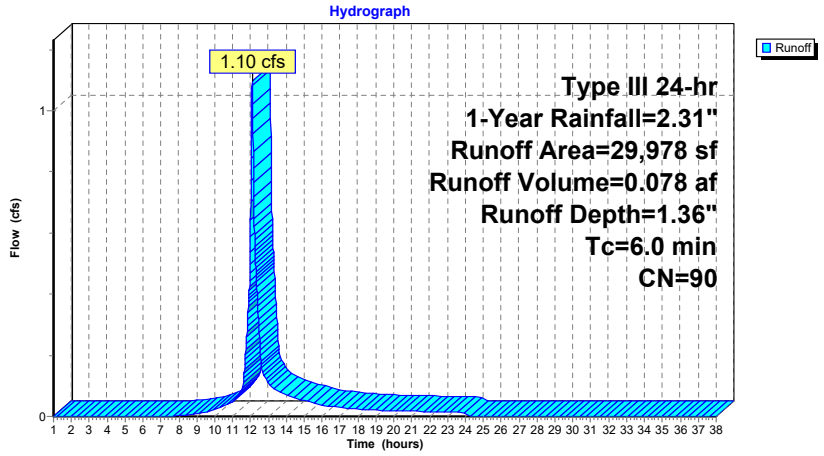
Runoff = 1.10 cfs @ 12.09 hrs, Volume= 0.078 af, Depth= 1.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
18,334	98	Paved parking, HSG D
65	96	Gravel surface, HSG D
936	61	>75% Grass cover, Good, HSG B
10,643	80	>75% Grass cover, Good, HSG D
29,978	90	Weighted Average
11,644		38.84% Pervious Area
18,334		61.16% Impervious Area

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

Subcatchment EDA-6: EDA-6



Summary for Subcatchment EDA-7: EDA-7

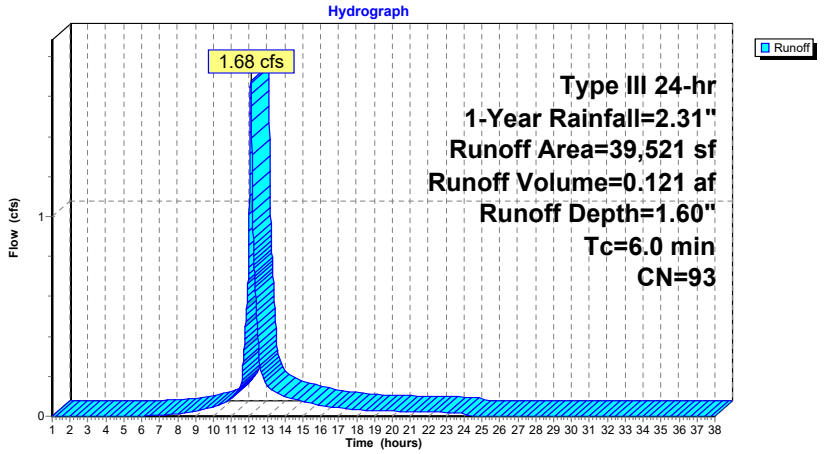
Runoff = 1.68 cfs @ 12.09 hrs, Volume= 0.121 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
29,633	98	Paved parking, HSG D
340	96	Gravel surface, HSG D
2,663	61	>75% Grass cover, Good, HSG B
5,061	80	>75% Grass cover, Good, HSG D
1,824	98	Paved parking, HSG D
39,521	93	Weighted Average
8,064		20.40% Pervious Area
31,457		79.60% Impervious Area

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

Subcatchment EDA-7: EDA-7



Summary for Subcatchment EDA-8: EDA-8

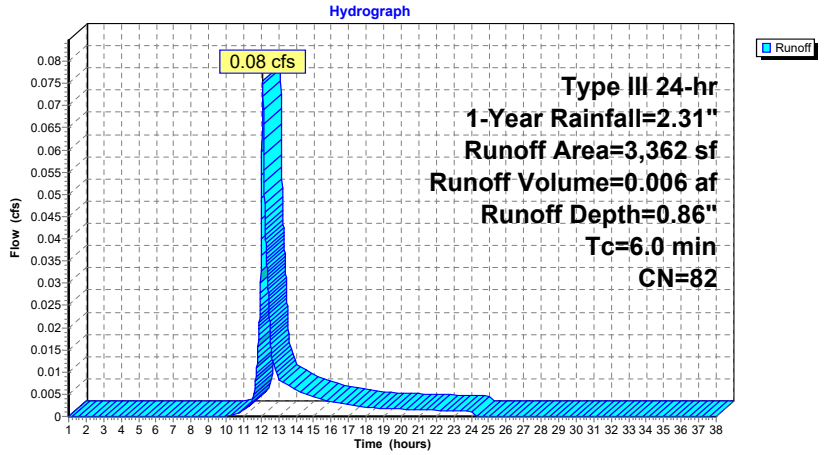
Runoff = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
1,720	98	Paved parking, HSG D
244	96	Gravel surface, HSG D
1,398	61	>75% Grass cover, Good, HSG B
0	80	>75% Grass cover, Good, HSG D
3,362	82	Weighted Average
1,642		48.84% Pervious Area
1,720		51.16% Impervious Area

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

Subcatchment EDA-8: EDA-8



Summary for Subcatchment EDA-9: EDA-9

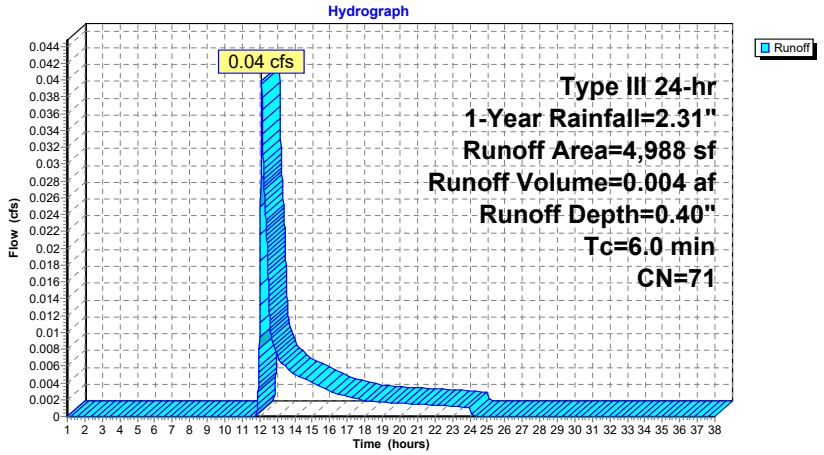
Runoff = 0.04 cfs @ 12.11 hrs, Volume= 0.004 af, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
1,090	98	Paved parking, HSG D
290	96	Gravel surface, HSG D
3,608	61	>75% Grass cover, Good, HSG B
0	80	>75% Grass cover, Good, HSG D
4,988	71	Weighted Average
3,898		78.15% Pervious Area
1,090		21.85% Impervious Area

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

Subcatchment EDA-9: EDA-9



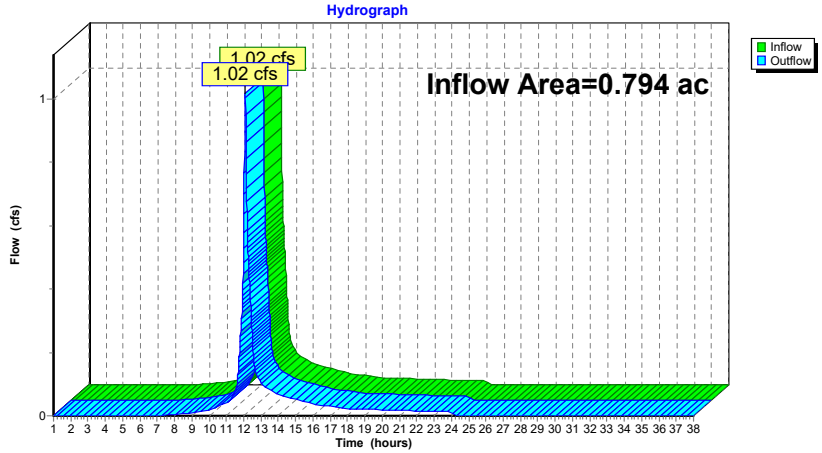
Summary for Reach DP1: Design Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.794 ac, 50.08% Impervious, Inflow Depth = 1.13" for 1-Year event
Inflow = 1.02 cfs @ 12.09 hrs, Volume= 0.075 af
Outflow = 1.02 cfs @ 12.09 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs

Reach DP1: Design Point 1



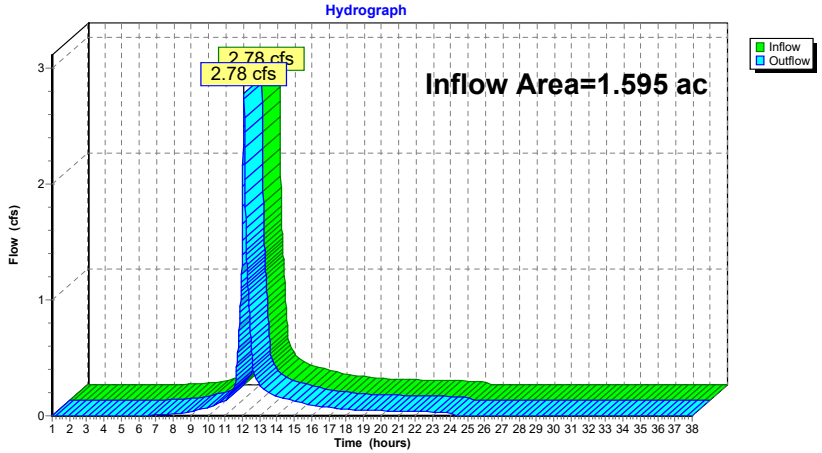
Summary for Reach DP2: Design Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.595 ac, 71.64% Impervious, Inflow Depth = 1.50" for 1-Year event
Inflow = 2.78 cfs @ 12.09 hrs, Volume= 0.199 af
Outflow = 2.78 cfs @ 12.09 hrs, Volume= 0.199 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs

Reach DP2: Design Point 2



Summary for Pond 2P: (new Pond)

[57] Hint: Peaked at 180.08' (Flood elevation advised)

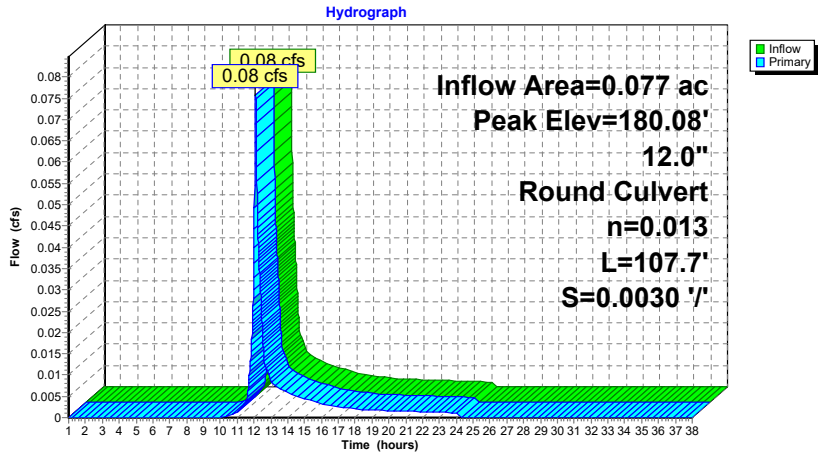
Inflow Area = 0.077 ac, 51.16% Impervious, Inflow Depth = 0.86" for 1-Year event
Inflow = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af
Outflow = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min
Primary = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 180.08' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	179.90'	**12.0" Round Culvert** L= 107.7' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.90' / 179.58' S= 0.0030 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.08 cfs @ 12.09 hrs HW=180.08' (Free Discharge)
1=Culvert (Barrel Controls 0.08 cfs @ 1.20 fps)

Pond 2P: (new Pond)



Summary for Pond 3P: (new Pond)

[79] Warning: Submerged Pond 2P Primary device # 1 OUTLET by 0.19'

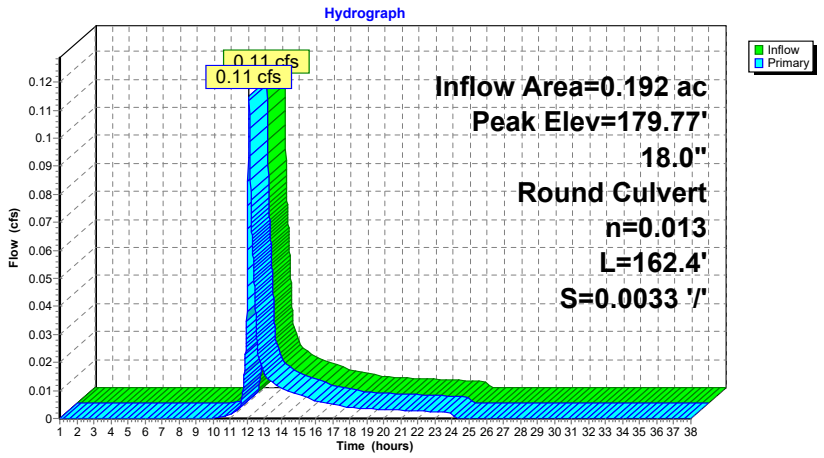
Inflow Area = 0.192 ac, 33.65% Impervious, Inflow Depth = 0.59" for 1-Year event
Inflow = 0.11 cfs @ 12.10 hrs, Volume= 0.009 af
Outflow = 0.11 cfs @ 12.10 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min
Primary = 0.11 cfs @ 12.10 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 179.77' @ 12.10 hrs
Flood Elev= 189.68'

Device	Routing	Invert	Outlet Devices
#1	Primary	179.58'	**18.0" Round Culvert** L= 162.4' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.58' / 179.04' S= 0.0033 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.11 cfs @ 12.10 hrs HW=179.77' (Free Discharge)
1=Culvert (Barrel Controls 0.11 cfs @ 1.32 fps)

Pond 3P: (new Pond)



Summary for Pond 6P: (new Pond)

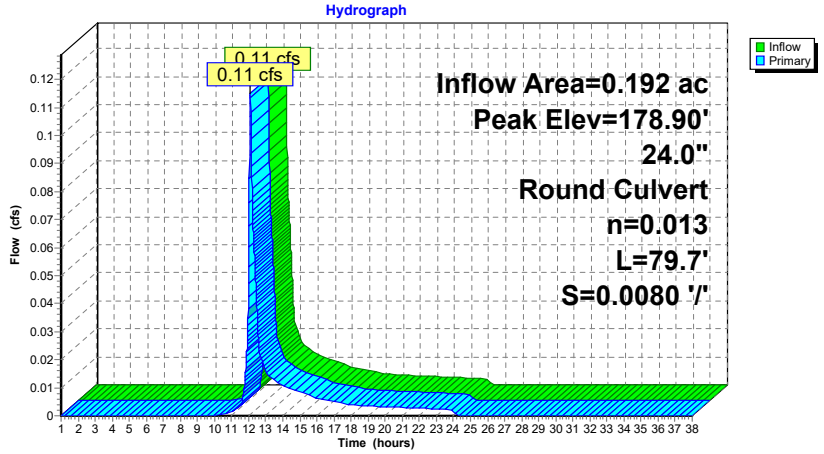
Inflow Area = 0.192 ac, 33.65% Impervious, Inflow Depth = 0.59" for 1-Year event
Inflow = 0.11 cfs @ 12.10 hrs, Volume= 0.009 af
Outflow = 0.11 cfs @ 12.10 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min
Primary = 0.11 cfs @ 12.10 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 178.90' @ 12.10 hrs
Flood Elev= 189.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	178.76'	**24.0" Round Culvert** L= 79.7' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 178.76' / 178.12' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.10 cfs @ 12.10 hrs HW=178.90' (Free Discharge)
1=Culvert (Inlet Controls 0.10 cfs @ 1.02 fps)

Pond 6P: (new Pond)



Summary for Pond 7P: (new Pond)

[57] Hint: Peaked at 178.59' (Flood elevation advised)
[79] Warning: Submerged Pond 6P Primary device # 1 OUTLET by 0.47'

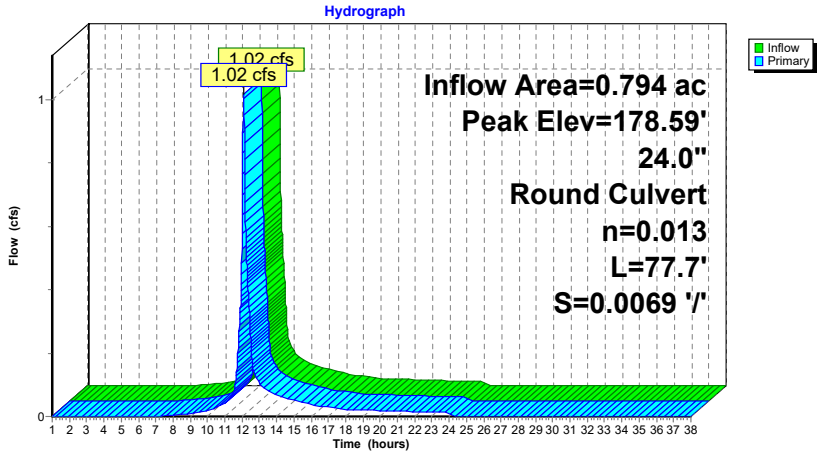
Inflow Area = 0.794 ac, 50.08% Impervious, Inflow Depth = 1.13" for 1-Year event
Inflow = 1.02 cfs @ 12.09 hrs, Volume= 0.075 af
Outflow = 1.02 cfs @ 12.09 hrs, Volume= 0.075 af, Atten= 0%, Lag= 0.0 min
Primary = 1.02 cfs @ 12.09 hrs, Volume= 0.075 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 178.59' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.12'	**24.0" Round Culvert** L= 77.7' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 178.12' / 177.58' S= 0.0069 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 3.14 sf

Primary OutFlow Max=1.02 cfs @ 12.09 hrs HW=178.59' (Free Discharge)
1=Culvert (Inlet Controls 1.02 cfs @ 1.83 fps)

Pond 7P: (new Pond)



Summary for Pond 8P: (new Pond)

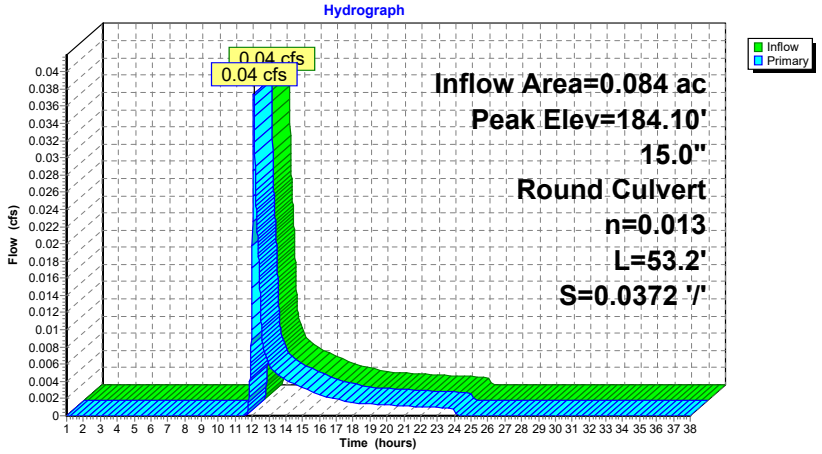
Inflow Area = 0.084 ac, 21.02% Impervious, Inflow Depth = 0.47" for 1-Year event
Inflow = 0.04 cfs @ 12.11 hrs, Volume= 0.003 af
Outflow = 0.04 cfs @ 12.11 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min
Primary = 0.04 cfs @ 12.11 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 184.10' @ 12.11 hrs
Flood Elev= 187.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	184.00'	**15.0" Round Culvert** L= 53.2' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 184.00' / 182.02' S= 0.0372 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 1.23 sf

Primary OutFlow Max=0.04 cfs @ 12.11 hrs HW=184.10' (Free Discharge)
1=Culvert (Inlet Controls 0.04 cfs @ 0.84 fps)

Pond 8P: (new Pond)



Summary for Pond 9P: (new Pond)

[57] Hint: Peaked at 181.17' (Flood elevation advised)
[79] Warning: Submerged Pond 10P Primary device # 1 OUTLET by 0.55'

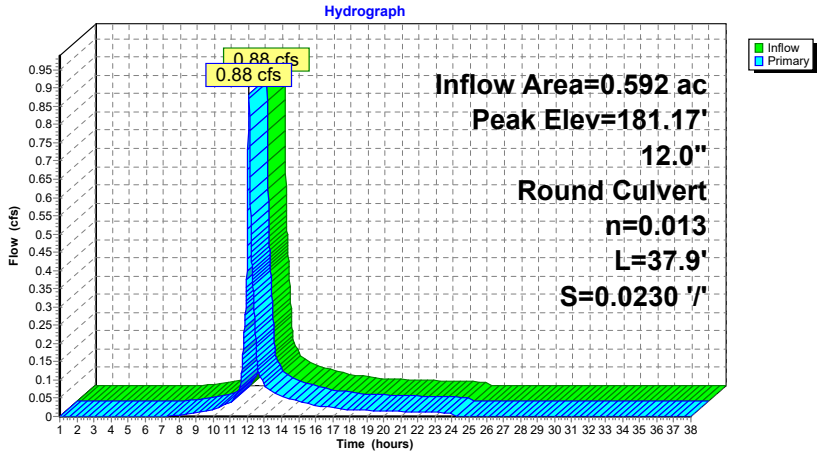
Inflow Area = 0.592 ac, 55.50% Impervious, Inflow Depth = 1.29" for 1-Year event
Inflow = 0.88 cfs @ 12.09 hrs, Volume= 0.064 af
Outflow = 0.88 cfs @ 12.09 hrs, Volume= 0.064 af, Atten= 0%, Lag= 0.0 min
Primary = 0.88 cfs @ 12.09 hrs, Volume= 0.064 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 181.17' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	180.62'	**12.0" Round Culvert** L= 37.9' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 180.62' / 179.75' S= 0.0230 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Primary OutFlow Max=0.88 cfs @ 12.09 hrs HW=181.17' (Free Discharge)
1=Culvert (Inlet Controls 0.88 cfs @ 1.99 fps)

Pond 9P: (new Pond)



Summary for Pond 10P: (new Pond)

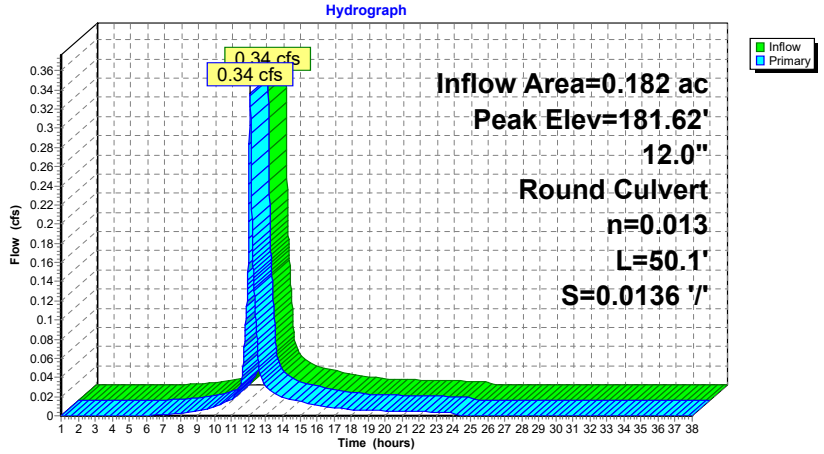
Inflow Area = 0.182 ac, 75.19% Impervious, Inflow Depth = 1.60" for 1-Year event
Inflow = 0.34 cfs @ 12.09 hrs, Volume= 0.024 af
Outflow = 0.34 cfs @ 12.09 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min
Primary = 0.34 cfs @ 12.09 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 181.62' @ 12.09 hrs
Flood Elev= 184.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	181.30'	**12.0" Round Culvert** L= 50.1' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 181.30' / 180.62' S= 0.0136 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.79 sf

Primary OutFlow Max=0.34 cfs @ 12.09 hrs HW=181.62' (Free Discharge)
1=Culvert (Inlet Controls 0.34 cfs @ 1.53 fps)

Pond 10P: (new Pond)



Summary for Pond 11P: (new Pond)

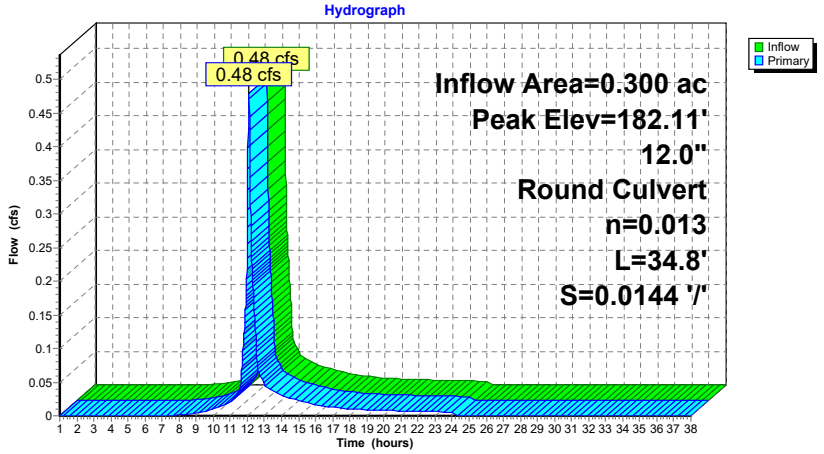
Inflow Area = 0.300 ac, 56.47% Impervious, Inflow Depth = 1.36" for 1-Year event
Inflow = 0.48 cfs @ 12.09 hrs, Volume= 0.034 af
Outflow = 0.48 cfs @ 12.09 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min
Primary = 0.48 cfs @ 12.09 hrs, Volume= 0.034 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 182.11' @ 12.09 hrs
Flood Elev= 184.22'

Device	Routing	Invert	Outlet Devices
#1	Primary	181.72'	**12.0" Round Culvert** L= 34.8' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 181.72' / 181.22' S= 0.0144 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.79 sf

Primary OutFlow Max=0.48 cfs @ 12.09 hrs HW=182.11' (Free Discharge)
1=Culvert (Inlet Controls 0.48 cfs @ 1.68 fps)

Pond 11P: (new Pond)



Time span=1.00-38.00 hrs, dt=0.01 hrs, 3701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EDA-1: EDA-1 Runoff Area=464 sf 45.04% Impervious Runoff Depth=3.21"
Tc=6.0 min CN=94 Runoff=0.04 cfs 0.003 af

Subcatchment EDA-2: EDA-2 Runoff Area=1,139 sf 18.35% Impervious Runoff Depth=2.35"
Tc=6.0 min CN=85 Runoff=0.07 cfs 0.005 af

Subcatchment EDA-3: EDA-3 Runoff Area=13,063 sf 56.47% Impervious Runoff Depth=2.81"
Tc=6.0 min CN=90 Runoff=0.97 cfs 0.070 af

Subcatchment EDA-4: EDA-4 Runoff Area=3,659 sf 21.02% Impervious Runoff Depth=1.44"
Tc=6.0 min CN=73 Runoff=0.14 cfs 0.010 af

Subcatchment EDA-5: EDA-5 Runoff Area=7,908 sf 75.19% Impervious Runoff Depth=3.10"
Tc=6.0 min CN=93 Runoff=0.63 cfs 0.047 af

Subcatchment EDA-6: EDA-6 Runoff Area=29,978 sf 61.16% Impervious Runoff Depth=2.81"
Tc=6.0 min CN=90 Runoff=2.22 cfs 0.161 af

Subcatchment EDA-7: EDA-7 Runoff Area=39,521 sf 79.60% Impervious Runoff Depth=3.10"
Tc=6.0 min CN=93 Runoff=3.16 cfs 0.235 af

Subcatchment EDA-8: EDA-8 Runoff Area=3,362 sf 51.16% Impervious Runoff Depth=2.10"
Tc=6.0 min CN=82 Runoff=0.19 cfs 0.014 af

Subcatchment EDA-9: EDA-9 Runoff Area=4,988 sf 21.85% Impervious Runoff Depth=1.31"
Tc=6.0 min CN=71 Runoff=0.17 cfs 0.013 af

Reach DP1: Design Point 1 Inflow=2.20 cfs 0.161 af
Outflow=2.20 cfs 0.161 af

Reach DP2: Design Point 2 Inflow=5.37 cfs 0.396 af
Outflow=5.37 cfs 0.396 af

Pond 2P: (new Pond) Peak Elev=180.18' Inflow=0.19 cfs 0.014 af
12.0" Round Culvert n=0.013 L=107.7' S=0.0030 '/' Outflow=0.19 cfs 0.014 af

Pond 3P: (new Pond) Peak Elev=179.91' Inflow=0.36 cfs 0.026 af
18.0" Round Culvert n=0.013 L=162.4' S=0.0033 '/' Outflow=0.36 cfs 0.026 af

Pond 6P: (new Pond) Peak Elev=179.03' Inflow=0.36 cfs 0.026 af
24.0" Round Culvert n=0.013 L=79.7' S=0.0080 '/' Outflow=0.36 cfs 0.026 af

Pond 7P: (new Pond) Peak Elev=178.82' Inflow=2.20 cfs 0.161 af
24.0" Round Culvert n=0.013 L=77.7' S=0.0069 '/' Outflow=2.20 cfs 0.161 af

Pond 8P: (new Pond) Peak Elev=184.19' Inflow=0.14 cfs 0.010 af
15.0" Round Culvert n=0.013 L=53.2' S=0.0372 '/' Outflow=0.14 cfs 0.010 af

Pond 9P: (new Pond) Peak Elev=181.49' Inflow=1.81 cfs 0.132 af
12.0" Round Culvert n=0.013 L=37.9' S=0.0230 '/' Outflow=1.81 cfs 0.132 af

Pond 10P: (new Pond) Peak Elev=181.76' Inflow=0.63 cfs 0.047 af
12.0" Round Culvert n=0.013 L=50.1' S=0.0136 '/' Outflow=0.63 cfs 0.047 af

Pond 11P: (new Pond) Peak Elev=182.30' Inflow=0.97 cfs 0.070 af
12.0" Round Culvert n=0.013 L=34.8' S=0.0144 '/' Outflow=0.97 cfs 0.070 af

Total Runoff Area = 2.389 ac Runoff Volume = 0.557 af Average Runoff Depth = 2.80"
35.52% Pervious = 0.849 ac 64.48% Impervious = 1.541 ac

Summary for Subcatchment EDA-1: EDA-1

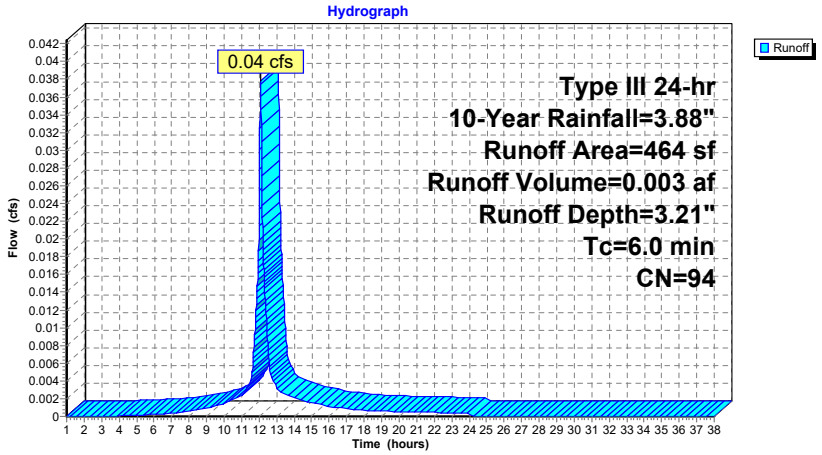
Runoff = 0.04 cfs @ 12.08 hrs, Volume= 0.003 af, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
209	98	Paved parking, HSG D
165	96	Gravel surface, HSG D
0	61	>75% Grass cover, Good, HSG B
90	80	>75% Grass cover, Good, HSG D
464	94	Weighted Average
255		54.96% Pervious Area
209		45.04% Impervious Area

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

Subcatchment EDA-1: EDA-1



Summary for Subcatchment EDA-2: EDA-2

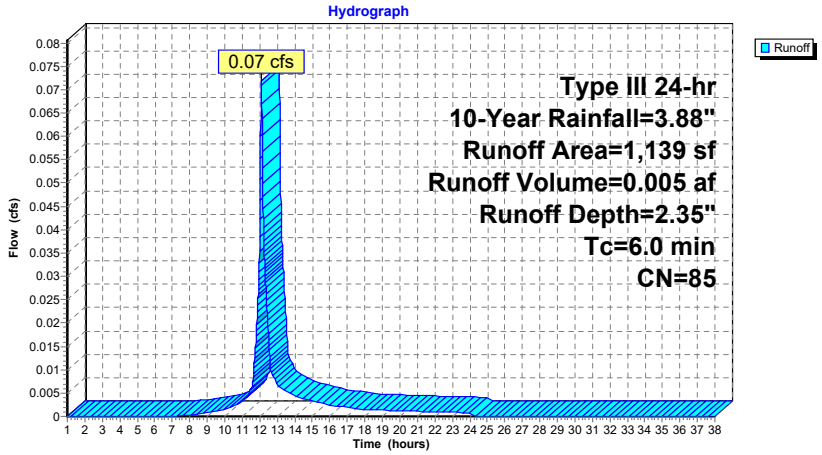
Runoff = 0.07 cfs @ 12.09 hrs, Volume= 0.005 af, Depth= 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
209	98	Paved parking, HSG D
115	96	Gravel surface, HSG D
0	61	>75% Grass cover, Good, HSG B
815	80	>75% Grass cover, Good, HSG D
1,139	85	Weighted Average
930		81.65% Pervious Area
209		18.35% Impervious Area

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

Subcatchment EDA-2: EDA-2



Summary for Subcatchment EDA-3: EDA-3

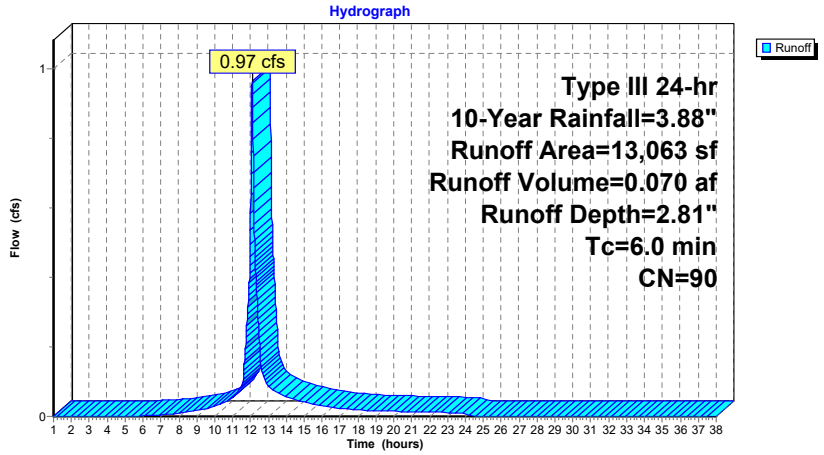
Runoff = 0.97 cfs @ 12.09 hrs, Volume= 0.070 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
7,377	98	Paved parking, HSG D
676	96	Gravel surface, HSG D
812	61	>75% Grass cover, Good, HSG B
4,198	80	>75% Grass cover, Good, HSG D
13,063	90	Weighted Average
5,686		43.53% Pervious Area
7,377		56.47% Impervious Area

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

Subcatchment EDA-3: EDA-3



Summary for Subcatchment EDA-4: EDA-4

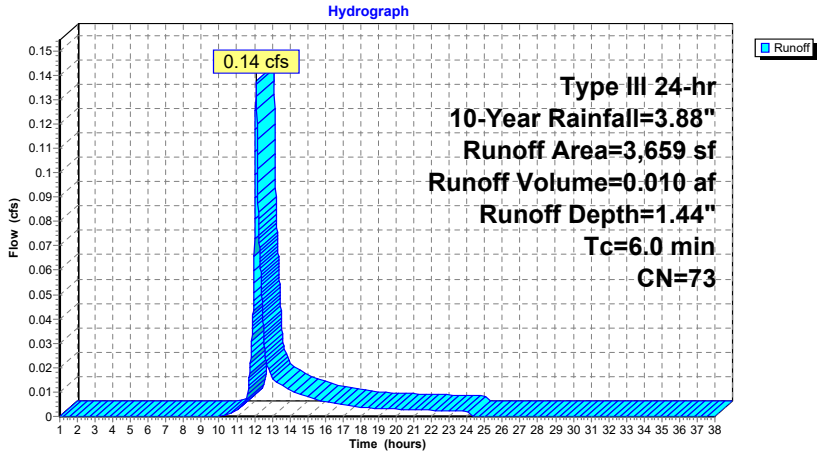
Runoff = 0.14 cfs @ 12.09 hrs, Volume= 0.010 af, Depth= 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
769	98	Paved parking, HSG D
415	96	Gravel surface, HSG D
2,345	61	>75% Grass cover, Good, HSG B
130	80	>75% Grass cover, Good, HSG D
3,659	73	Weighted Average
2,890		78.98% Pervious Area
769		21.02% Impervious Area

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

Subcatchment EDA-4: EDA-4



Summary for Subcatchment EDA-5: EDA-5

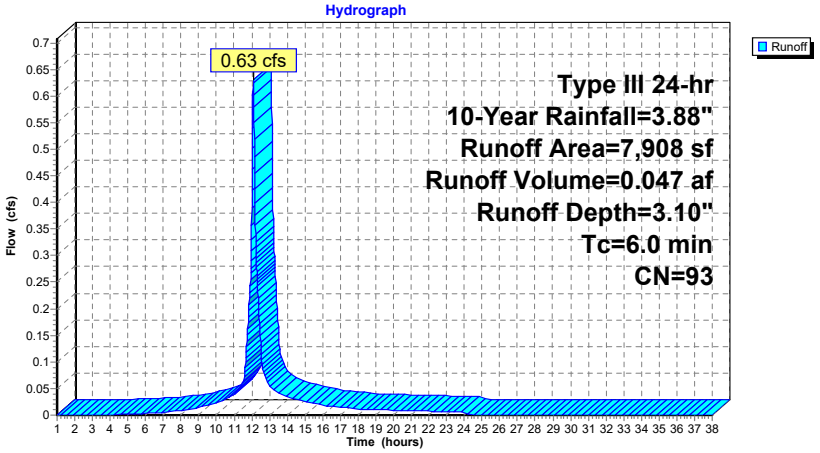
Runoff = 0.63 cfs @ 12.08 hrs, Volume= 0.047 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
5,914	98	Paved parking, HSG D
0	96	Gravel surface, HSG D
59	61	>75% Grass cover, Good, HSG B
1,903	80	>75% Grass cover, Good, HSG D
32	98	Unconnected roofs, HSG D
7,908	93	Weighted Average
1,962		24.81% Pervious Area
5,946		75.19% Impervious Area
32		0.54% Unconnected

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

Subcatchment EDA-5: EDA-5



Summary for Subcatchment EDA-6: EDA-6

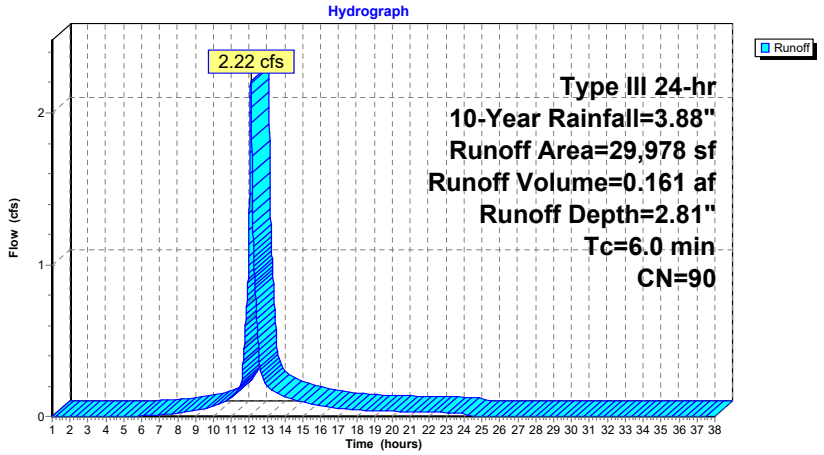
Runoff = 2.22 cfs @ 12.09 hrs, Volume= 0.161 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
18,334	98	Paved parking, HSG D
65	96	Gravel surface, HSG D
936	61	>75% Grass cover, Good, HSG B
10,643	80	>75% Grass cover, Good, HSG D
29,978	90	Weighted Average
11,644		38.84% Pervious Area
18,334		61.16% Impervious Area

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

Subcatchment EDA-6: EDA-6



Summary for Subcatchment EDA-7: EDA-7

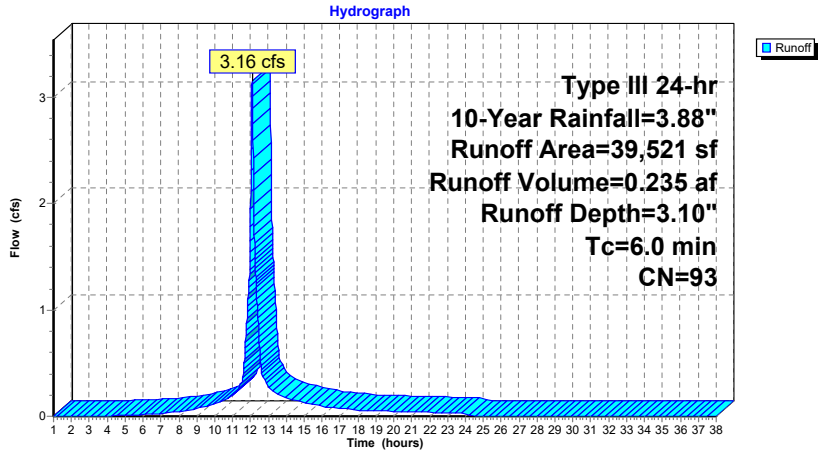
Runoff = 3.16 cfs @ 12.08 hrs, Volume= 0.235 af, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
29,633	98	Paved parking, HSG D
340	96	Gravel surface, HSG D
2,663	61	>75% Grass cover, Good, HSG B
5,061	80	>75% Grass cover, Good, HSG D
1,824	98	Paved parking, HSG D
39,521	93	Weighted Average
8,064		20.40% Pervious Area
31,457		79.60% Impervious Area

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

Subcatchment EDA-7: EDA-7



Summary for Subcatchment EDA-8: EDA-8

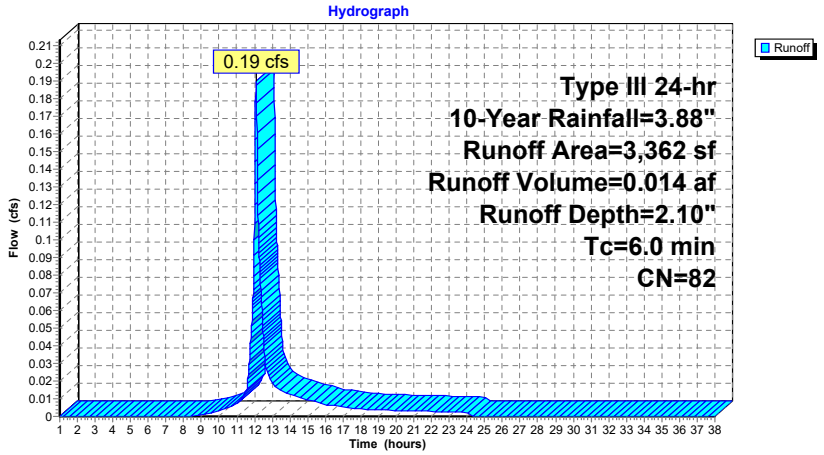
Runoff = 0.19 cfs @ 12.09 hrs, Volume= 0.014 af, Depth= 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
1,720	98	Paved parking, HSG D
244	96	Gravel surface, HSG D
1,398	61	>75% Grass cover, Good, HSG B
0	80	>75% Grass cover, Good, HSG D
3,362	82	Weighted Average
1,642		48.84% Pervious Area
1,720		51.16% Impervious Area

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

Subcatchment EDA-8: EDA-8



Summary for Subcatchment EDA-9: EDA-9

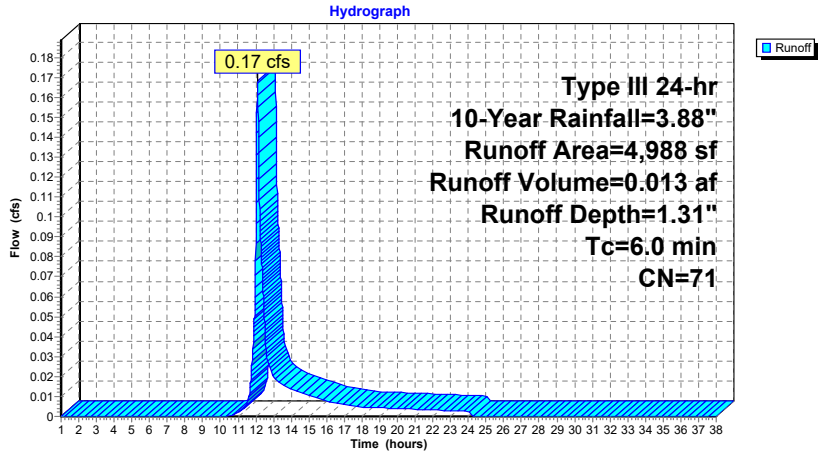
Runoff = 0.17 cfs @ 12.10 hrs, Volume= 0.013 af, Depth= 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
1,090	98	Paved parking, HSG D
290	96	Gravel surface, HSG D
3,608	61	>75% Grass cover, Good, HSG B
0	80	>75% Grass cover, Good, HSG D
4,988	71	Weighted Average
3,898		78.15% Pervious Area
1,090		21.85% Impervious Area

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

Subcatchment EDA-9: EDA-9



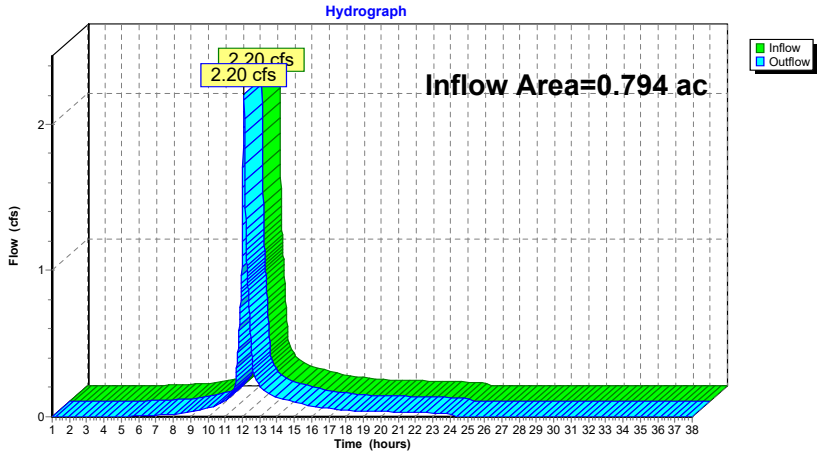
Summary for Reach DP1: Design Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.794 ac, 50.08% Impervious, Inflow Depth = 2.44" for 10-Year event
Inflow = 2.20 cfs @ 12.09 hrs, Volume= 0.161 af
Outflow = 2.20 cfs @ 12.09 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs

Reach DP1: Design Point 1



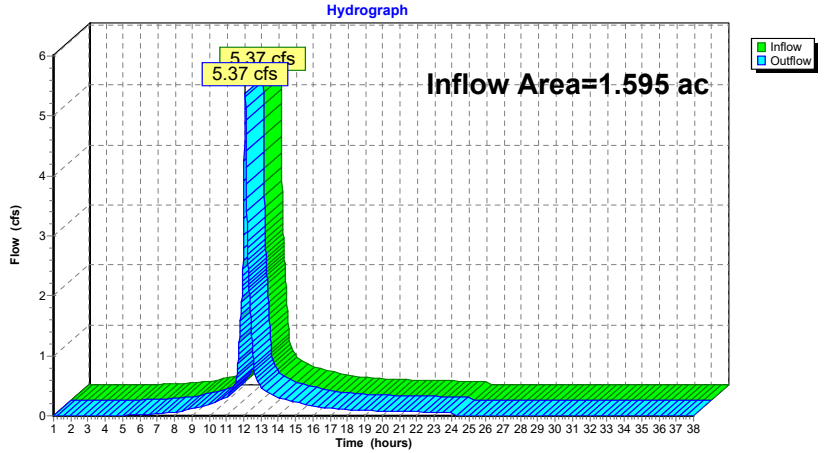
Summary for Reach DP2: Design Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.595 ac, 71.64% Impervious, Inflow Depth = 2.97" for 10-Year event
Inflow = 5.37 cfs @ 12.09 hrs, Volume= 0.396 af
Outflow = 5.37 cfs @ 12.09 hrs, Volume= 0.396 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs

Reach DP2: Design Point 2



Summary for Pond 2P: (new Pond)

[57] Hint: Peaked at 180.18' (Flood elevation advised)

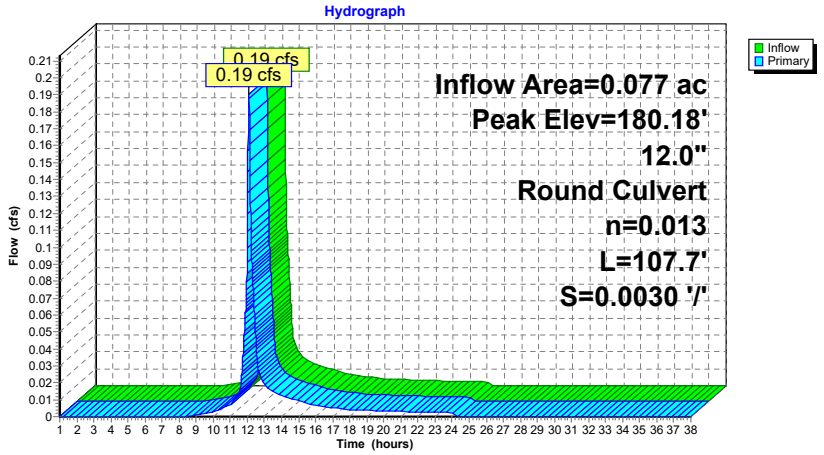
Inflow Area = 0.077 ac, 51.16% Impervious, Inflow Depth = 2.10" for 10-Year event
Inflow = 0.19 cfs @ 12.09 hrs, Volume= 0.014 af
Outflow = 0.19 cfs @ 12.09 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min
Primary = 0.19 cfs @ 12.09 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 180.18' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	179.90'	**12.0" Round Culvert** L= 107.7' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.90' / 179.58' S= 0.0030 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.19 cfs @ 12.09 hrs HW=180.18' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.19 cfs @ 1.57 fps)

Pond 2P: (new Pond)



Summary for Pond 3P: (new Pond)

[79] Warning: Submerged Pond 2P Primary device # 1 INLET by 0.01'

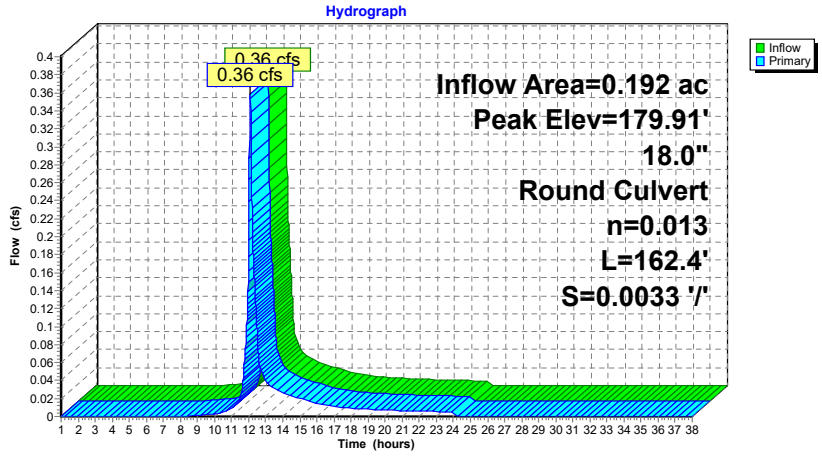
Inflow Area = 0.192 ac, 33.65% Impervious, Inflow Depth = 1.63" for 10-Year event
Inflow = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af
Outflow = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
Primary = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 179.91' @ 12.09 hrs
Flood Elev= 189.68'

Device	Routing	Invert	Outlet Devices
#1	Primary	179.58'	**18.0" Round Culvert** L= 162.4' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.58' / 179.04' S= 0.0033 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.35 cfs @ 12.09 hrs HW=179.91' (Free Discharge)
1=Culvert (Barrel Controls 0.35 cfs @ 1.84 fps)

Pond 3P: (new Pond)



Summary for Pond 6P: (new Pond)

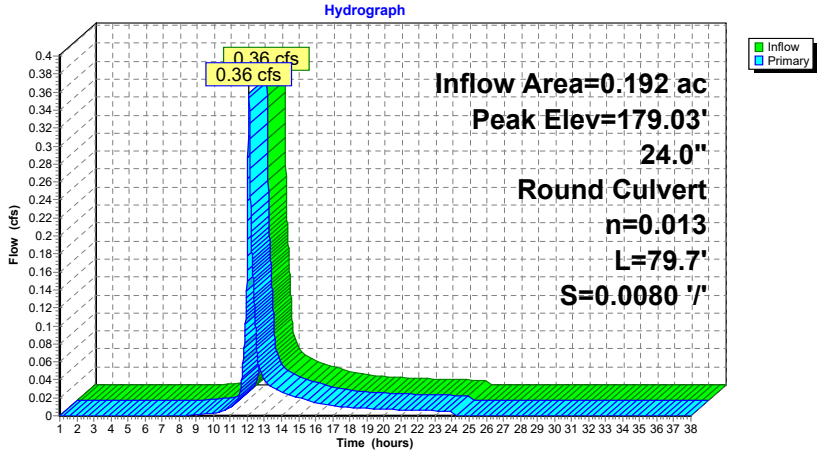
Inflow Area = 0.192 ac, 33.65% Impervious, Inflow Depth = 1.63" for 10-Year event
Inflow = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af
Outflow = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
Primary = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 179.03' @ 12.09 hrs
Flood Elev= 189.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	178.76'	**24.0" Round Culvert** L= 79.7' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 178.76' / 178.12' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.35 cfs @ 12.09 hrs HW=179.03' (Free Discharge)
1=Culvert (Inlet Controls 0.35 cfs @ 1.39 fps)

Pond 6P: (new Pond)



Summary for Pond 7P: (new Pond)

[57] Hint: Peaked at 178.82' (Flood elevation advised)
[79] Warning: Submerged Pond 6P Primary device # 1 INLET by 0.06'

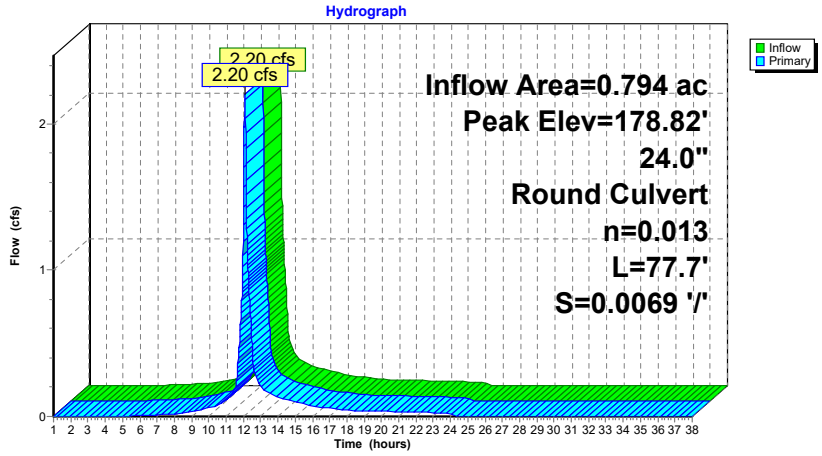
Inflow Area = 0.794 ac, 50.08% Impervious, Inflow Depth = 2.44" for 10-Year event
Inflow = 2.20 cfs @ 12.09 hrs, Volume= 0.161 af
Outflow = 2.20 cfs @ 12.09 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.0 min
Primary = 2.20 cfs @ 12.09 hrs, Volume= 0.161 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 178.82' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.12'	**24.0" Round Culvert** L= 77.7' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 178.12' / 177.58' S= 0.0069 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 3.14 sf

Primary OutFlow Max=2.20 cfs @ 12.09 hrs HW=178.82' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.20 cfs @ 2.25 fps)

Pond 7P: (new Pond)



Summary for Pond 8P: (new Pond)

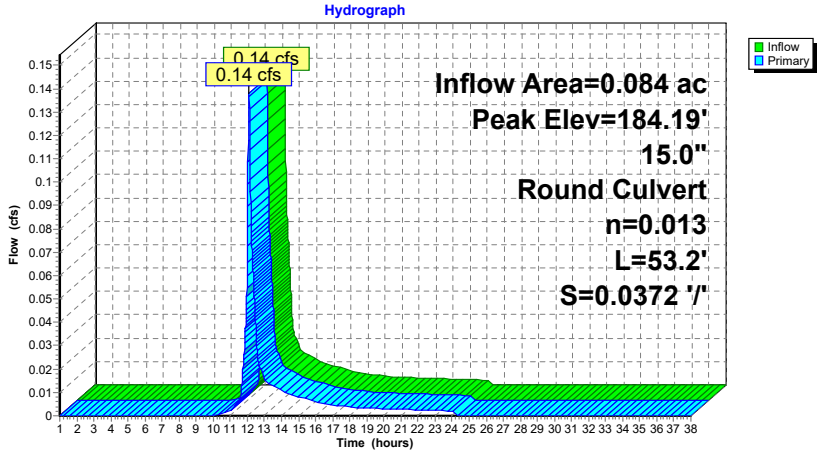
Inflow Area = 0.084 ac, 21.02% Impervious, Inflow Depth = 1.44" for 10-Year event
Inflow = 0.14 cfs @ 12.09 hrs, Volume= 0.010 af
Outflow = 0.14 cfs @ 12.09 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min
Primary = 0.14 cfs @ 12.09 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 184.19' @ 12.09 hrs
Flood Elev= 187.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	184.00'	**15.0" Round Culvert** L= 53.2' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 184.00' / 182.02' S= 0.0372 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 1.23 sf

Primary OutFlow Max=0.14 cfs @ 12.09 hrs HW=184.19' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.14 cfs @ 1.17 fps)

Pond 8P: (new Pond)



Summary for Pond 9P: (new Pond)

[57] Hint: Peaked at 181.49' (Flood elevation advised)
[79] Warning: Submerged Pond 10P Primary device # 1 INLET by 0.18'
[79] Warning: Submerged Pond 11P Primary device # 1 OUTLET by 0.26'

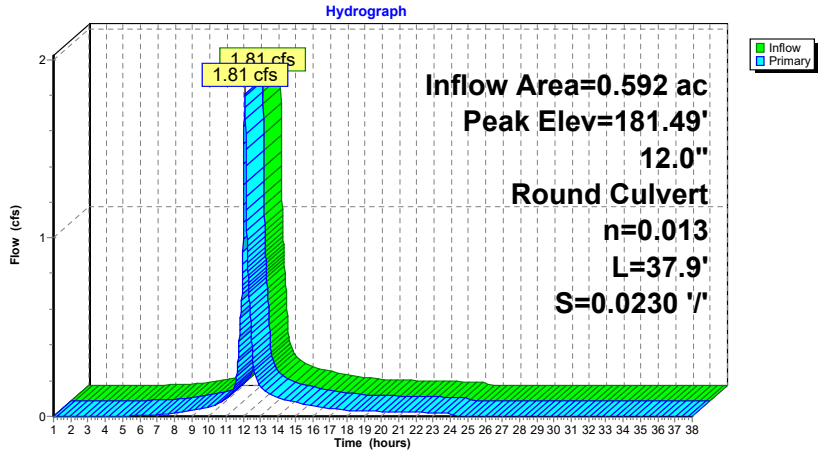
Inflow Area = 0.592 ac, 55.50% Impervious, Inflow Depth = 2.68" for 10-Year event
Inflow = 1.81 cfs @ 12.09 hrs, Volume= 0.132 af
Outflow = 1.81 cfs @ 12.09 hrs, Volume= 0.132 af, Atten= 0%, Lag= 0.0 min
Primary = 1.81 cfs @ 12.09 hrs, Volume= 0.132 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 181.49' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	180.62'	**12.0" Round Culvert** L= 37.9' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 180.62' / 179.75' S= 0.0230 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Primary OutFlow Max=1.80 cfs @ 12.09 hrs HW=181.48' (Free Discharge)
1=Culvert (Inlet Controls 1.80 cfs @ 2.50 fps)

Pond 9P: (new Pond)



Summary for Pond 10P: (new Pond)

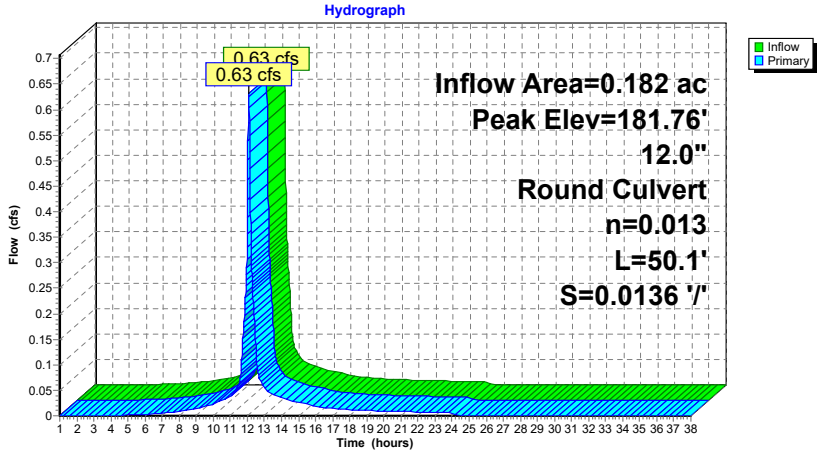
Inflow Area = 0.182 ac, 75.19% Impervious, Inflow Depth = 3.10" for 10-Year event
Inflow = 0.63 cfs @ 12.08 hrs, Volume= 0.047 af
Outflow = 0.63 cfs @ 12.08 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min
Primary = 0.63 cfs @ 12.08 hrs, Volume= 0.047 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 181.76' @ 12.08 hrs
Flood Elev= 184.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	181.30'	**12.0" Round Culvert** L= 50.1' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 181.30' / 180.62' S= 0.0136 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.79 sf

Primary OutFlow Max=0.63 cfs @ 12.08 hrs HW=181.75' (Free Discharge)
1=Culvert (Inlet Controls 0.63 cfs @ 1.81 fps)

Pond 10P: (new Pond)



Summary for Pond 11P: (new Pond)

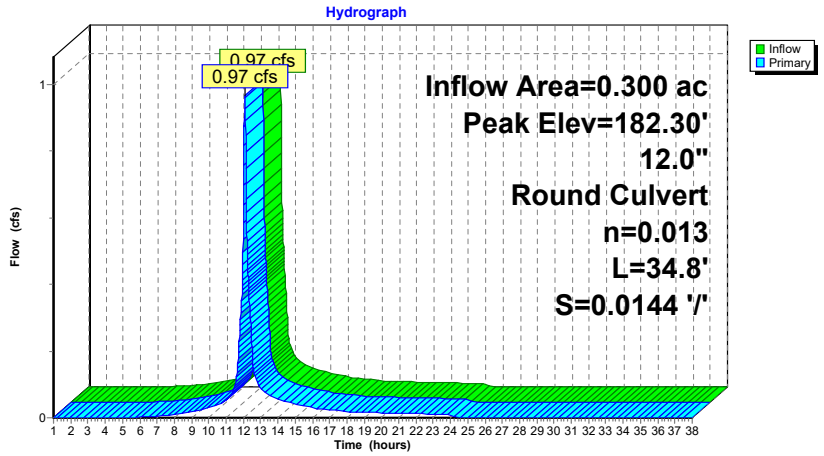
Inflow Area = 0.300 ac, 56.47% Impervious, Inflow Depth = 2.81" for 10-Year event
Inflow = 0.97 cfs @ 12.09 hrs, Volume= 0.070 af
Outflow = 0.97 cfs @ 12.09 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min
Primary = 0.97 cfs @ 12.09 hrs, Volume= 0.070 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 182.30' @ 12.09 hrs
Flood Elev= 184.22'

Device	Routing	Invert	Outlet Devices
#1	Primary	181.72'	**12.0" Round Culvert** L= 34.8' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 181.72' / 181.22' S= 0.0144 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.79 sf

Primary OutFlow Max=0.96 cfs @ 12.09 hrs HW=182.30' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.96 cfs @ 2.05 fps)

Pond 11P: (new Pond)



Time span=1.00-38.00 hrs, dt=0.01 hrs, 3701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EDA-1: EDA-1 Runoff Area=464 sf 45.04% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=94 Runoff=0.07 cfs 0.005 af

Subcatchment EDA-2: EDA-2 Runoff Area=1,139 sf 18.35% Impervious Runoff Depth=4.85"
Tc=6.0 min CN=85 Runoff=0.15 cfs 0.011 af

Subcatchment EDA-3: EDA-3 Runoff Area=13,063 sf 56.47% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=90 Runoff=1.80 cfs 0.135 af

Subcatchment EDA-4: EDA-4 Runoff Area=3,659 sf 21.02% Impervious Runoff Depth=3.58"
Tc=6.0 min CN=73 Runoff=0.35 cfs 0.025 af

Subcatchment EDA-5: EDA-5 Runoff Area=7,908 sf 75.19% Impervious Runoff Depth=5.76"
Tc=6.0 min CN=93 Runoff=1.13 cfs 0.087 af

Subcatchment EDA-6: EDA-6 Runoff Area=29,978 sf 61.16% Impervious Runoff Depth=5.41"
Tc=6.0 min CN=90 Runoff=4.14 cfs 0.310 af

Subcatchment EDA-7: EDA-7 Runoff Area=39,521 sf 79.60% Impervious Runoff Depth=5.76"
Tc=6.0 min CN=93 Runoff=5.65 cfs 0.435 af

Subcatchment EDA-8: EDA-8 Runoff Area=3,362 sf 51.16% Impervious Runoff Depth=4.52"
Tc=6.0 min CN=82 Runoff=0.40 cfs 0.029 af

Subcatchment EDA-9: EDA-9 Runoff Area=4,988 sf 21.85% Impervious Runoff Depth=3.37"
Tc=6.0 min CN=71 Runoff=0.45 cfs 0.032 af

Reach DP1: Design Point 1 Inflow=4.35 cfs 0.324 af
Outflow=4.35 cfs 0.324 af

Reach DP2: Design Point 2 Inflow=9.79 cfs 0.746 af
Outflow=9.79 cfs 0.746 af

Pond 2P: (new Pond) Peak Elev=180.32' Inflow=0.40 cfs 0.029 af
12.0" Round Culvert n=0.013 L=107.7' S=0.0030 '/' Outflow=0.40 cfs 0.029 af

Pond 3P: (new Pond) Peak Elev=180.10' Inflow=0.86 cfs 0.061 af
18.0" Round Culvert n=0.013 L=162.4' S=0.0033 '/' Outflow=0.86 cfs 0.061 af

Pond 6P: (new Pond) Peak Elev=179.18' Inflow=0.86 cfs 0.061 af
24.0" Round Culvert n=0.013 L=79.7' S=0.0080 '/' Outflow=0.86 cfs 0.061 af

Pond 7P: (new Pond) Peak Elev=179.14' Inflow=4.35 cfs 0.324 af
24.0" Round Culvert n=0.013 L=77.7' S=0.0069 '/' Outflow=4.35 cfs 0.324 af

Pond 8P: (new Pond) Peak Elev=184.31' Inflow=0.35 cfs 0.025 af
15.0" Round Culvert n=0.013 L=53.2' S=0.0372 '/' Outflow=0.35 cfs 0.025 af

Pond 9P: (new Pond) Peak Elev=182.44' Inflow=3.43 cfs 0.258 af
12.0" Round Culvert n=0.013 L=37.9' S=0.0230 '/' Outflow=3.43 cfs 0.258 af

Pond 10P: (new Pond) Peak Elev=181.94' Inflow=1.13 cfs 0.087 af
12.0" Round Culvert n=0.013 L=50.1' S=0.0136 '/' Outflow=1.13 cfs 0.087 af

Pond 11P: (new Pond) Peak Elev=182.58' Inflow=1.80 cfs 0.135 af
12.0" Round Culvert n=0.013 L=34.8' S=0.0144 '/' Outflow=1.80 cfs 0.135 af

Total Runoff Area = 2.389 ac Runoff Volume = 1.070 af Average Runoff Depth = 5.37"
35.52% Pervious = 0.849 ac 64.48% Impervious = 1.541 ac

Summary for Subcatchment EDA-1: EDA-1

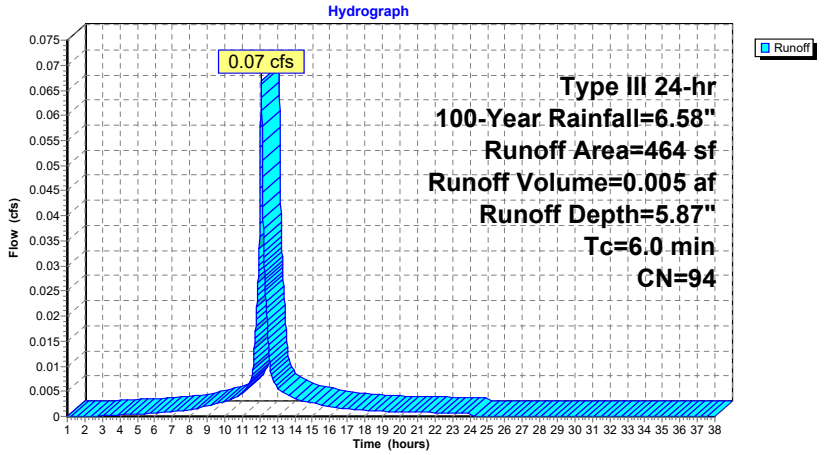
Runoff = 0.07 cfs @ 12.08 hrs, Volume= 0.005 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
209	98	Paved parking, HSG D
165	96	Gravel surface, HSG D
0	61	>75% Grass cover, Good, HSG B
90	80	>75% Grass cover, Good, HSG D
464	94	Weighted Average
255		54.96% Pervious Area
209		45.04% Impervious Area

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

Subcatchment EDA-1: EDA-1



Summary for Subcatchment EDA-2: EDA-2

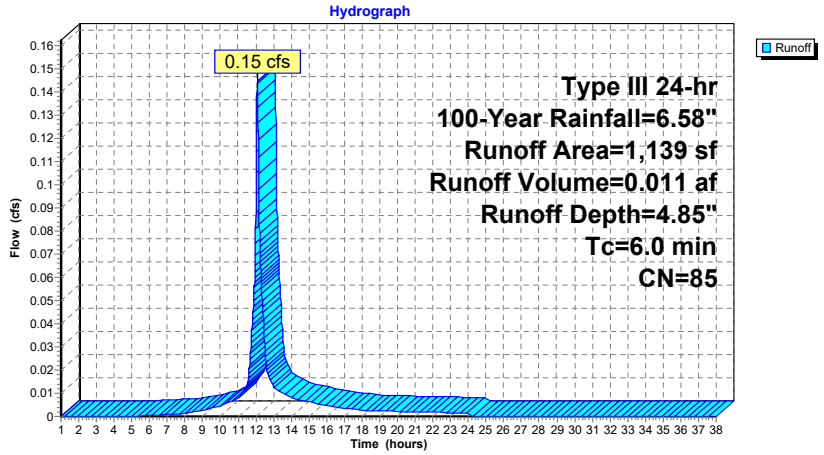
Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 4.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
209	98	Paved parking, HSG D
115	96	Gravel surface, HSG D
0	61	>75% Grass cover, Good, HSG B
815	80	>75% Grass cover, Good, HSG D
1,139	85	Weighted Average
930		81.65% Pervious Area
209		18.35% Impervious Area

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

Subcatchment EDA-2: EDA-2



Summary for Subcatchment EDA-3: EDA-3

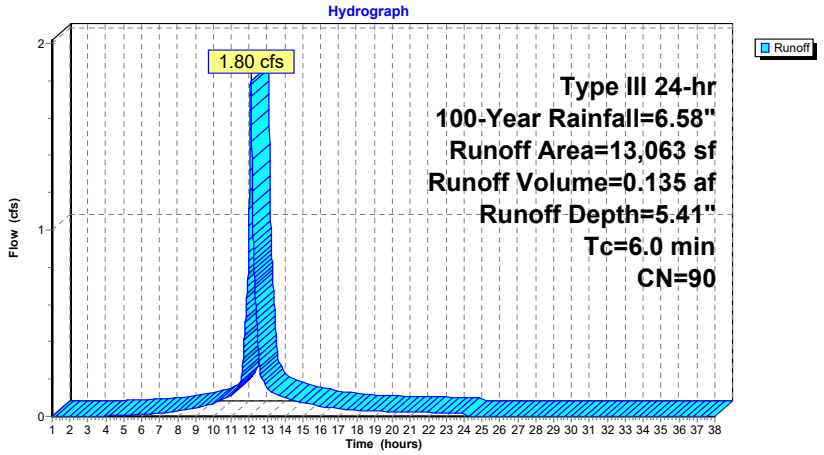
Runoff = 1.80 cfs @ 12.08 hrs, Volume= 0.135 af, Depth= 5.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
7,377	98	Paved parking, HSG D
676	96	Gravel surface, HSG D
812	61	>75% Grass cover, Good, HSG B
4,198	80	>75% Grass cover, Good, HSG D
13,063	90	Weighted Average
5,686		43.53% Pervious Area
7,377		56.47% Impervious Area

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

Subcatchment EDA-3: EDA-3



Summary for Subcatchment EDA-4: EDA-4

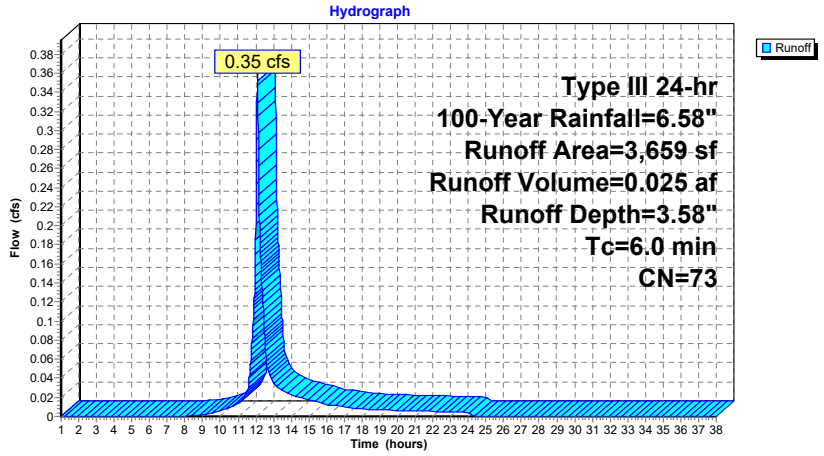
Runoff = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
769	98	Paved parking, HSG D
415	96	Gravel surface, HSG D
2,345	61	>75% Grass cover, Good, HSG B
130	80	>75% Grass cover, Good, HSG D
3,659	73	Weighted Average
2,890		78.98% Pervious Area
769		21.02% Impervious Area

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

Subcatchment EDA-4: EDA-4



Summary for Subcatchment EDA-5: EDA-5

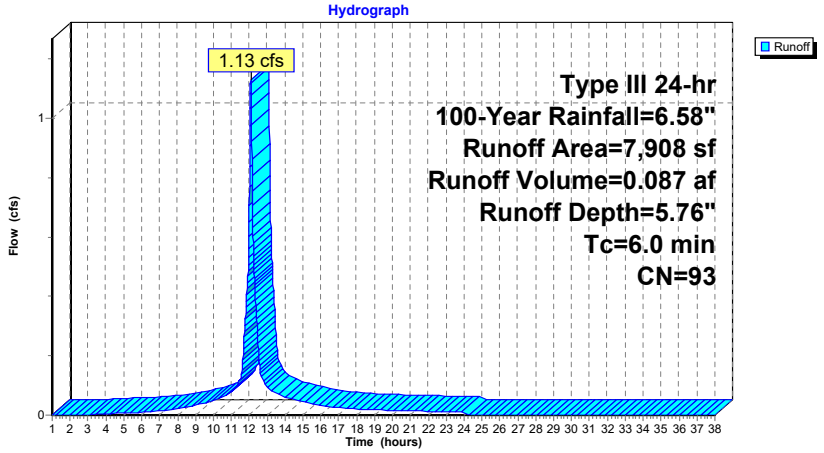
Runoff = 1.13 cfs @ 12.08 hrs, Volume= 0.087 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
5,914	98	Paved parking, HSG D
0	96	Gravel surface, HSG D
59	61	>75% Grass cover, Good, HSG B
1,903	80	>75% Grass cover, Good, HSG D
32	98	Unconnected roofs, HSG D
7,908	93	Weighted Average
1,962		24.81% Pervious Area
5,946		75.19% Impervious Area
32		0.54% Unconnected

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

Subcatchment EDA-5: EDA-5



Summary for Subcatchment EDA-6: EDA-6

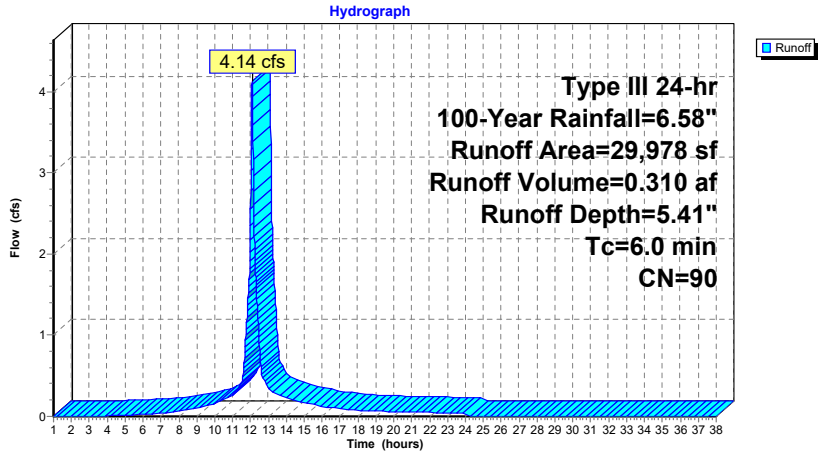
Runoff = 4.14 cfs @ 12.08 hrs, Volume= 0.310 af, Depth= 5.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
18,334	98	Paved parking, HSG D
65	96	Gravel surface, HSG D
936	61	>75% Grass cover, Good, HSG B
10,643	80	>75% Grass cover, Good, HSG D
29,978	90	Weighted Average
11,644		38.84% Pervious Area
18,334		61.16% Impervious Area

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

Subcatchment EDA-6: EDA-6



Summary for Subcatchment EDA-7: EDA-7

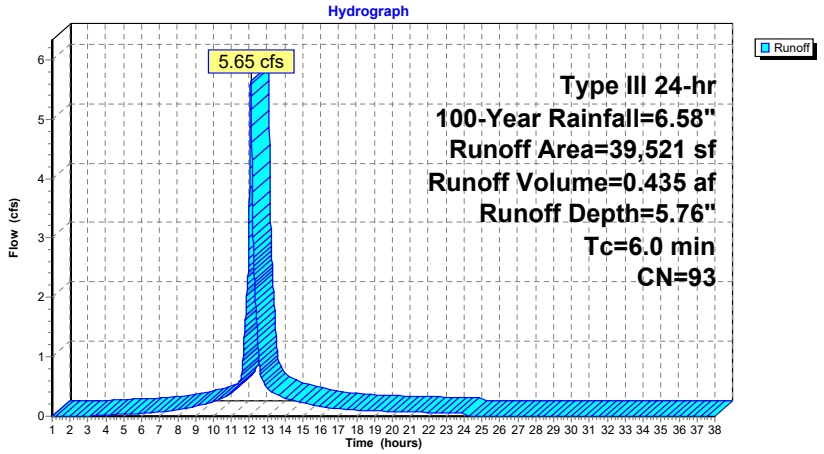
Runoff = 5.65 cfs @ 12.08 hrs, Volume= 0.435 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
29,633	98	Paved parking, HSG D
340	96	Gravel surface, HSG D
2,663	61	>75% Grass cover, Good, HSG B
5,061	80	>75% Grass cover, Good, HSG D
1,824	98	Paved parking, HSG D
39,521	93	Weighted Average
8,064		20.40% Pervious Area
31,457		79.60% Impervious Area

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

Subcatchment EDA-7: EDA-7



Summary for Subcatchment EDA-8: EDA-8

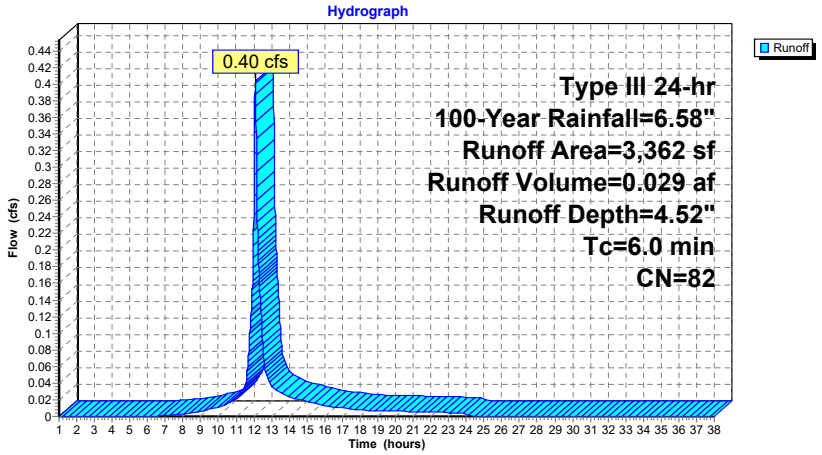
Runoff = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af, Depth= 4.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
1,720	98	Paved parking, HSG D
244	96	Gravel surface, HSG D
1,398	61	>75% Grass cover, Good, HSG B
0	80	>75% Grass cover, Good, HSG D
3,362	82	Weighted Average
1,642		48.84% Pervious Area
1,720		51.16% Impervious Area

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

Subcatchment EDA-8: EDA-8



Summary for Subcatchment EDA-9: EDA-9

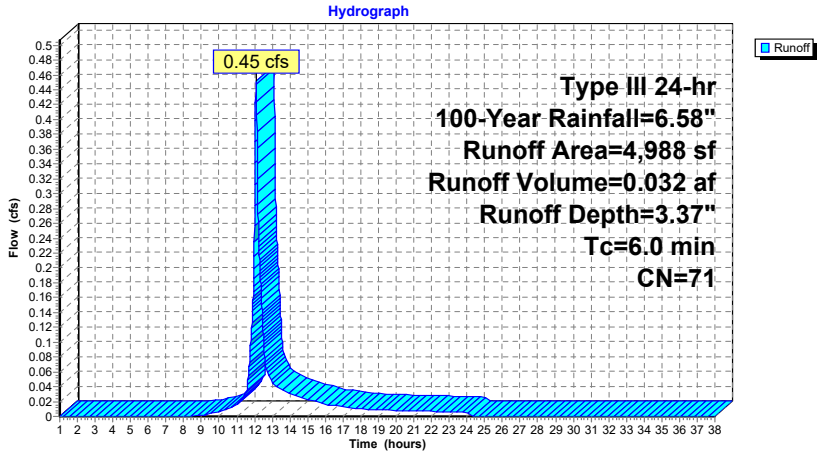
Runoff = 0.45 cfs @ 12.09 hrs, Volume= 0.032 af, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
1,090	98	Paved parking, HSG D
290	96	Gravel surface, HSG D
3,608	61	>75% Grass cover, Good, HSG B
0	80	>75% Grass cover, Good, HSG D
4,988	71	Weighted Average
3,898		78.15% Pervious Area
1,090		21.85% Impervious Area

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

Subcatchment EDA-9: EDA-9



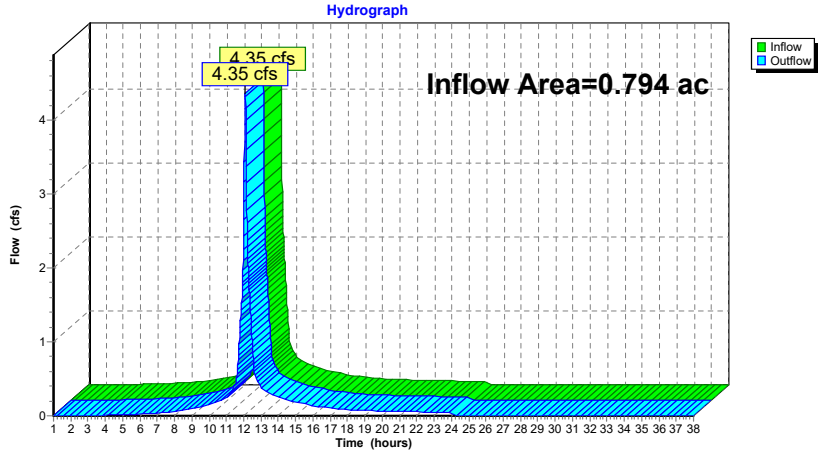
Summary for Reach DP1: Design Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.794 ac, 50.08% Impervious, Inflow Depth = 4.90" for 100-Year event
Inflow = 4.35 cfs @ 12.09 hrs, Volume= 0.324 af
Outflow = 4.35 cfs @ 12.09 hrs, Volume= 0.324 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs

Reach DP1: Design Point 1



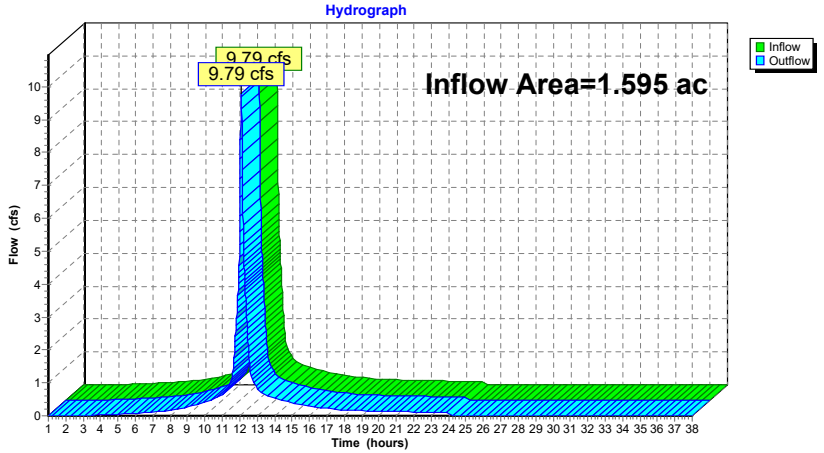
Summary for Reach DP2: Design Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.595 ac, 71.64% Impervious, Inflow Depth = 5.61" for 100-Year event
Inflow = 9.79 cfs @ 12.08 hrs, Volume= 0.746 af
Outflow = 9.79 cfs @ 12.08 hrs, Volume= 0.746 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs

Reach DP2: Design Point 2



Summary for Pond 2P: (new Pond)

[57] Hint: Peaked at 180.32' (Flood elevation advised)

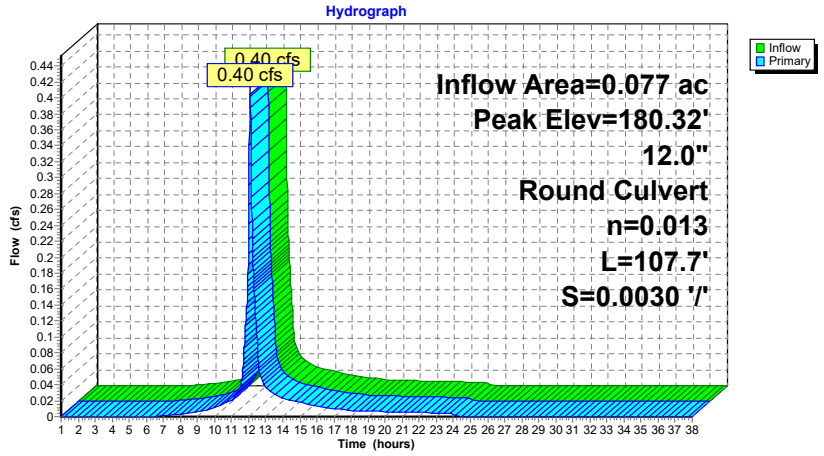
Inflow Area = 0.077 ac, 51.16% Impervious, Inflow Depth = 4.52" for 100-Year event
Inflow = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af
Outflow = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min
Primary = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 180.32' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	179.90'	**12.0" Round Culvert** L= 107.7' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.90' / 179.58' S= 0.0030 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.40 cfs @ 12.09 hrs HW=180.32' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.40 cfs @ 1.93 fps)

Pond 2P: (new Pond)



Summary for Pond 3P: (new Pond)

[79] Warning: Submerged Pond 2P Primary device # 1 INLET by 0.20'

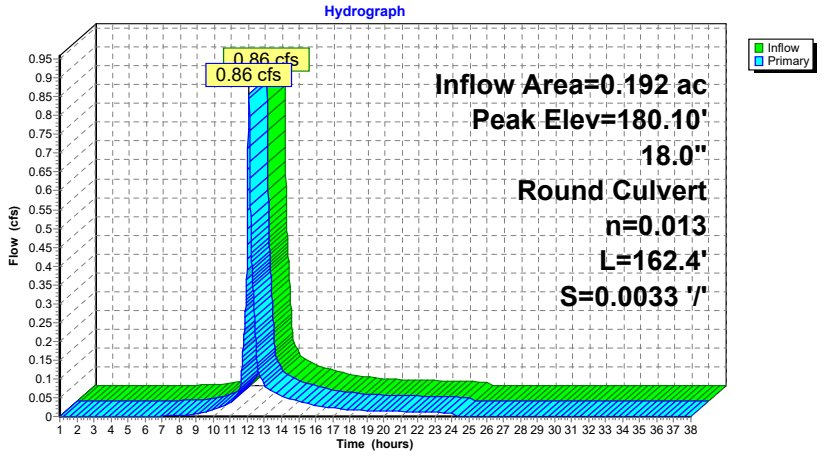
Inflow Area = 0.192 ac, 33.65% Impervious, Inflow Depth = 3.84" for 100-Year event
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 0.061 af
Outflow = 0.86 cfs @ 12.09 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
Primary = 0.86 cfs @ 12.09 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 180.10' @ 12.09 hrs
Flood Elev= 189.68'

Device	Routing	Invert	Outlet Devices
#1	Primary	179.58'	**18.0" Round Culvert** L= 162.4' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.58' / 179.04' S= 0.0033 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.85 cfs @ 12.09 hrs HW=180.10' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.85 cfs @ 2.36 fps)

Pond 3P: (new Pond)



Summary for Pond 6P: (new Pond)

[79] Warning: Submerged Pond 3P Primary device # 1 OUTLET by 0.14'

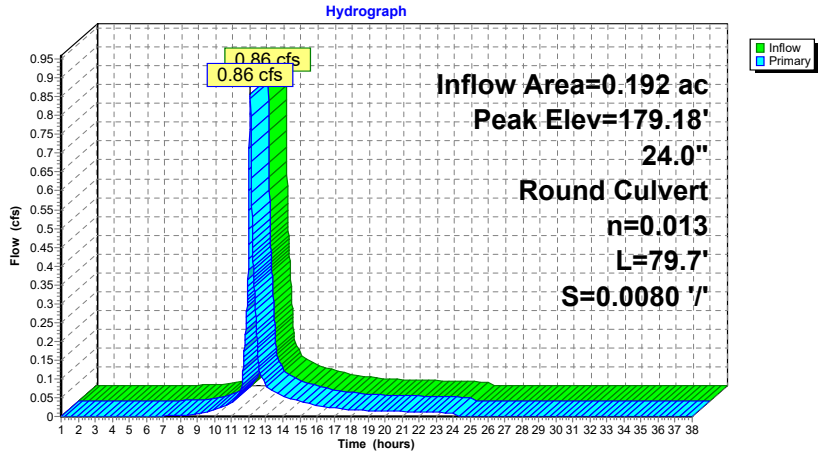
Inflow Area = 0.192 ac, 33.65% Impervious, Inflow Depth = 3.84" for 100-Year event
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 0.061 af
Outflow = 0.86 cfs @ 12.09 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
Primary = 0.86 cfs @ 12.09 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 179.18' @ 12.09 hrs
Flood Elev= 189.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	178.76'	**24.0" Round Culvert** L= 79.7' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 178.76' / 178.12' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.85 cfs @ 12.09 hrs HW=179.18' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.85 cfs @ 1.75 fps)

Pond 6P: (new Pond)



Summary for Pond 7P: (new Pond)

[57] Hint: Peaked at 179.14' (Flood elevation advised)
[79] Warning: Submerged Pond 6P Primary device # 1 INLET by 0.38'

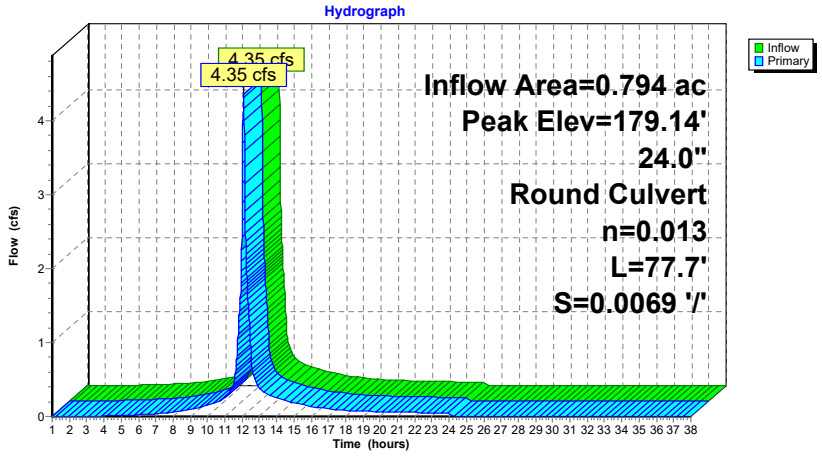
Inflow Area = 0.794 ac, 50.08% Impervious, Inflow Depth = 4.90" for 100-Year event
Inflow = 4.35 cfs @ 12.09 hrs, Volume= 0.324 af
Outflow = 4.35 cfs @ 12.09 hrs, Volume= 0.324 af, Atten= 0%, Lag= 0.0 min
Primary = 4.35 cfs @ 12.09 hrs, Volume= 0.324 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 179.14' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.12'	**24.0" Round Culvert** L= 77.7' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 178.12' / 177.58' S= 0.0069 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 3.14 sf

Primary OutFlow Max=4.34 cfs @ 12.09 hrs HW=179.14' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.34 cfs @ 2.71 fps)

Pond 7P: (new Pond)



Summary for Pond 8P: (new Pond)

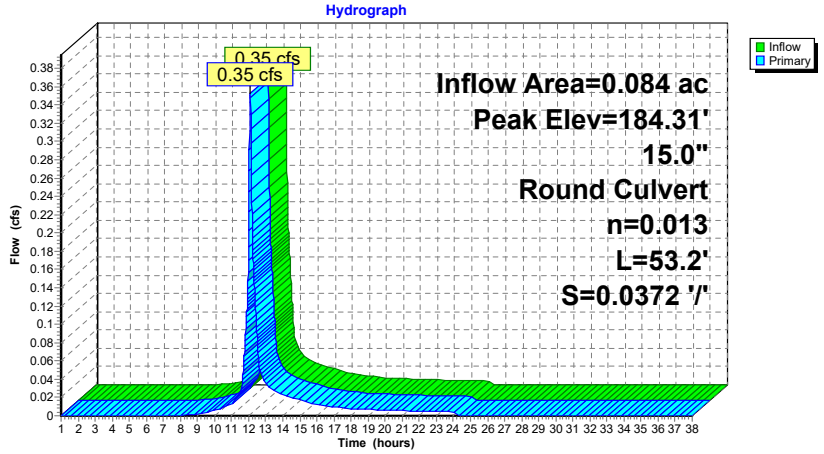
Inflow Area = 0.084 ac, 21.02% Impervious, Inflow Depth = 3.58" for 100-Year event
Inflow = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af
Outflow = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min
Primary = 0.35 cfs @ 12.09 hrs, Volume= 0.025 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 184.31' @ 12.09 hrs
Flood Elev= 187.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	184.00'	**15.0" Round Culvert** L= 53.2' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 184.00' / 182.02' S= 0.0372 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 1.23 sf

Primary OutFlow Max=0.35 cfs @ 12.09 hrs HW=184.31' (Free Discharge)
1=Culvert (Inlet Controls 0.35 cfs @ 1.49 fps)

Pond 8P: (new Pond)



Summary for Pond 9P: (new Pond)

[57] Hint: Peaked at 182.44' (Flood elevation advised)
[79] Warning: Submerged Pond 8P Primary device # 1 OUTLET by 0.42'
[81] Warning: Exceeded Pond 10P by 0.50' @ 12.08 hrs
[79] Warning: Submerged Pond 11P Primary device # 1 INLET by 0.72'

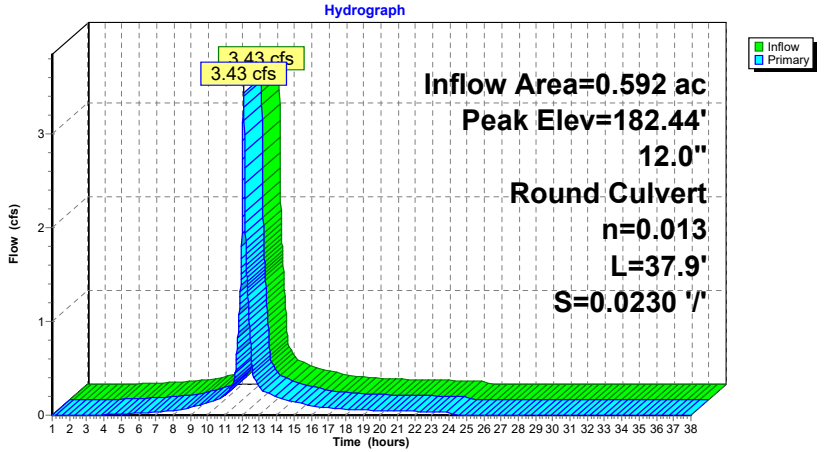
Inflow Area = 0.592 ac, 55.50% Impervious, Inflow Depth = 5.23" for 100-Year event
Inflow = 3.43 cfs @ 12.08 hrs, Volume= 0.258 af
Outflow = 3.43 cfs @ 12.08 hrs, Volume= 0.258 af, Atten= 0%, Lag= 0.0 min
Primary = 3.43 cfs @ 12.08 hrs, Volume= 0.258 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 182.44' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	180.62'	**12.0" Round Culvert** L= 37.9' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 180.62' / 179.75' S= 0.0230 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Primary OutFlow Max=3.42 cfs @ 12.08 hrs HW=182.44' (Free Discharge)
1=Culvert (Inlet Controls 3.42 cfs @ 4.36 fps)

Pond 9P: (new Pond)



Summary for Pond 10P: (new Pond)

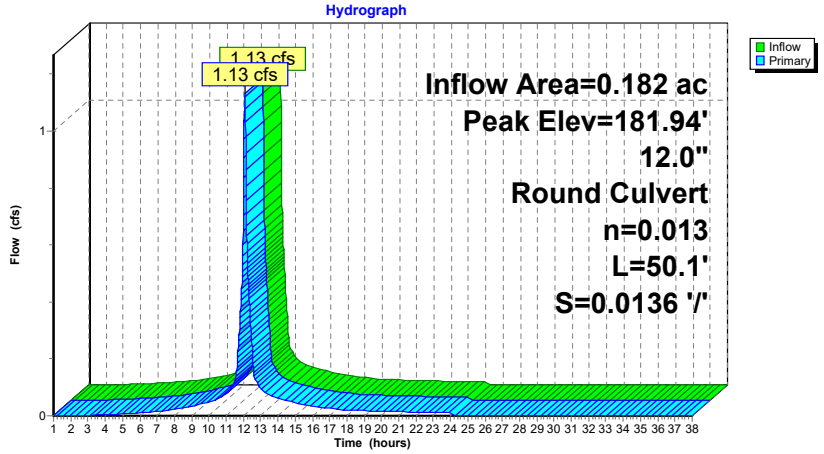
Inflow Area = 0.182 ac, 75.19% Impervious, Inflow Depth = 5.76" for 100-Year event
Inflow = 1.13 cfs @ 12.08 hrs, Volume= 0.087 af
Outflow = 1.13 cfs @ 12.08 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min
Primary = 1.13 cfs @ 12.08 hrs, Volume= 0.087 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 181.94' @ 12.08 hrs
Flood Elev= 184.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	181.30'	**12.0" Round Culvert** L= 50.1' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 181.30' / 180.62' S= 0.0136 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.79 sf

Primary OutFlow Max=1.13 cfs @ 12.08 hrs HW=181.94' (Free Discharge)
1=Culvert (Inlet Controls 1.13 cfs @ 2.14 fps)

Pond 10P: (new Pond)



Summary for Pond 11P: (new Pond)

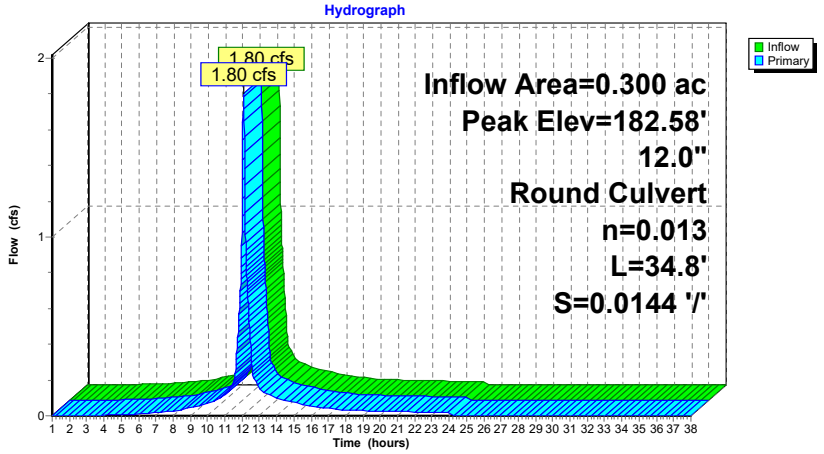
Inflow Area = 0.300 ac, 56.47% Impervious, Inflow Depth = 5.41" for 100-Year event
Inflow = 1.80 cfs @ 12.08 hrs, Volume= 0.135 af
Outflow = 1.80 cfs @ 12.08 hrs, Volume= 0.135 af, Atten= 0%, Lag= 0.0 min
Primary = 1.80 cfs @ 12.08 hrs, Volume= 0.135 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 182.58' @ 12.08 hrs
Flood Elev= 184.22'

Device	Routing	Invert	Outlet Devices
#1	Primary	181.72'	**12.0" Round Culvert** L= 34.8' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 181.72' / 181.22' S= 0.0144 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.79 sf

Primary OutFlow Max=1.80 cfs @ 12.08 hrs HW=182.58' (Free Discharge)
1=Culvert (Inlet Controls 1.80 cfs @ 2.50 fps)

Pond 11P: (new Pond)



Appendix I:
Post-Development Stormwater Modeling

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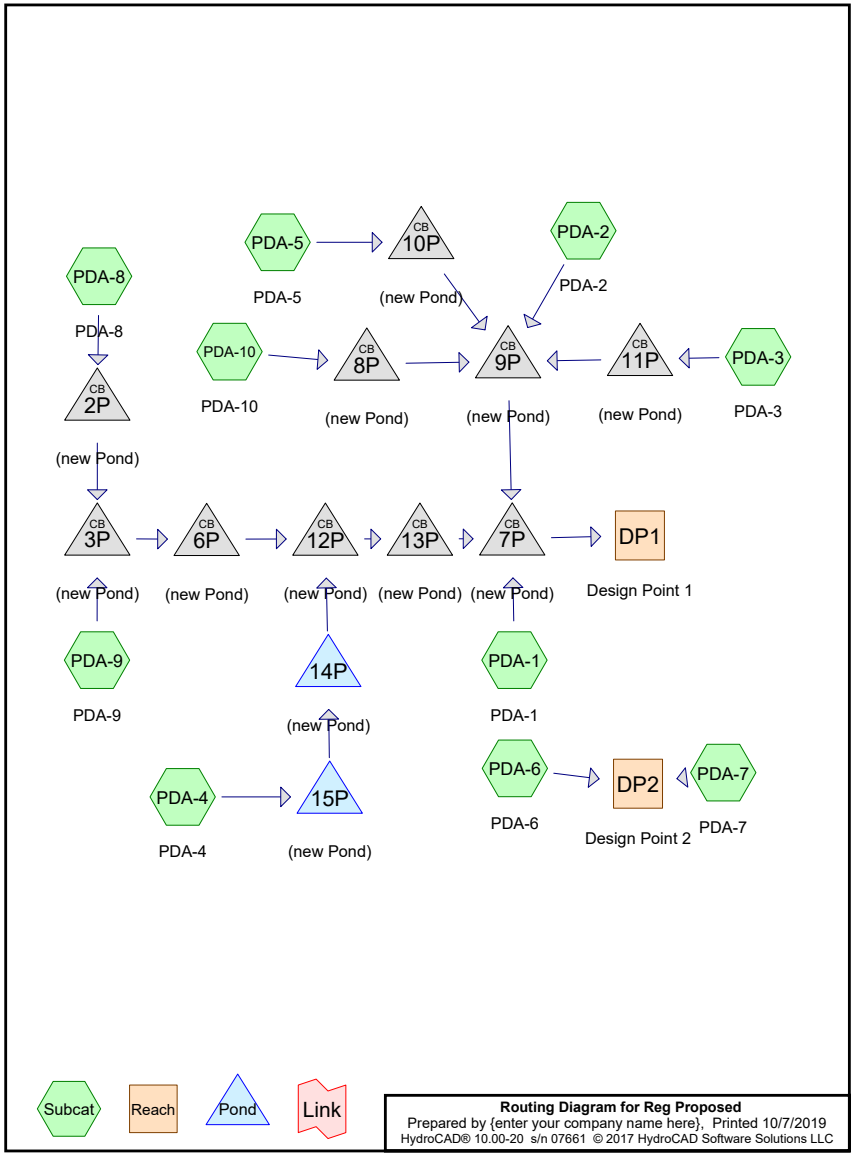


Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.015	39	>75% Grass cover, Good, HSG A (PDA-4)
0.174	61	>75% Grass cover, Good, HSG B (PDA-10, PDA-5, PDA-6, PDA-7, PDA-8, PDA-9)
0.532	80	>75% Grass cover, Good, HSG D (PDA-1, PDA-10, PDA-2, PDA-3, PDA-5, PDA-6, PDA-7)
0.033	96	Gravel surface, HSG D (PDA-1, PDA-10, PDA-2, PDA-3, PDA-5, PDA-6, PDA-7, PDA-8, PDA-9)
1.492	98	Paved parking, HSG D (PDA-1, PDA-10, PDA-2, PDA-3, PDA-5, PDA-6, PDA-7, PDA-8, PDA-9)
0.143	98	Unconnected roofs, HSG D (PDA-4)
2.389	**91**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.015	HSG A	PDA-4
0.174	HSG B	PDA-10, PDA-5, PDA-6, PDA-7, PDA-8, PDA-9
0.000	HSG C	
2.201	HSG D	PDA-1, PDA-10, PDA-2, PDA-3, PDA-4, PDA-5, PDA-6, PDA-7, PDA-8, PDA-9
0.000	Other	
2.389		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.015	0.174	0.000	0.532	0.000	0.721	>75% Grass cover, Good	PDA-1, PDA-10, PDA-2, PDA-3, PDA-4, PDA-5, PDA-6, PDA-7, PDA-8, PDA-9
0.000	0.000	0.000	0.033	0.000	0.033	Gravel surface	PDA-1, PDA-10, PDA-2, PDA-3, PDA-5, PDA-6, PDA-7, PDA-8, PDA-9
0.000	0.000	0.000	1.492	0.000	1.492	Paved parking	PDA-1, PDA-10, PDA-2, PDA-3, PDA-5, PDA-6, PDA-7, PDA-8, PDA-9
0.000	0.000	0.000	0.143	0.000	0.143	Unconnected roofs	PDA-4
0.015	**0.174**	**0.000**	**2.201**	**0.000**	**2.389**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	2P	179.90	179.58	107.7	0.0030	0.013	12.0	0.0	0.0
2	3P	179.58	179.30	57.0	0.0049	0.013	24.0	0.0	0.0
3	6P	179.10	178.86	95.0	0.0025	0.013	24.0	0.0	0.0
4	7P	178.12	177.58	77.7	0.0069	0.013	24.0	0.0	0.0
5	8P	184.00	182.02	53.2	0.0372	0.013	15.0	0.0	0.0
6	9P	180.62	179.75	37.9	0.0230	0.013	12.0	0.0	0.0
7	10P	181.30	180.62	50.1	0.0136	0.013	12.0	0.0	0.0
8	11P	181.72	181.22	34.8	0.0144	0.013	12.0	0.0	0.0
9	12P	178.76	178.69	27.0	0.0026	0.013	24.0	0.0	0.0
10	13P	178.69	178.12	71.6	0.0080	0.013	24.0	0.0	0.0
11	14P	183.00	182.84	32.0	0.0050	0.013	15.0	0.0	0.0
12	15P	188.00	187.50	50.0	0.0100	0.013	12.0	0.0	0.0

Time span=1.00-38.00 hrs, dt=0.01 hrs, 3701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PDA-1: PDA-1 Runoff Area=464 sf 45.04% Impervious Runoff Depth=1.69"
Tc=6.0 min CN=94 Runoff=0.02 cfs 0.001 af

Subcatchment PDA-10: PDA-10 Runoff Area=4,882 sf 52.09% Impervious Runoff Depth=1.22"
Tc=6.0 min CN=88 Runoff=0.16 cfs 0.011 af

Subcatchment PDA-2: PDA-2 Runoff Area=1,414 sf 15.06% Impervious Runoff Depth=0.97"
Tc=6.0 min CN=84 Runoff=0.04 cfs 0.003 af

Subcatchment PDA-3: PDA-3 Runoff Area=8,796 sf 65.25% Impervious Runoff Depth=1.52"
Tc=6.0 min CN=92 Runoff=0.36 cfs 0.026 af

Subcatchment PDA-4: PDA-4 Runoff Area=6,885 sf 90.57% Impervious Runoff Depth=1.52"
Tc=6.0 min CN=92 Runoff=0.28 cfs 0.020 af

Subcatchment PDA-5: PDA-5 Runoff Area=7,877 sf 63.06% Impervious Runoff Depth=1.44"
Tc=6.0 min CN=91 Runoff=0.30 cfs 0.022 af

Subcatchment PDA-6: PDA-6 Runoff Area=29,013 sf 63.93% Impervious Runoff Depth=1.52"
Tc=6.0 min CN=92 Runoff=1.18 cfs 0.084 af

Subcatchment PDA-7: PDA-7 Runoff Area=36,457 sf 80.95% Impervious Runoff Depth=1.69"
Tc=6.0 min CN=94 Runoff=1.62 cfs 0.118 af

Subcatchment PDA-8: PDA-8 Runoff Area=3,362 sf 51.16% Impervious Runoff Depth=0.86"
Tc=6.0 min CN=82 Runoff=0.08 cfs 0.006 af

Subcatchment PDA-9: PDA-9 Runoff Area=4,929 sf 31.61% Impervious Runoff Depth=0.50"
Tc=6.0 min CN=74 Runoff=0.06 cfs 0.005 af

Reach DP1: Design Point 1 Inflow=1.02 cfs 0.090 af
Outflow=1.02 cfs 0.090 af

Reach DP2: Design Point 2 Inflow=2.80 cfs 0.202 af
Outflow=2.80 cfs 0.202 af

Pond 2P: (new Pond) Peak Elev=180.08' Inflow=0.08 cfs 0.006 af
12.0" Round Culvert n=0.013 L=107.7' S=0.0030 '/' Outflow=0.08 cfs 0.006 af

Pond 3P: (new Pond) Peak Elev=179.75' Inflow=0.13 cfs 0.010 af
24.0" Round Culvert n=0.013 L=57.0' S=0.0049 '/' Outflow=0.13 cfs 0.010 af

Pond 6P: (new Pond) Peak Elev=179.30' Inflow=0.13 cfs 0.010 af
24.0" Round Culvert n=0.013 L=95.0' S=0.0025 '/' Outflow=0.13 cfs 0.010 af

Pond 7P: (new Pond) Peak Elev=178.58' Inflow=1.02 cfs 0.090 af
24.0" Round Culvert n=0.013 L=77.7' S=0.0069 '/' Outflow=1.02 cfs 0.090 af

Pond 8P: (new Pond) Peak Elev=184.20' Inflow=0.16 cfs 0.011 af
15.0" Round Culvert n=0.013 L=53.2' S=0.0372 '/' Outflow=0.16 cfs 0.011 af

Pond 9P: (new Pond) Peak Elev=181.16' Inflow=0.86 cfs 0.061 af
12.0" Round Culvert n=0.013 L=37.9' S=0.0230 '/' Outflow=0.86 cfs 0.061 af

Pond 10P: (new Pond) Peak Elev=181.61' Inflow=0.30 cfs 0.022 af
12.0" Round Culvert n=0.013 L=50.1' S=0.0136 '/' Outflow=0.30 cfs 0.022 af

Pond 11P: (new Pond) Peak Elev=182.05' Inflow=0.36 cfs 0.026 af
12.0" Round Culvert n=0.013 L=34.8' S=0.0144 '/' Outflow=0.36 cfs 0.026 af

Pond 12P: (new Pond) Peak Elev=178.96' Inflow=0.14 cfs 0.027 af
24.0" Round Culvert n=0.013 L=27.0' S=0.0026 '/' Outflow=0.14 cfs 0.027 af

Pond 13P: (new Pond) Peak Elev=178.86' Inflow=0.14 cfs 0.027 af
24.0" Round Culvert n=0.013 L=71.6' S=0.0080 '/' Outflow=0.14 cfs 0.027 af

Pond 14P: (new Pond) Peak Elev=183.09' Storage=0.001 af Inflow=0.01 cfs 0.018 af
Outflow=0.01 cfs 0.017 af

Pond 15P: (new Pond) Peak Elev=193.85' Storage=550 cf Inflow=0.28 cfs 0.020 af
Outflow=0.01 cfs 0.018 af

Total Runoff Area = 2.389 ac Runoff Volume = 0.295 af Average Runoff Depth = 1.48"
31.55% Pervious = 0.754 ac 68.45% Impervious = 1.636 ac

Summary for Subcatchment PDA-1: PDA-1

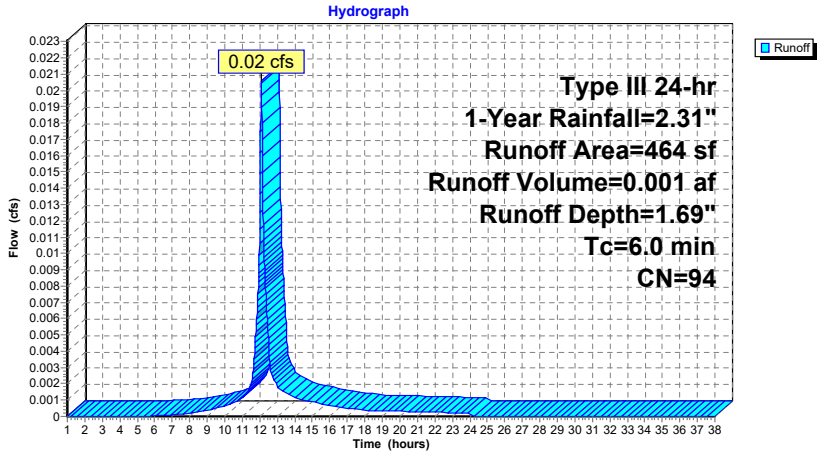
Runoff = 0.02 cfs @ 12.09 hrs, Volume= 0.001 af, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
209	98	Paved parking, HSG D
165	96	Gravel surface, HSG D
0	61	>75% Grass cover, Good, HSG B
90	80	>75% Grass cover, Good, HSG D
464	94	Weighted Average
255		54.96% Pervious Area
209		45.04% Impervious Area

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

Subcatchment PDA-1: PDA-1



Summary for Subcatchment PDA-10: PDA-10

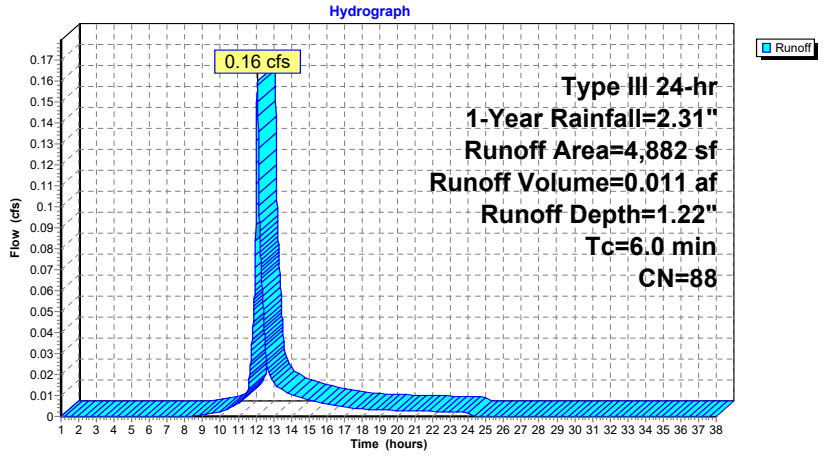
Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.011 af, Depth= 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
2,543	98	Paved parking, HSG D
392	96	Gravel surface, HSG D
798	61	>75% Grass cover, Good, HSG B
1,149	80	>75% Grass cover, Good, HSG D
4,882	88	Weighted Average
2,339		47.91% Pervious Area
2,543		52.09% Impervious Area

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

Subcatchment PDA-10: PDA-10



Summary for Subcatchment PDA-2: PDA-2

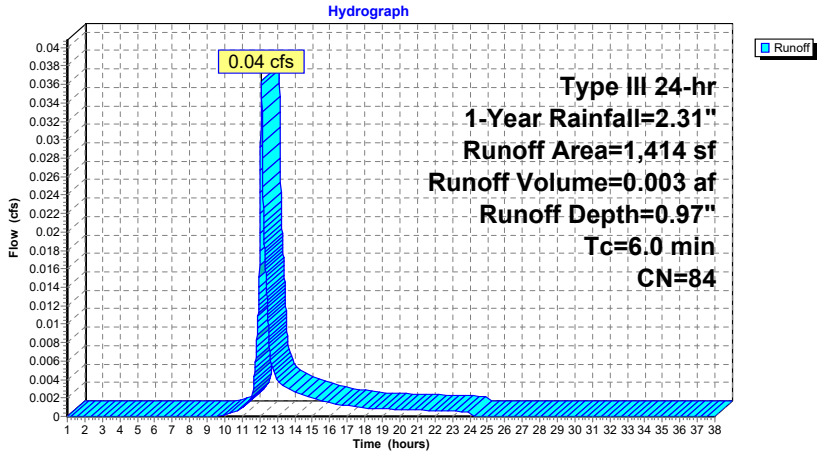
Runoff = 0.04 cfs @ 12.09 hrs, Volume= 0.003 af, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
213	98	Paved parking, HSG D
119	96	Gravel surface, HSG D
0	61	>75% Grass cover, Good, HSG B
1,082	80	>75% Grass cover, Good, HSG D
1,414	84	Weighted Average
1,201		84.94% Pervious Area
213		15.06% Impervious Area

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

Subcatchment PDA-2: PDA-2



Summary for Subcatchment PDA-3: PDA-3

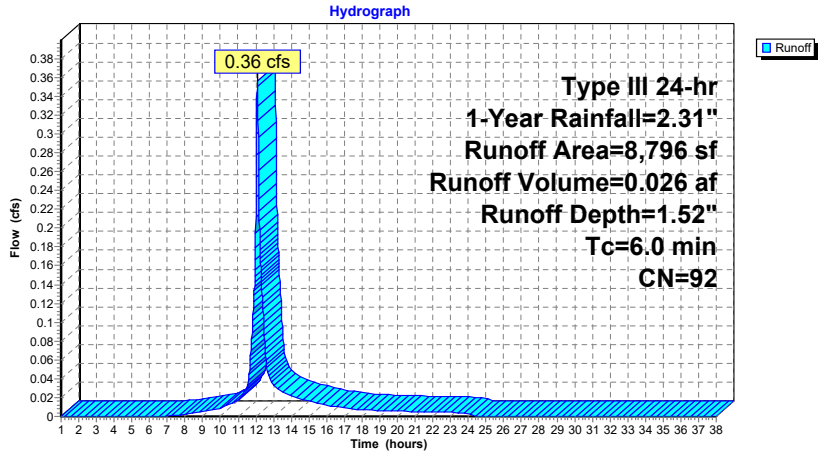
Runoff = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
5,739	98	Paved parking, HSG D
106	96	Gravel surface, HSG D
0	61	>75% Grass cover, Good, HSG B
2,951	80	>75% Grass cover, Good, HSG D
8,796	92	Weighted Average
3,057		34.75% Pervious Area
5,739		65.25% Impervious Area

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

Subcatchment PDA-3: PDA-3



Summary for Subcatchment PDA-4: PDA-4

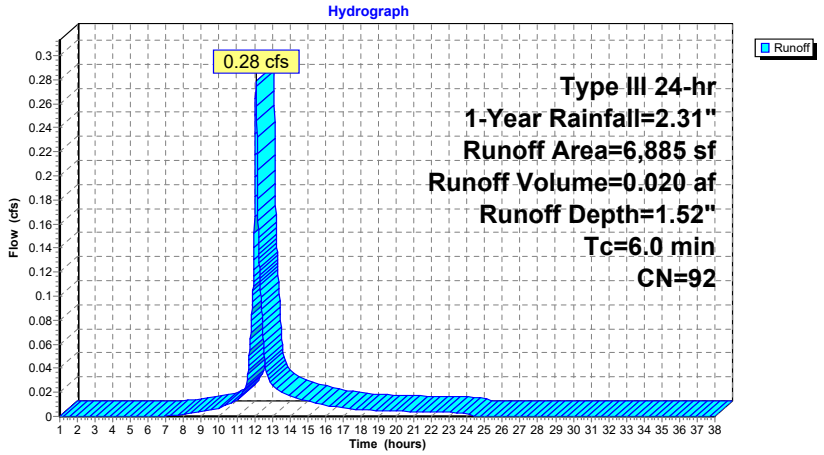
Runoff = 0.28 cfs @ 12.09 hrs, Volume= 0.020 af, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
6,236	98	Unconnected roofs, HSG D
649	39	>75% Grass cover, Good, HSG A
6,885	92	Weighted Average
649		9.43% Pervious Area
6,236		90.57% Impervious Area
6,236		100.00% Unconnected

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

Subcatchment PDA-4: PDA-4



Summary for Subcatchment PDA-5: PDA-5

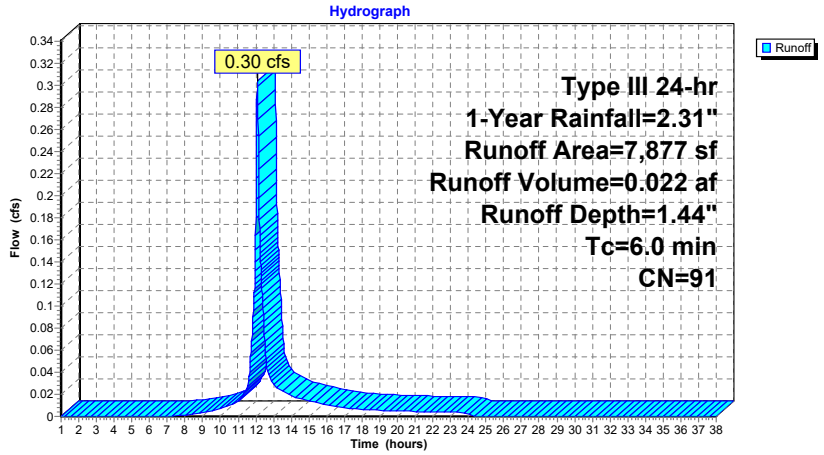
Runoff = 0.30 cfs @ 12.09 hrs, Volume= 0.022 af, Depth= 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
4,967	98	Paved parking, HSG D
115	96	Gravel surface, HSG D
237	61	>75% Grass cover, Good, HSG B
2,558	80	>75% Grass cover, Good, HSG D
7,877	91	Weighted Average
2,910		36.94% Pervious Area
4,967		63.06% Impervious Area

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

Subcatchment PDA-5: PDA-5



Summary for Subcatchment PDA-6: PDA-6

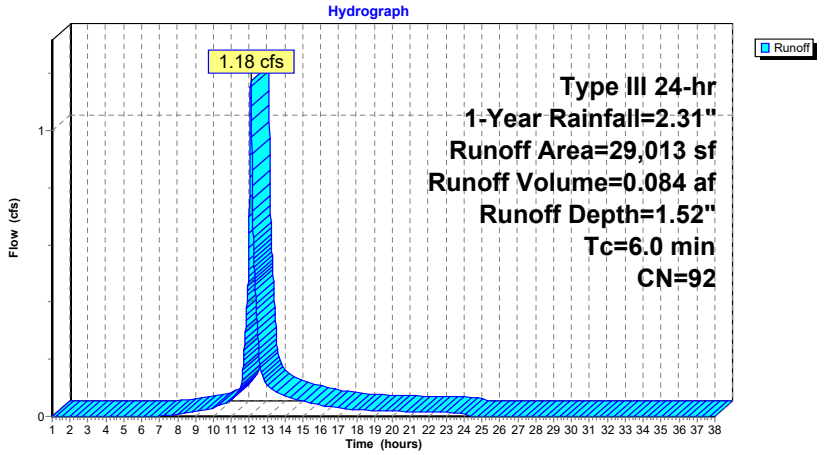
Runoff = 1.18 cfs @ 12.09 hrs, Volume= 0.084 af, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
18,548	98	Paved parking, HSG D
118	96	Gravel surface, HSG D
51	61	>75% Grass cover, Good, HSG B
10,296	80	>75% Grass cover, Good, HSG D
29,013	92	Weighted Average
10,465		36.07% Pervious Area
18,548		63.93% Impervious Area

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

Subcatchment PDA-6: PDA-6



Summary for Subcatchment PDA-7: PDA-7

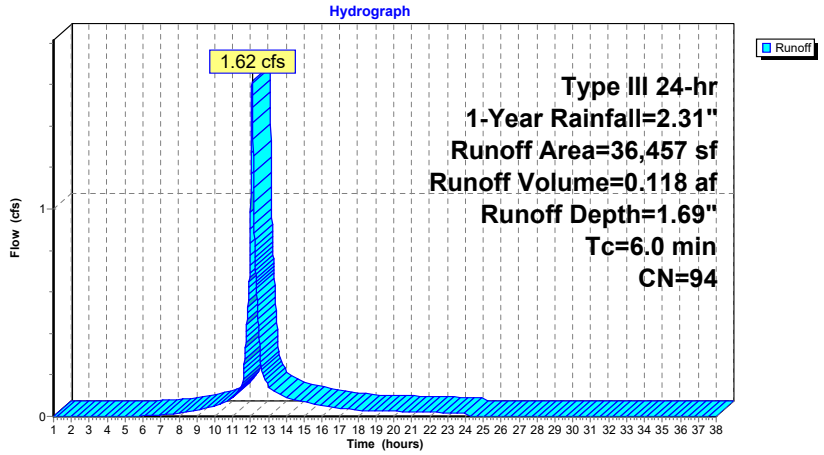
Runoff = 1.62 cfs @ 12.09 hrs, Volume= 0.118 af, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
29,513	98	Paved parking, HSG D
49	96	Gravel surface, HSG D
1,834	61	>75% Grass cover, Good, HSG B
5,061	80	>75% Grass cover, Good, HSG D
36,457	94	Weighted Average
6,944		19.05% Pervious Area
29,513		80.95% Impervious Area

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

Subcatchment PDA-7: PDA-7



Summary for Subcatchment PDA-8: PDA-8

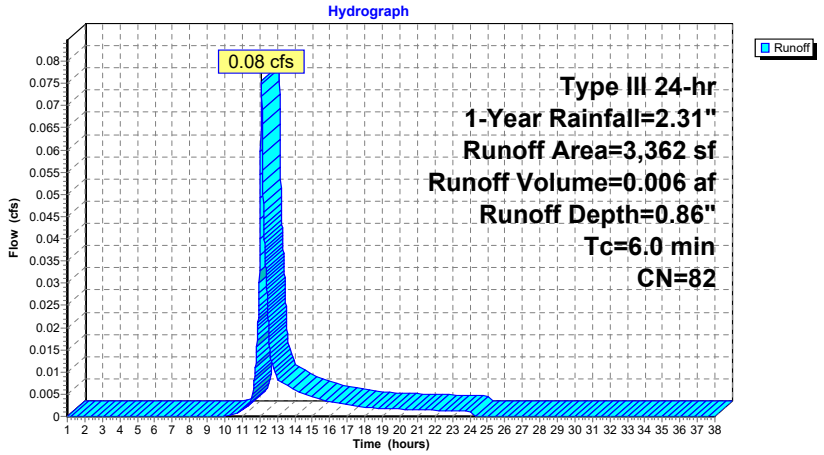
Runoff = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
1,720	98	Paved parking, HSG D
244	96	Gravel surface, HSG D
1,398	61	>75% Grass cover, Good, HSG B
0	80	>75% Grass cover, Good, HSG D
3,362	82	Weighted Average
1,642		48.84% Pervious Area
1,720		51.16% Impervious Area

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

Subcatchment PDA-8: PDA-8



Summary for Subcatchment PDA-9: PDA-9

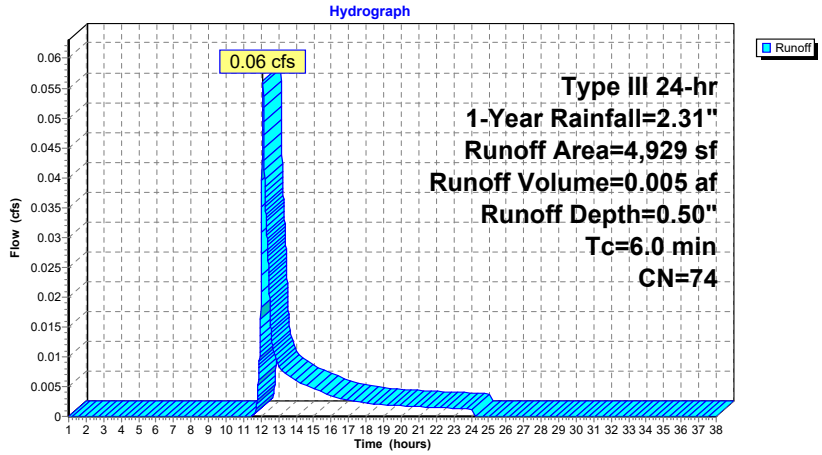
Runoff = 0.06 cfs @ 12.10 hrs, Volume= 0.005 af, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.31"

Area (sf)	CN	Description
1,558	98	Paved parking, HSG D
131	96	Gravel surface, HSG D
3,240	61	>75% Grass cover, Good, HSG B
0	80	>75% Grass cover, Good, HSG D
4,929	74	Weighted Average
3,371		68.39% Pervious Area
1,558		31.61% Impervious Area

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

Subcatchment PDA-9: PDA-9



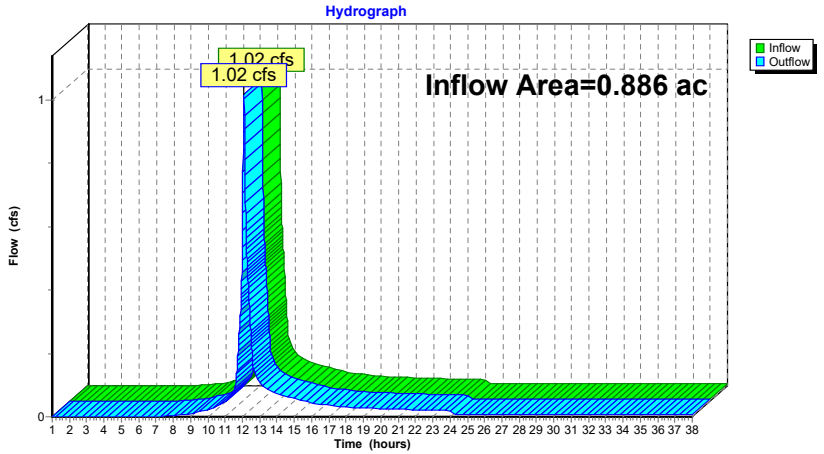
Summary for Reach DP1: Design Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.886 ac, 60.05% Impervious, Inflow Depth > 1.22" for 1-Year event
Inflow = 1.02 cfs @ 12.09 hrs, Volume= 0.090 af
Outflow = 1.02 cfs @ 12.09 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs

Reach DP1: Design Point 1



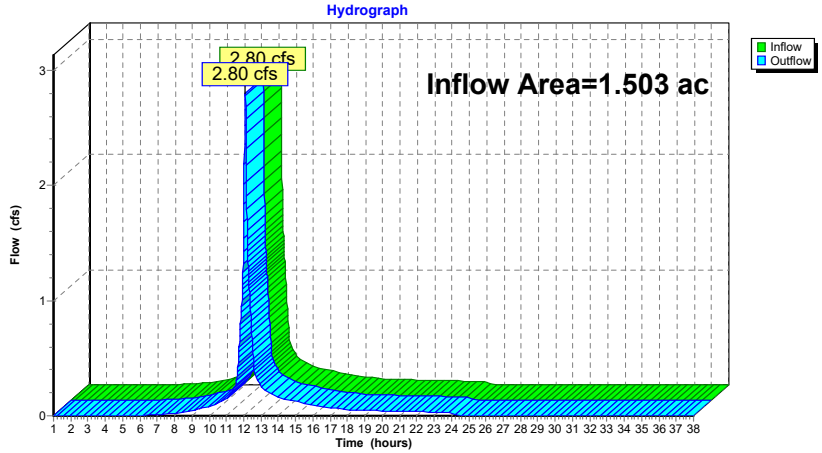
Summary for Reach DP2: Design Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.503 ac, 73.41% Impervious, Inflow Depth = 1.61" for 1-Year event
Inflow = 2.80 cfs @ 12.09 hrs, Volume= 0.202 af
Outflow = 2.80 cfs @ 12.09 hrs, Volume= 0.202 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs

Reach DP2: Design Point 2



Summary for Pond 2P: (new Pond)

[57] Hint: Peaked at 180.08' (Flood elevation advised)

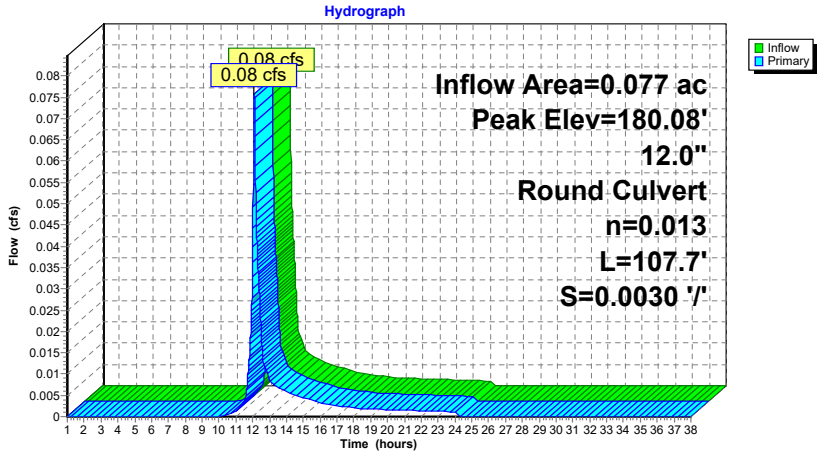
Inflow Area = 0.077 ac, 51.16% Impervious, Inflow Depth = 0.86" for 1-Year event
Inflow = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af
Outflow = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min
Primary = 0.08 cfs @ 12.09 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 180.08' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	179.90'	**12.0" Round Culvert** L= 107.7' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.90' / 179.58' S= 0.0030 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.08 cfs @ 12.09 hrs HW=180.08' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.08 cfs @ 1.20 fps)

Pond 2P: (new Pond)



Summary for Pond 3P: (new Pond)

[79] Warning: Submerged Pond 2P Primary device # 1 OUTLET by 0.17'

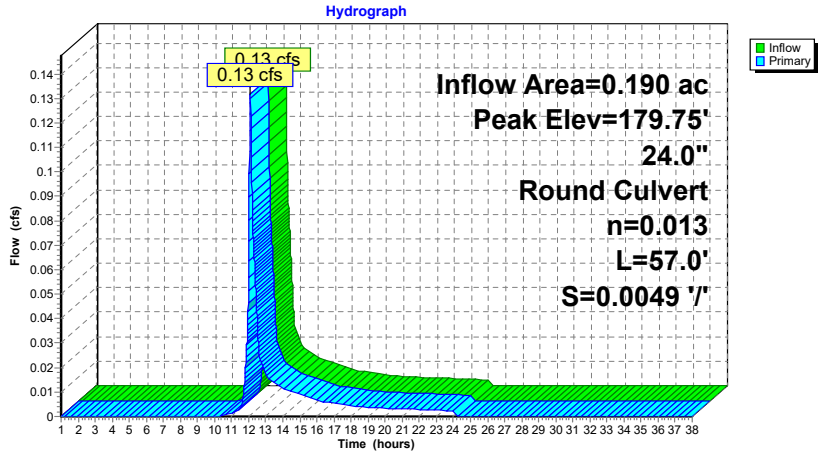
Inflow Area = 0.190 ac, 39.54% Impervious, Inflow Depth = 0.65" for 1-Year event
Inflow = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af
Outflow = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min
Primary = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 179.75' @ 12.10 hrs
Flood Elev= 189.68'

Device	Routing	Invert	Outlet Devices
#1	Primary	179.58'	**24.0" Round Culvert** L= 57.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.58' / 179.30' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.12 cfs @ 12.10 hrs HW=179.75' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.12 cfs @ 1.45 fps)

Pond 3P: (new Pond)



Summary for Pond 6P: (new Pond)

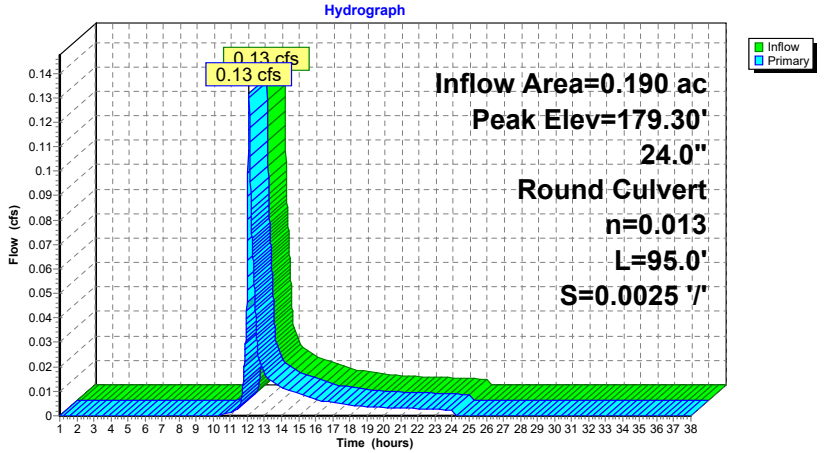
Inflow Area = 0.190 ac, 39.54% Impervious, Inflow Depth = 0.65" for 1-Year event
Inflow = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af
Outflow = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min
Primary = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 179.30' @ 12.10 hrs
Flood Elev= 189.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	179.10'	**24.0" Round Culvert** L= 95.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.10' / 178.86' S= 0.0025 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.13 cfs @ 12.10 hrs HW=179.30' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.13 cfs @ 1.22 fps)

Pond 6P: (new Pond)



Summary for Pond 7P: (new Pond)

[57] Hint: Peaked at 178.58' (Flood elevation advised)
[79] Warning: Submerged Pond 13P Primary device # 1 OUTLET by 0.46'

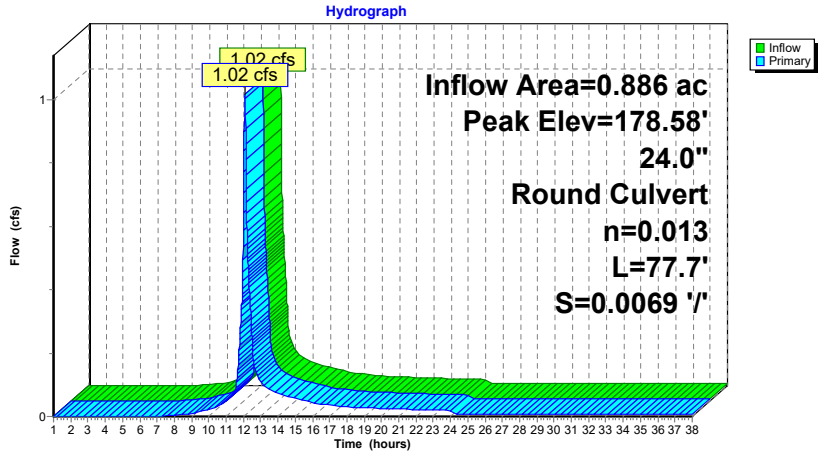
Inflow Area = 0.886 ac, 60.05% Impervious, Inflow Depth > 1.22" for 1-Year event
Inflow = 1.02 cfs @ 12.09 hrs, Volume= 0.090 af
Outflow = 1.02 cfs @ 12.09 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min
Primary = 1.02 cfs @ 12.09 hrs, Volume= 0.090 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 178.58' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.12'	**24.0" Round Culvert** L= 77.7' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 178.12' / 177.58' S= 0.0069 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 3.14 sf

Primary OutFlow Max=1.02 cfs @ 12.09 hrs HW=178.58' (Free Discharge)
1=Culvert (Inlet Controls 1.02 cfs @ 1.83 fps)

Pond 7P: (new Pond)



Summary for Pond 8P: (new Pond)

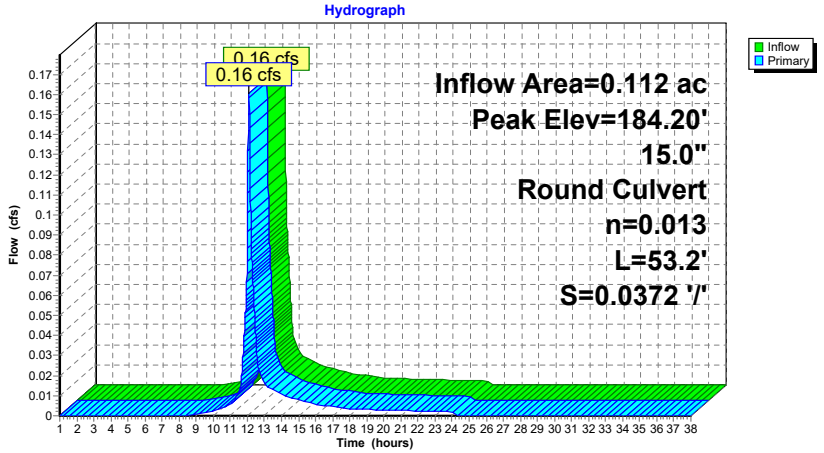
Inflow Area = 0.112 ac, 52.09% Impervious, Inflow Depth = 1.22" for 1-Year event
Inflow = 0.16 cfs @ 12.09 hrs, Volume= 0.011 af
Outflow = 0.16 cfs @ 12.09 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Primary = 0.16 cfs @ 12.09 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 184.20' @ 12.09 hrs
Flood Elev= 187.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	184.00'	**15.0" Round Culvert** L= 53.2' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 184.00' / 182.02' S= 0.0372 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 1.23 sf

Primary OutFlow Max=0.16 cfs @ 12.09 hrs HW=184.20' (Free Discharge)
1=Culvert (Inlet Controls 0.16 cfs @ 1.22 fps)

Pond 8P: (new Pond)



Summary for Pond 9P: (new Pond)

[57] Hint: Peaked at 181.16' (Flood elevation advised)
[79] Warning: Submerged Pond 10P Primary device # 1 OUTLET by 0.54'

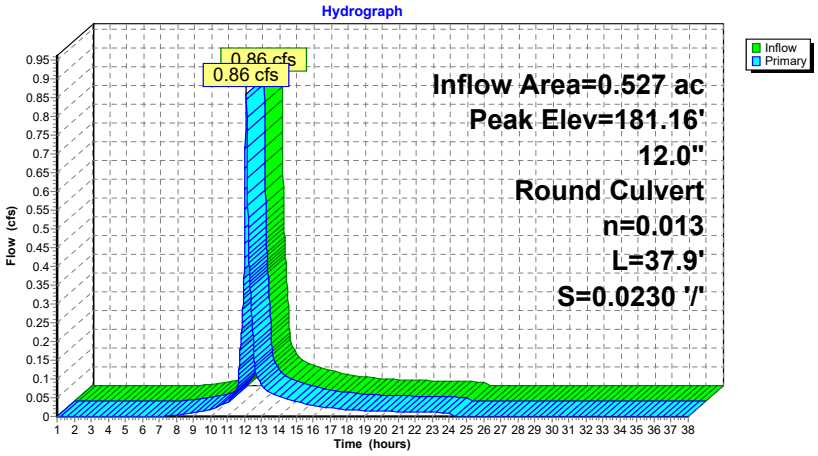
Inflow Area = 0.527 ac, 58.61% Impervious, Inflow Depth = 1.39" for 1-Year event
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 0.061 af
Outflow = 0.86 cfs @ 12.09 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
Primary = 0.86 cfs @ 12.09 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 181.16' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	180.62'	**12.0" Round Culvert** L= 37.9' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 180.62' / 179.75' S= 0.0230 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Primary OutFlow Max=0.86 cfs @ 12.09 hrs HW=181.16' (Free Discharge)
1=Culvert (Inlet Controls 0.86 cfs @ 1.98 fps)

Pond 9P: (new Pond)



Summary for Pond 10P: (new Pond)

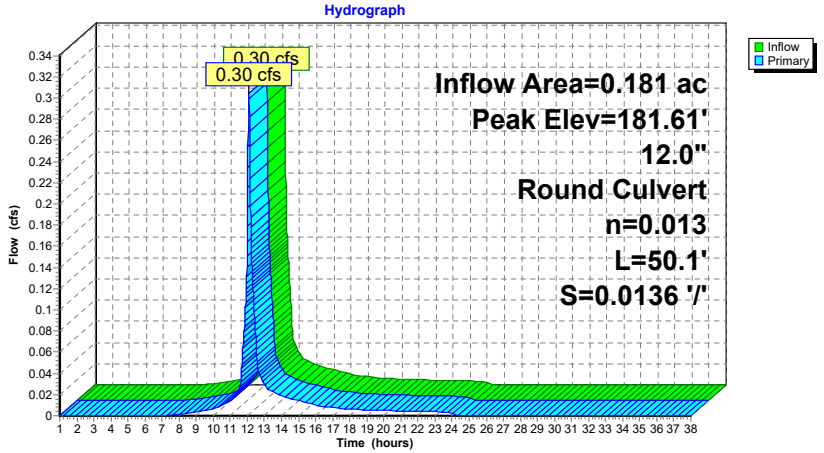
Inflow Area = 0.181 ac, 63.06% Impervious, Inflow Depth = 1.44" for 1-Year event
Inflow = 0.30 cfs @ 12.09 hrs, Volume= 0.022 af
Outflow = 0.30 cfs @ 12.09 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min
Primary = 0.30 cfs @ 12.09 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 181.61' @ 12.09 hrs
Flood Elev= 184.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	181.30'	**12.0" Round Culvert** L= 50.1' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 181.30' / 180.62' S= 0.0136 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.79 sf

Primary OutFlow Max=0.30 cfs @ 12.09 hrs HW=181.61' (Free Discharge)
1=Culvert (Inlet Controls 0.30 cfs @ 1.49 fps)

Pond 10P: (new Pond)



Summary for Pond 11P: (new Pond)

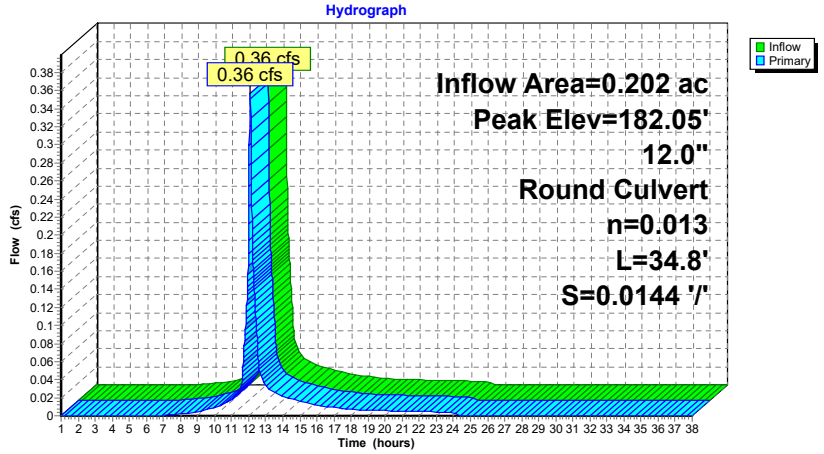
Inflow Area = 0.202 ac, 65.25% Impervious, Inflow Depth = 1.52" for 1-Year event
Inflow = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af
Outflow = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
Primary = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 182.05' @ 12.09 hrs
Flood Elev= 184.22'

Device	Routing	Invert	Outlet Devices
#1	Primary	181.72'	**12.0" Round Culvert** L= 34.8' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 181.72' / 181.22' S= 0.0144 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.79 sf

Primary OutFlow Max=0.36 cfs @ 12.09 hrs HW=182.05' (Free Discharge)
1=Culvert (Inlet Controls 0.36 cfs @ 1.55 fps)

Pond 11P: (new Pond)



Summary for Pond 12P: (new Pond)

[57] Hint: Peaked at 178.96' (Flood elevation advised)
[79] Warning: Submerged Pond 6P Primary device # 1 OUTLET by 0.10'

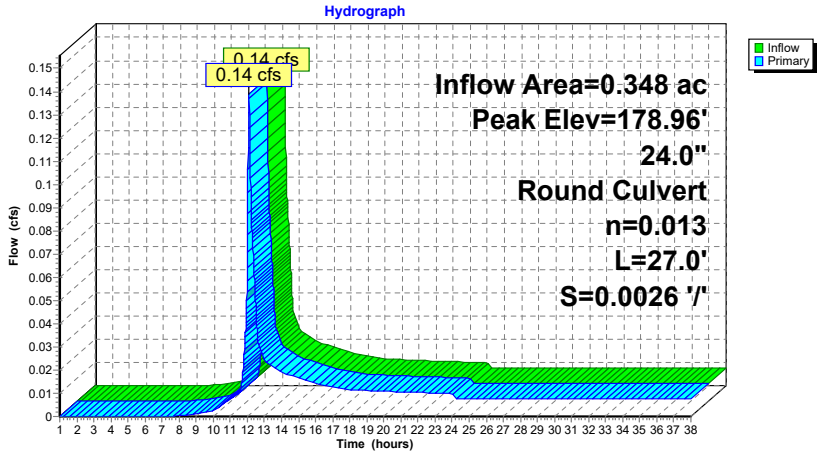
Inflow Area = 0.348 ac, 62.69% Impervious, Inflow Depth > 0.94" for 1-Year event
Inflow = 0.14 cfs @ 12.10 hrs, Volume= 0.027 af
Outflow = 0.14 cfs @ 12.10 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min
Primary = 0.14 cfs @ 12.10 hrs, Volume= 0.027 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 178.96' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.76'	**24.0" Round Culvert** L= 27.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 178.76' / 178.69' S= 0.0026 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.14 cfs @ 12.10 hrs HW=178.96' (Free Discharge)
1=Culvert (Barrel Controls 0.14 cfs @ 1.27 fps)

Pond 12P: (new Pond)



Summary for Pond 13P: (new Pond)

[57] Hint: Peaked at 178.86' (Flood elevation advised)
[79] Warning: Submerged Pond 12P Primary device # 1 INLET by 0.10'

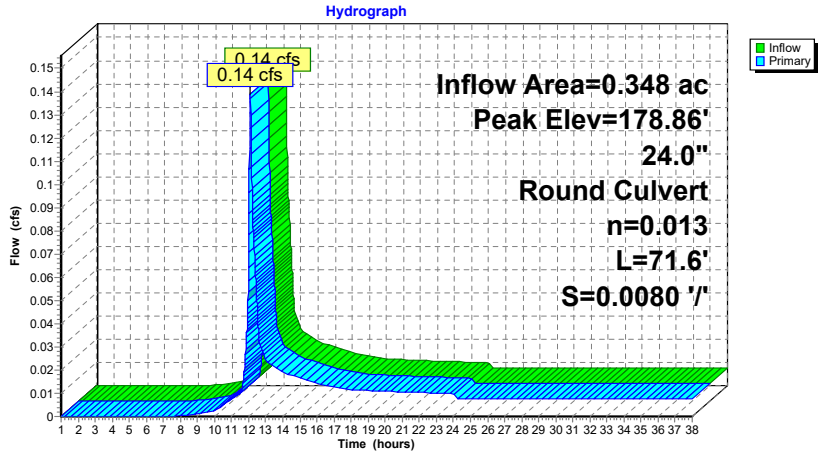
Inflow Area = 0.348 ac, 62.69% Impervious, Inflow Depth > 0.94" for 1-Year event
Inflow = 0.14 cfs @ 12.10 hrs, Volume= 0.027 af
Outflow = 0.14 cfs @ 12.10 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min
Primary = 0.14 cfs @ 12.10 hrs, Volume= 0.027 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 178.86' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.69'	**24.0" Round Culvert** L= 71.6' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 178.69' / 178.12' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.14 cfs @ 12.10 hrs HW=178.86' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.14 cfs @ 1.10 fps)

Pond 13P: (new Pond)



Summary for Pond 14P: (new Pond)

Inflow Area = 0.158 ac, 90.57% Impervious, Inflow Depth > 1.35" for 1-Year event
Inflow = 0.01 cfs @ 10.49 hrs, Volume= 0.018 af
Outflow = 0.01 cfs @ 34.32 hrs, Volume= 0.017 af, Atten= 0%, Lag= 1,429.8 min
Primary = 0.01 cfs @ 34.32 hrs, Volume= 0.017 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 183.09' @ 31.50 hrs Surf.Area= 0.018 ac Storage= 0.001 af

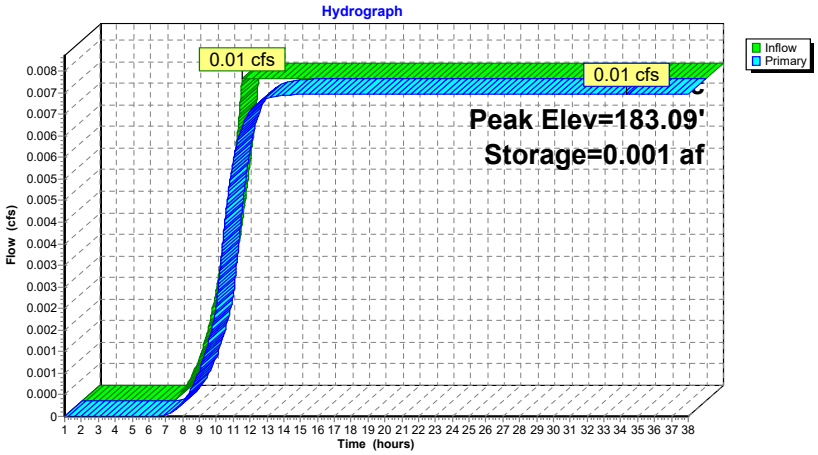
Plug-Flow detention time= 60.7 min calculated for 0.017 af (96% of inflow)
Center-of-Mass det. time= 30.1 min (1,445.5 - 1,415.4)

Volume	Invert	Avail.Storage	Storage Description
#1	183.00'	0.024 af	**16.75'W x 46.03'L x 4.50'H Prismatoid** 0.080 af Overall - 0.019 af Embedded = 0.061 af x 40.0% Voids
#2	183.50'	0.019 af	**ADS_StormTech SC-740 +Cap** x 18 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 3 Rows of 6 Chambers
		0.043 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	183.00'	**15.0" Round Culvert** L= 32.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 183.00' / 182.84' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	183.00'	**1.2" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.01 cfs @ 34.32 hrs HW=183.09' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 0.02 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.01 cfs @ 1.01 fps)

Pond 14P: (new Pond)



Summary for Pond 15P: (new Pond)

Inflow Area = 0.158 ac, 90.57% Impervious, Inflow Depth = 1.52" for 1-Year event
Inflow = 0.28 cfs @ 12.09 hrs, Volume= 0.020 af
Outflow = 0.01 cfs @ 10.49 hrs, Volume= 0.018 af, Atten= 97%, Lag= 0.0 min
Primary = 0.01 cfs @ 10.49 hrs, Volume= 0.018 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 193.85' @ 16.80 hrs Surf.Area= 645 sf Storage= 550 cf

Plug-Flow detention time= 658.0 min calculated for 0.018 af (89% of inflow)
Center-of-Mass det. time= 605.4 min (1,415.4 - 810.1)

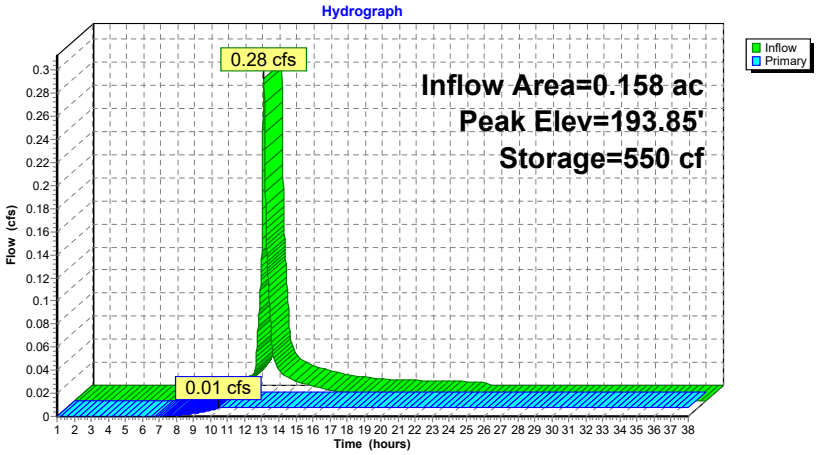
Volume	Invert	Avail.Storage	Storage Description
#1	193.00'	1,290 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
193.00	645	0	0
194.00	645	645	645
195.00	645	645	1,290

Device	Routing	Invert	Outlet Devices
#1	Primary	188.00'	**12.0" Round Culvert** L= 50.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 188.00' / 187.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	193.00'	**0.500 in/hr Exfiltration over Horizontal area**
#3	Device 1	194.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.01 cfs @ 10.49 hrs HW=193.02' (Free Discharge)
└**1=Culvert** (Passes 0.01 cfs of 6.35 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Pond 15P: (new Pond)



Time span=1.00-38.00 hrs, dt=0.01 hrs, 3701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PDA-1: PDA-1 Runoff Area=464 sf 45.04% Impervious Runoff Depth=3.21"
Tc=6.0 min CN=94 Runoff=0.04 cfs 0.003 af

Subcatchment PDA-10: PDA-10 Runoff Area=4,882 sf 52.09% Impervious Runoff Depth=2.62"
Tc=6.0 min CN=88 Runoff=0.34 cfs 0.024 af

Subcatchment PDA-2: PDA-2 Runoff Area=1,414 sf 15.06% Impervious Runoff Depth=2.27"
Tc=6.0 min CN=84 Runoff=0.09 cfs 0.006 af

Subcatchment PDA-3: PDA-3 Runoff Area=8,796 sf 65.25% Impervious Runoff Depth=3.00"
Tc=6.0 min CN=92 Runoff=0.69 cfs 0.051 af

Subcatchment PDA-4: PDA-4 Runoff Area=6,885 sf 90.57% Impervious Runoff Depth=3.00"
Tc=6.0 min CN=92 Runoff=0.54 cfs 0.040 af

Subcatchment PDA-5: PDA-5 Runoff Area=7,877 sf 63.06% Impervious Runoff Depth=2.90"
Tc=6.0 min CN=91 Runoff=0.60 cfs 0.044 af

Subcatchment PDA-6: PDA-6 Runoff Area=29,013 sf 63.93% Impervious Runoff Depth=3.00"
Tc=6.0 min CN=92 Runoff=2.26 cfs 0.167 af

Subcatchment PDA-7: PDA-7 Runoff Area=36,457 sf 80.95% Impervious Runoff Depth=3.21"
Tc=6.0 min CN=94 Runoff=2.98 cfs 0.224 af

Subcatchment PDA-8: PDA-8 Runoff Area=3,362 sf 51.16% Impervious Runoff Depth=2.10"
Tc=6.0 min CN=82 Runoff=0.19 cfs 0.014 af

Subcatchment PDA-9: PDA-9 Runoff Area=4,929 sf 31.61% Impervious Runoff Depth=1.51"
Tc=6.0 min CN=74 Runoff=0.20 cfs 0.014 af

Reach DP1: Design Point 1 Inflow=2.14 cfs 0.188 af
Outflow=2.14 cfs 0.188 af

Reach DP2: Design Point 2 Inflow=5.24 cfs 0.390 af
Outflow=5.24 cfs 0.390 af

Pond 2P: (new Pond) Peak Elev=180.18' Inflow=0.19 cfs 0.014 af
12.0" Round Culvert n=0.013 L=107.7' S=0.0030 '/' Outflow=0.19 cfs 0.014 af

Pond 3P: (new Pond) Peak Elev=179.88' Inflow=0.39 cfs 0.028 af
24.0" Round Culvert n=0.013 L=57.0' S=0.0049 '/' Outflow=0.39 cfs 0.028 af

Pond 6P: (new Pond) Peak Elev=179.43' Inflow=0.39 cfs 0.028 af
24.0" Round Culvert n=0.013 L=95.0' S=0.0025 '/' Outflow=0.39 cfs 0.028 af

Pond 7P: (new Pond) Peak Elev=178.81' Inflow=2.14 cfs 0.188 af
24.0" Round Culvert n=0.013 L=77.7' S=0.0069 '/' Outflow=2.14 cfs 0.188 af

Pond 8P: (new Pond) Peak Elev=184.30' Inflow=0.34 cfs 0.024 af
15.0" Round Culvert n=0.013 L=53.2' S=0.0372 '/' Outflow=0.34 cfs 0.024 af

Pond 9P: (new Pond) Peak Elev=181.45' Inflow=1.71 cfs 0.125 af
12.0" Round Culvert n=0.013 L=37.9' S=0.0230 '/' Outflow=1.71 cfs 0.125 af

Pond 10P: (new Pond) Peak Elev=181.74' Inflow=0.60 cfs 0.044 af
12.0" Round Culvert n=0.013 L=50.1' S=0.0136 '/' Outflow=0.60 cfs 0.044 af

Pond 11P: (new Pond) Peak Elev=182.20' Inflow=0.69 cfs 0.051 af
12.0" Round Culvert n=0.013 L=34.8' S=0.0144 '/' Outflow=0.69 cfs 0.051 af

Pond 12P: (new Pond) Peak Elev=179.10' Inflow=0.39 cfs 0.061 af
24.0" Round Culvert n=0.013 L=27.0' S=0.0026 '/' Outflow=0.39 cfs 0.061 af

Pond 13P: (new Pond) Peak Elev=178.97' Inflow=0.39 cfs 0.061 af
24.0" Round Culvert n=0.013 L=71.6' S=0.0080 '/' Outflow=0.39 cfs 0.061 af

Pond 14P: (new Pond) Peak Elev=183.83' Storage=0.008 af Inflow=0.30 cfs 0.034 af
Outflow=0.03 cfs 0.033 af

Pond 15P: (new Pond) Peak Elev=194.05' Storage=677 cf Inflow=0.54 cfs 0.040 af
Outflow=0.30 cfs 0.034 af

Total Runoff Area = 2.389 ac Runoff Volume = 0.585 af Average Runoff Depth = 2.94"
31.55% Pervious = 0.754 ac 68.45% Impervious = 1.636 ac

Summary for Subcatchment PDA-1: PDA-1

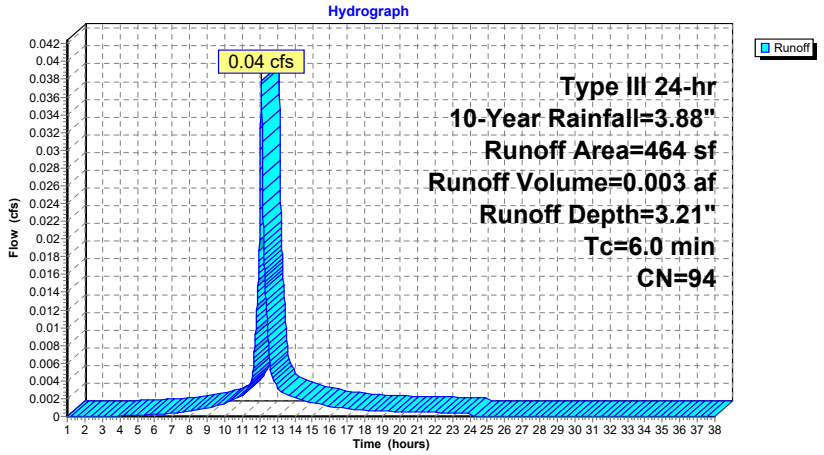
Runoff = 0.04 cfs @ 12.08 hrs, Volume= 0.003 af, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
209	98	Paved parking, HSG D
165	96	Gravel surface, HSG D
0	61	>75% Grass cover, Good, HSG B
90	80	>75% Grass cover, Good, HSG D
464	94	Weighted Average
255		54.96% Pervious Area
209		45.04% Impervious Area

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

Subcatchment PDA-1: PDA-1



Summary for Subcatchment PDA-10: PDA-10

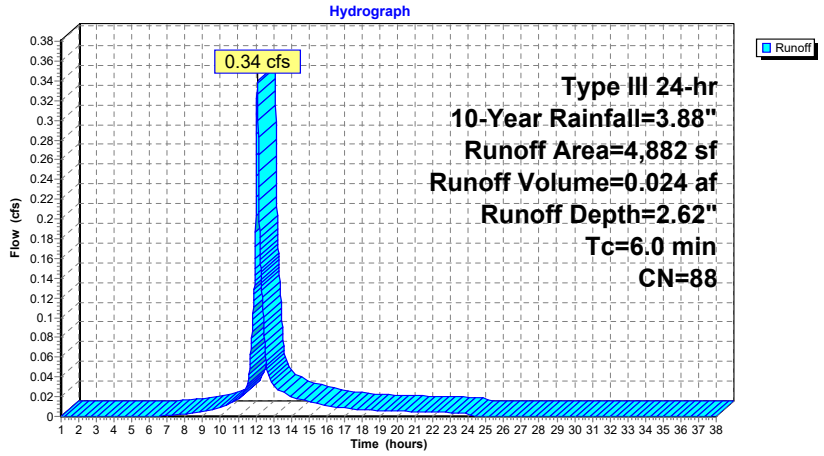
Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.024 af, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
2,543	98	Paved parking, HSG D
392	96	Gravel surface, HSG D
798	61	>75% Grass cover, Good, HSG B
1,149	80	>75% Grass cover, Good, HSG D
4,882	88	Weighted Average
2,339		47.91% Pervious Area
2,543		52.09% Impervious Area

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

Subcatchment PDA-10: PDA-10



Summary for Subcatchment PDA-2: PDA-2

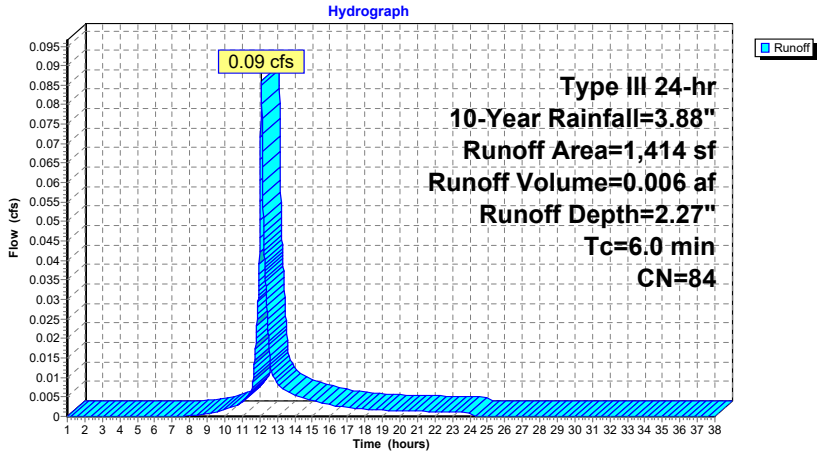
Runoff = 0.09 cfs @ 12.09 hrs, Volume= 0.006 af, Depth= 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
213	98	Paved parking, HSG D
119	96	Gravel surface, HSG D
0	61	>75% Grass cover, Good, HSG B
1,082	80	>75% Grass cover, Good, HSG D
1,414	84	Weighted Average
1,201		84.94% Pervious Area
213		15.06% Impervious Area

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

Subcatchment PDA-2: PDA-2



Summary for Subcatchment PDA-3: PDA-3

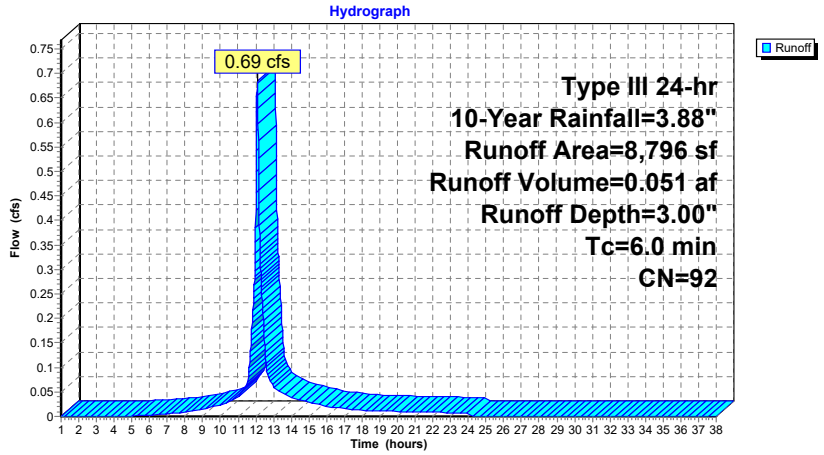
Runoff = 0.69 cfs @ 12.09 hrs, Volume= 0.051 af, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
5,739	98	Paved parking, HSG D
106	96	Gravel surface, HSG D
0	61	>75% Grass cover, Good, HSG B
2,951	80	>75% Grass cover, Good, HSG D
8,796	92	Weighted Average
3,057		34.75% Pervious Area
5,739		65.25% Impervious Area

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

Subcatchment PDA-3: PDA-3



Summary for Subcatchment PDA-4: PDA-4

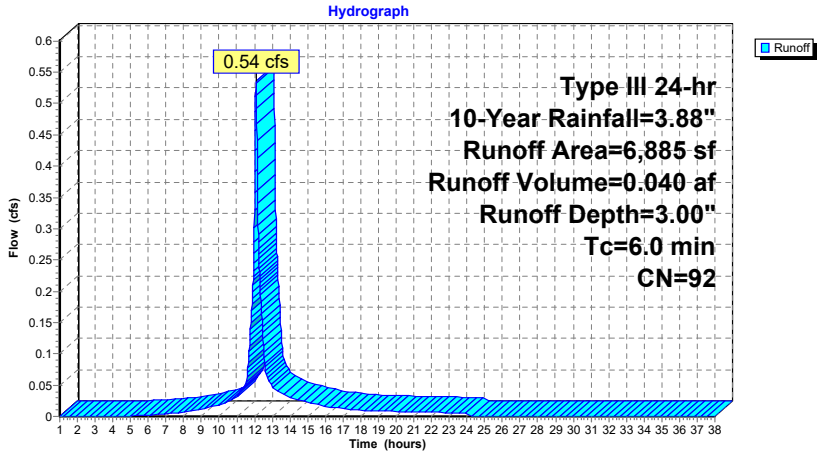
Runoff = 0.54 cfs @ 12.09 hrs, Volume= 0.040 af, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
6,236	98	Unconnected roofs, HSG D
649	39	>75% Grass cover, Good, HSG A
6,885	92	Weighted Average
649		9.43% Pervious Area
6,236		90.57% Impervious Area
6,236		100.00% Unconnected

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

Subcatchment PDA-4: PDA-4



Summary for Subcatchment PDA-5: PDA-5

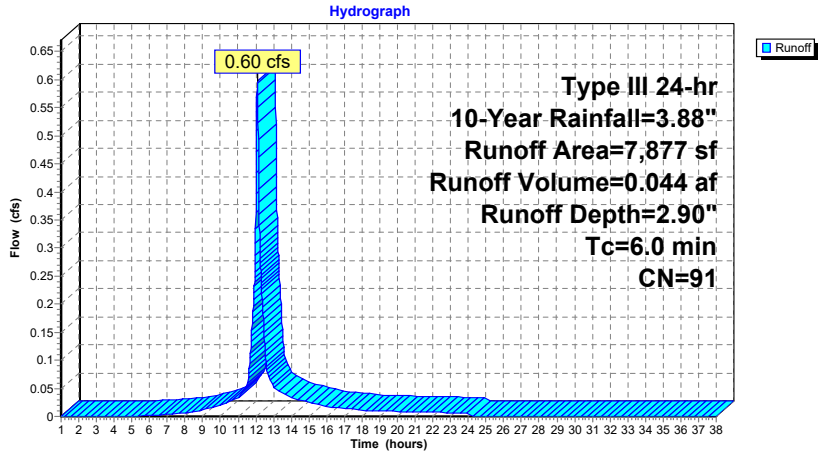
Runoff = 0.60 cfs @ 12.09 hrs, Volume= 0.044 af, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
4,967	98	Paved parking, HSG D
115	96	Gravel surface, HSG D
237	61	>75% Grass cover, Good, HSG B
2,558	80	>75% Grass cover, Good, HSG D
7,877	91	Weighted Average
2,910		36.94% Pervious Area
4,967		63.06% Impervious Area

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

Subcatchment PDA-5: PDA-5



Summary for Subcatchment PDA-6: PDA-6

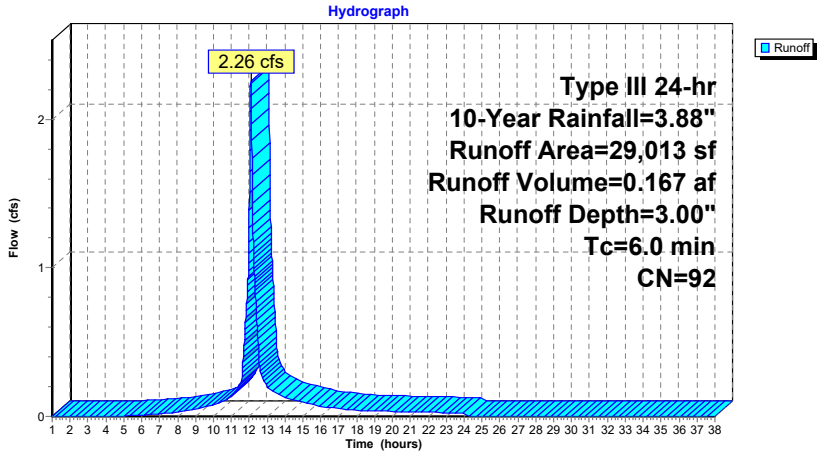
Runoff = 2.26 cfs @ 12.09 hrs, Volume= 0.167 af, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
18,548	98	Paved parking, HSG D
118	96	Gravel surface, HSG D
51	61	>75% Grass cover, Good, HSG B
10,296	80	>75% Grass cover, Good, HSG D
29,013	92	Weighted Average
10,465		36.07% Pervious Area
18,548		63.93% Impervious Area

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

Subcatchment PDA-6: PDA-6



Summary for Subcatchment PDA-7: PDA-7

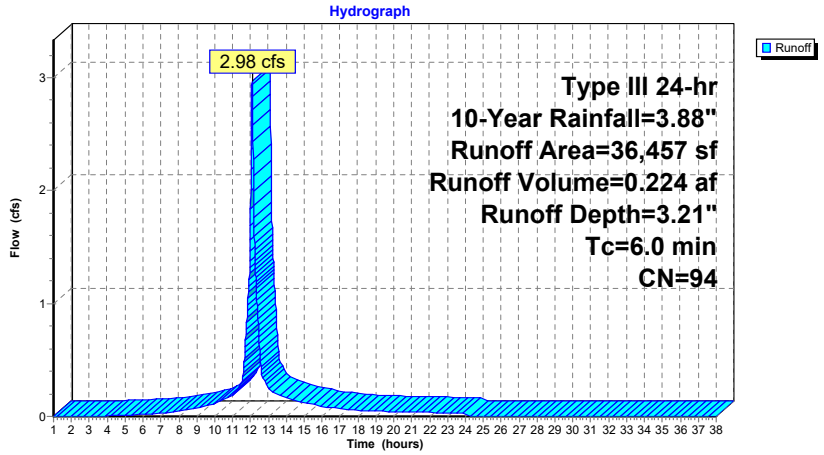
Runoff = 2.98 cfs @ 12.08 hrs, Volume= 0.224 af, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
29,513	98	Paved parking, HSG D
49	96	Gravel surface, HSG D
1,834	61	>75% Grass cover, Good, HSG B
5,061	80	>75% Grass cover, Good, HSG D
36,457	94	Weighted Average
6,944		19.05% Pervious Area
29,513		80.95% Impervious Area

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

Subcatchment PDA-7: PDA-7



Summary for Subcatchment PDA-8: PDA-8

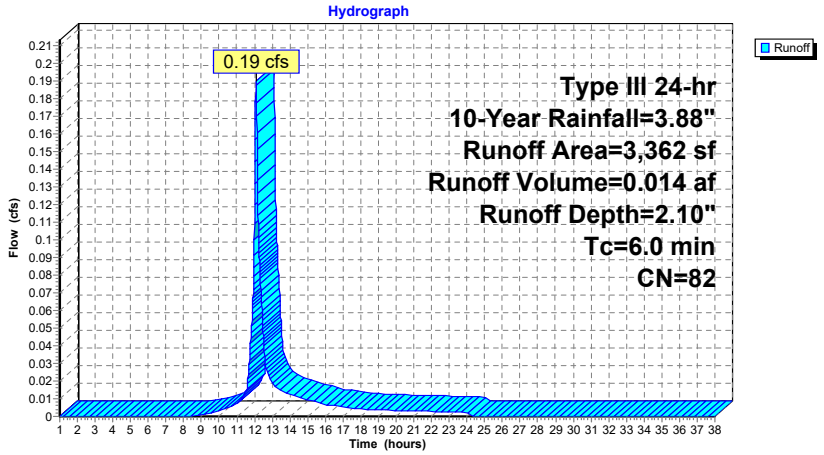
Runoff = 0.19 cfs @ 12.09 hrs, Volume= 0.014 af, Depth= 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
1,720	98	Paved parking, HSG D
244	96	Gravel surface, HSG D
1,398	61	>75% Grass cover, Good, HSG B
0	80	>75% Grass cover, Good, HSG D
3,362	82	Weighted Average
1,642		48.84% Pervious Area
1,720		51.16% Impervious Area

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

Subcatchment PDA-8: PDA-8



Summary for Subcatchment PDA-9: PDA-9

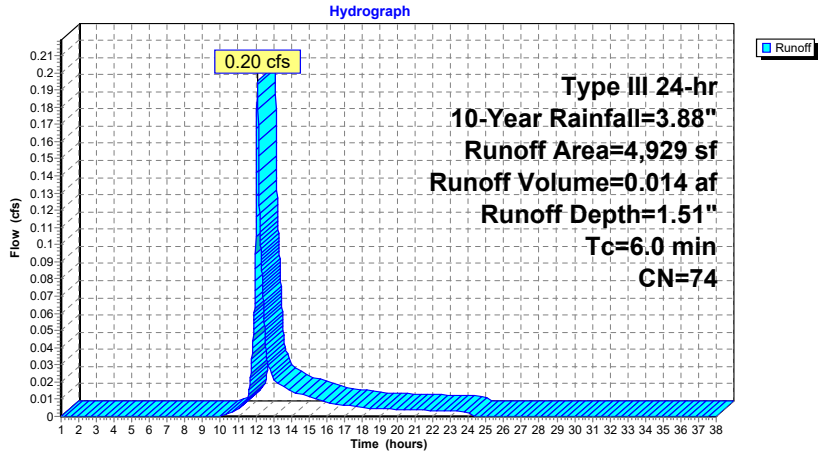
Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af, Depth= 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=3.88"

Area (sf)	CN	Description
1,558	98	Paved parking, HSG D
131	96	Gravel surface, HSG D
3,240	61	>75% Grass cover, Good, HSG B
0	80	>75% Grass cover, Good, HSG D
4,929	74	Weighted Average
3,371		68.39% Pervious Area
1,558		31.61% Impervious Area

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

Subcatchment PDA-9: PDA-9



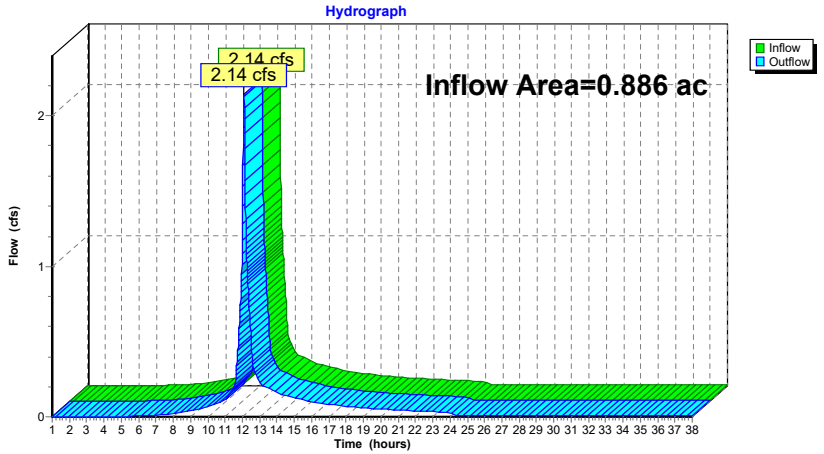
Summary for Reach DP1: Design Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.886 ac, 60.05% Impervious, Inflow Depth > 2.55" for 10-Year event
Inflow = 2.14 cfs @ 12.09 hrs, Volume= 0.188 af
Outflow = 2.14 cfs @ 12.09 hrs, Volume= 0.188 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs

Reach DP1: Design Point 1



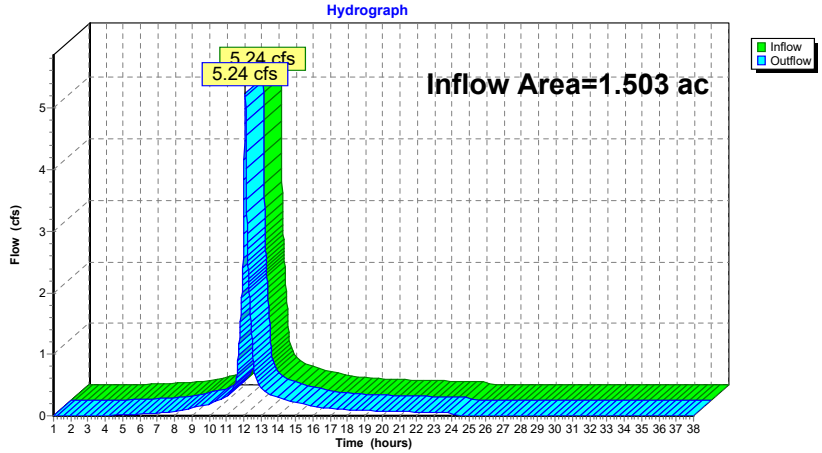
Summary for Reach DP2: Design Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.503 ac, 73.41% Impervious, Inflow Depth = 3.12" for 10-Year event
Inflow = 5.24 cfs @ 12.08 hrs, Volume= 0.390 af
Outflow = 5.24 cfs @ 12.08 hrs, Volume= 0.390 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs

Reach DP2: Design Point 2



Summary for Pond 2P: (new Pond)

[57] Hint: Peaked at 180.18' (Flood elevation advised)

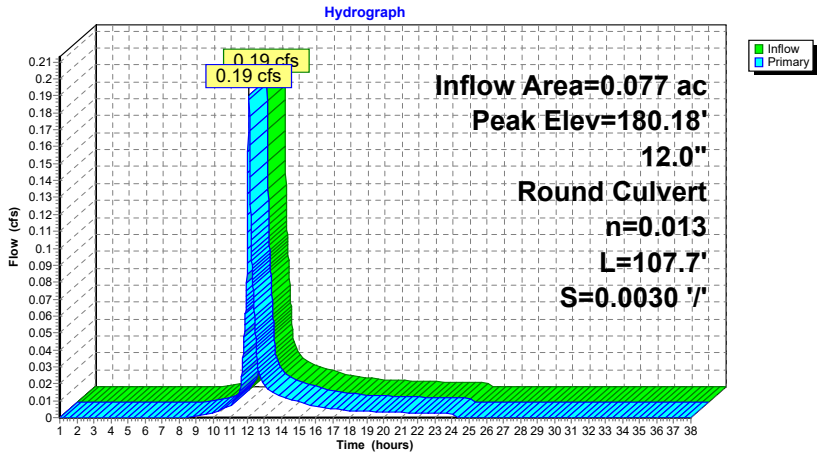
Inflow Area = 0.077 ac, 51.16% Impervious, Inflow Depth = 2.10" for 10-Year event
Inflow = 0.19 cfs @ 12.09 hrs, Volume= 0.014 af
Outflow = 0.19 cfs @ 12.09 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min
Primary = 0.19 cfs @ 12.09 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 180.18' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	179.90'	**12.0" Round Culvert** L= 107.7' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.90' / 179.58' S= 0.0030 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.19 cfs @ 12.09 hrs HW=180.18' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.19 cfs @ 1.57 fps)

Pond 2P: (new Pond)



Summary for Pond 3P: (new Pond)

[79] Warning: Submerged Pond 2P Primary device # 1 OUTLET by 0.30'

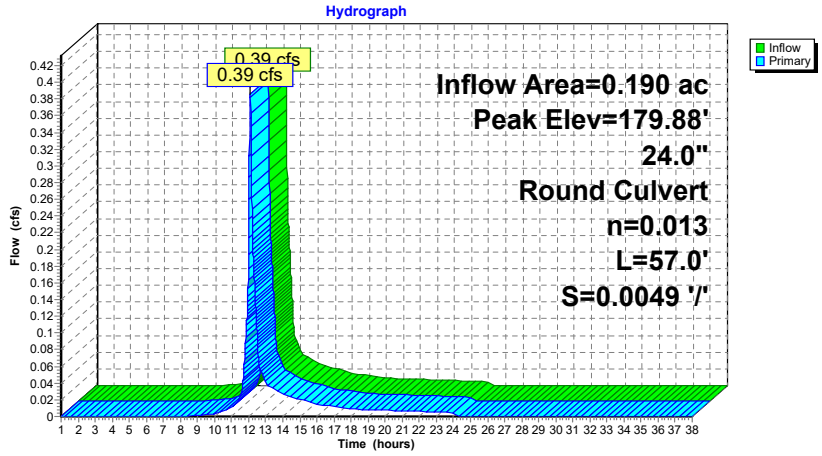
Inflow Area = 0.190 ac, 39.54% Impervious, Inflow Depth = 1.75" for 10-Year event
Inflow = 0.39 cfs @ 12.09 hrs, Volume= 0.028 af
Outflow = 0.39 cfs @ 12.09 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min
Primary = 0.39 cfs @ 12.09 hrs, Volume= 0.028 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 179.88' @ 12.09 hrs
Flood Elev= 189.68'

Device	Routing	Invert	Outlet Devices
#1	Primary	179.58'	**24.0" Round Culvert** L= 57.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.58' / 179.30' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.38 cfs @ 12.09 hrs HW=179.88' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.38 cfs @ 1.99 fps)

Pond 3P: (new Pond)



Summary for Pond 6P: (new Pond)

[79] Warning: Submerged Pond 3P Primary device # 1 OUTLET by 0.13'

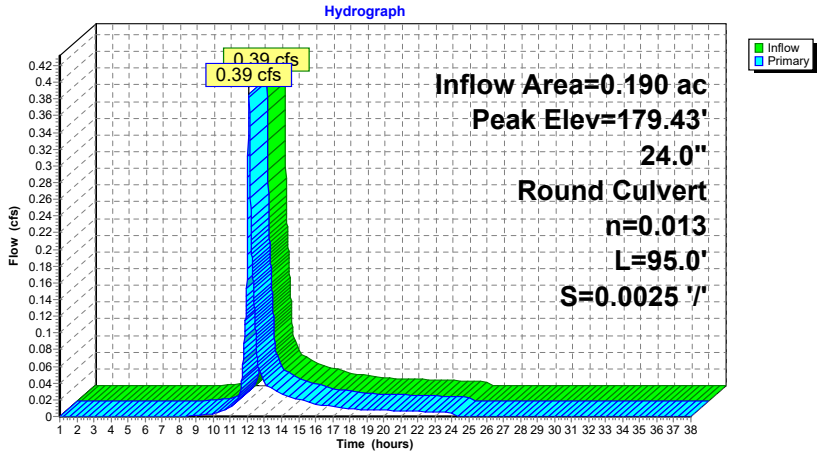
Inflow Area = 0.190 ac, 39.54% Impervious, Inflow Depth = 1.75" for 10-Year event
Inflow = 0.39 cfs @ 12.09 hrs, Volume= 0.028 af
Outflow = 0.39 cfs @ 12.09 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min
Primary = 0.39 cfs @ 12.09 hrs, Volume= 0.028 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 179.43' @ 12.09 hrs
Flood Elev= 189.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	179.10'	**24.0" Round Culvert** L= 95.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.10' / 178.86' S= 0.0025 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.38 cfs @ 12.09 hrs HW=179.43' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.38 cfs @ 1.67 fps)

Pond 6P: (new Pond)



Summary for Pond 7P: (new Pond)

[57] Hint: Peaked at 178.81' (Flood elevation advised)
[79] Warning: Submerged Pond 13P Primary device # 1 INLET by 0.12'

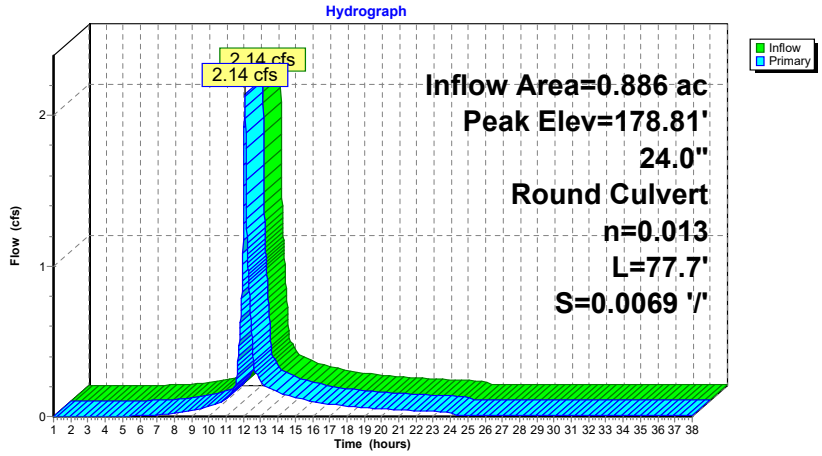
Inflow Area = 0.886 ac, 60.05% Impervious, Inflow Depth > 2.55" for 10-Year event
Inflow = 2.14 cfs @ 12.09 hrs, Volume= 0.188 af
Outflow = 2.14 cfs @ 12.09 hrs, Volume= 0.188 af, Atten= 0%, Lag= 0.0 min
Primary = 2.14 cfs @ 12.09 hrs, Volume= 0.188 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 178.81' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.12'	**24.0" Round Culvert** L= 77.7' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 178.12' / 177.58' S= 0.0069 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 3.14 sf

Primary OutFlow Max=2.14 cfs @ 12.09 hrs HW=178.81' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.14 cfs @ 2.23 fps)

Pond 7P: (new Pond)



Summary for Pond 8P: (new Pond)

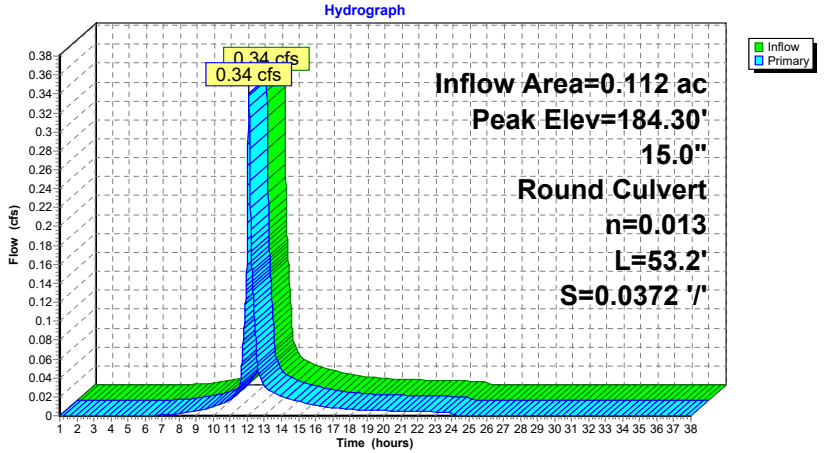
Inflow Area = 0.112 ac, 52.09% Impervious, Inflow Depth = 2.62" for 10-Year event
Inflow = 0.34 cfs @ 12.09 hrs, Volume= 0.024 af
Outflow = 0.34 cfs @ 12.09 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min
Primary = 0.34 cfs @ 12.09 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 184.30' @ 12.09 hrs
Flood Elev= 187.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	184.00'	**15.0" Round Culvert** L= 53.2' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 184.00' / 182.02' S= 0.0372 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 1.23 sf

Primary OutFlow Max=0.34 cfs @ 12.09 hrs HW=184.30' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.34 cfs @ 1.48 fps)

Pond 8P: (new Pond)



Summary for Pond 9P: (new Pond)

[57] Hint: Peaked at 181.45' (Flood elevation advised)
[79] Warning: Submerged Pond 10P Primary device # 1 INLET by 0.15'
[79] Warning: Submerged Pond 11P Primary device # 1 OUTLET by 0.23'

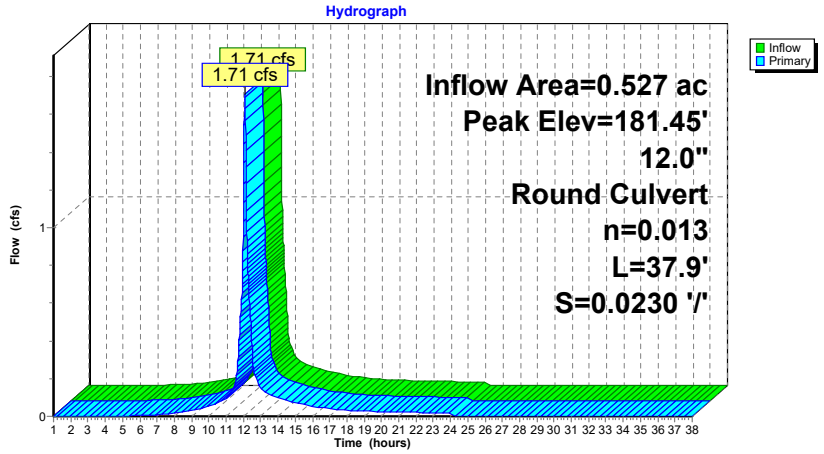
Inflow Area = 0.527 ac, 58.61% Impervious, Inflow Depth = 2.84" for 10-Year event
Inflow = 1.71 cfs @ 12.09 hrs, Volume= 0.125 af
Outflow = 1.71 cfs @ 12.09 hrs, Volume= 0.125 af, Atten= 0%, Lag= 0.0 min
Primary = 1.71 cfs @ 12.09 hrs, Volume= 0.125 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 181.45' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	180.62'	**12.0" Round Culvert** L= 37.9' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 180.62' / 179.75' S= 0.0230 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Primary OutFlow Max=1.71 cfs @ 12.09 hrs HW=181.45' (Free Discharge)
↳**1=Culvert** (Inlet Controls 1.71 cfs @ 2.45 fps)

Pond 9P: (new Pond)



Summary for Pond 10P: (new Pond)

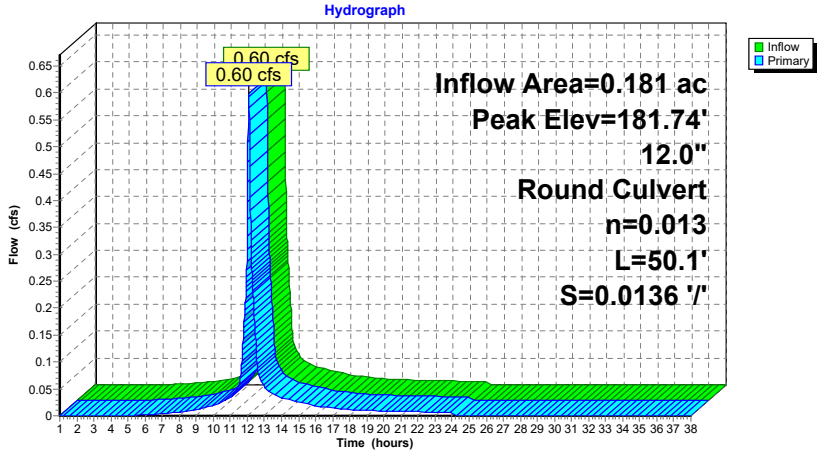
Inflow Area = 0.181 ac, 63.06% Impervious, Inflow Depth = 2.90" for 10-Year event
Inflow = 0.60 cfs @ 12.09 hrs, Volume= 0.044 af
Outflow = 0.60 cfs @ 12.09 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min
Primary = 0.60 cfs @ 12.09 hrs, Volume= 0.044 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 181.74' @ 12.09 hrs
Flood Elev= 184.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	181.30'	**12.0" Round Culvert** L= 50.1' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 181.30' / 180.62' S= 0.0136 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.79 sf

Primary OutFlow Max=0.60 cfs @ 12.09 hrs HW=181.74' (Free Discharge)
↳**1=Culvert** (Inlet Controls 0.60 cfs @ 1.79 fps)

Pond 10P: (new Pond)



Summary for Pond 11P: (new Pond)

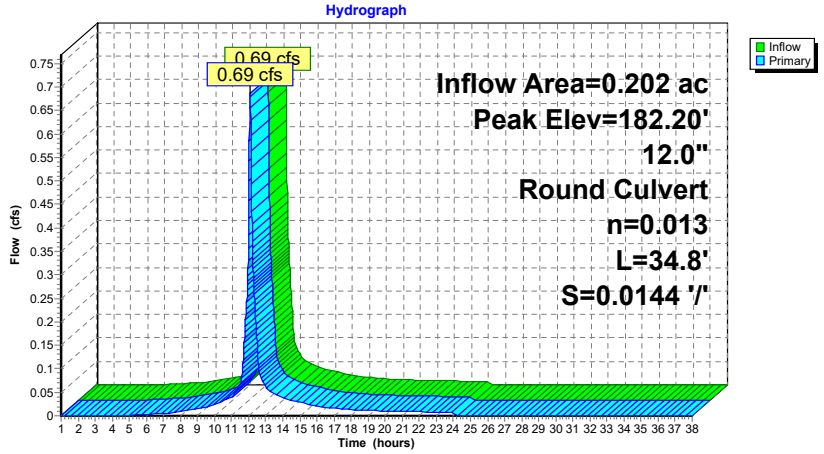
Inflow Area = 0.202 ac, 65.25% Impervious, Inflow Depth = 3.00" for 10-Year event
Inflow = 0.69 cfs @ 12.09 hrs, Volume= 0.051 af
Outflow = 0.69 cfs @ 12.09 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.0 min
Primary = 0.69 cfs @ 12.09 hrs, Volume= 0.051 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 182.20' @ 12.09 hrs
Flood Elev= 184.22'

Device	Routing	Invert	Outlet Devices
#1	Primary	181.72'	**12.0" Round Culvert** L= 34.8' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 181.72' / 181.22' S= 0.0144 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.79 sf

Primary OutFlow Max=0.68 cfs @ 12.09 hrs HW=182.20' (Free Discharge)
1=Culvert (Inlet Controls 0.68 cfs @ 1.86 fps)

Pond 11P: (new Pond)



Summary for Pond 12P: (new Pond)

[57] Hint: Peaked at 179.10' (Flood elevation advised)
[79] Warning: Submerged Pond 6P Primary device # 1 OUTLET by 0.24'

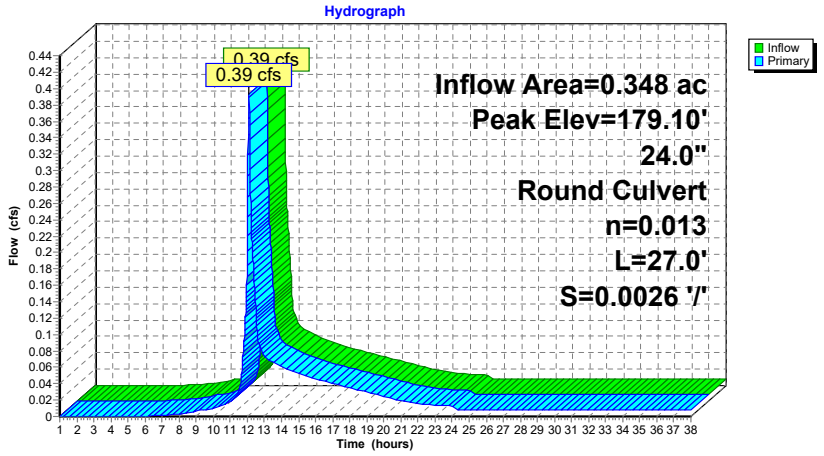
Inflow Area = 0.348 ac, 62.69% Impervious, Inflow Depth > 2.09" for 10-Year event
Inflow = 0.39 cfs @ 12.09 hrs, Volume= 0.061 af
Outflow = 0.39 cfs @ 12.09 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
Primary = 0.39 cfs @ 12.09 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 179.10' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.76'	**24.0" Round Culvert** L= 27.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 178.76' / 178.69' S= 0.0026 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.39 cfs @ 12.09 hrs HW=179.10' (Free Discharge)
1=Culvert (Barrel Controls 0.39 cfs @ 1.70 fps)

Pond 12P: (new Pond)



Summary for Pond 13P: (new Pond)

[57] Hint: Peaked at 178.97' (Flood elevation advised)
[79] Warning: Submerged Pond 12P Primary device # 1 INLET by 0.21'

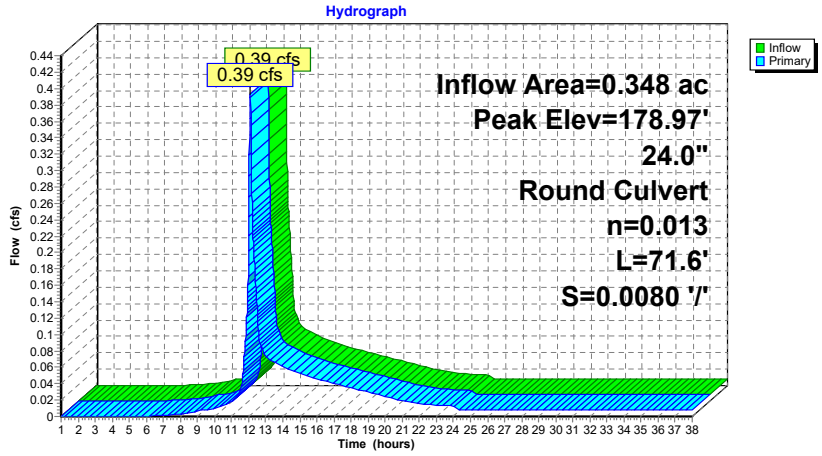
Inflow Area = 0.348 ac, 62.69% Impervious, Inflow Depth > 2.09" for 10-Year event
Inflow = 0.39 cfs @ 12.09 hrs, Volume= 0.061 af
Outflow = 0.39 cfs @ 12.09 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
Primary = 0.39 cfs @ 12.09 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 178.97' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.69'	**24.0" Round Culvert** L= 71.6' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 178.69' / 178.12' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.39 cfs @ 12.09 hrs HW=178.97' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.39 cfs @ 1.43 fps)

Pond 13P: (new Pond)



Summary for Pond 14P: (new Pond)

Inflow Area = 0.158 ac, 90.57% Impervious, Inflow Depth > 2.56" for 10-Year event
Inflow = 0.30 cfs @ 12.21 hrs, Volume= 0.034 af
Outflow = 0.03 cfs @ 13.81 hrs, Volume= 0.033 af, Atten= 89%, Lag= 96.0 min
Primary = 0.03 cfs @ 13.81 hrs, Volume= 0.033 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 183.83' @ 13.81 hrs Surf.Area= 0.018 ac Storage= 0.008 af

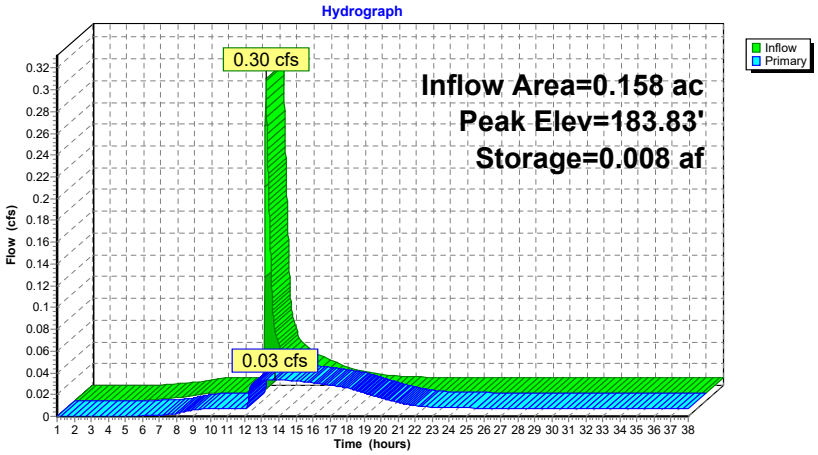
Plug-Flow detention time= 105.9 min calculated for 0.033 af (98% of inflow)
Center-of-Mass det. time= 84.3 min (1,199.1 - 1,114.7)

Volume	Invert	Avail.Storage	Storage Description
#1	183.00'	0.024 af	**16.75'W x 46.03'L x 4.50'H Prismatoid** 0.080 af Overall - 0.019 af Embedded = 0.061 af x 40.0% Voids
#2	183.50'	0.019 af	**ADS_StormTech SC-740 +Cap** x 18 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 3 Rows of 6 Chambers
		0.043 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	183.00'	**15.0" Round Culvert** L= 32.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 183.00' / 182.84' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	183.00'	**1.2" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.03 cfs @ 13.81 hrs HW=183.83' (Free Discharge)
└**1=Culvert** (Passes 0.03 cfs of 1.82 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.03 cfs @ 4.25 fps)

Pond 14P: (new Pond)



Summary for Pond 15P: (new Pond)

Inflow Area = 0.158 ac, 90.57% Impervious, Inflow Depth = 3.00" for 10-Year event
Inflow = 0.54 cfs @ 12.09 hrs, Volume= 0.040 af
Outflow = 0.30 cfs @ 12.21 hrs, Volume= 0.034 af, Atten= 45%, Lag= 7.3 min
Primary = 0.30 cfs @ 12.21 hrs, Volume= 0.034 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 194.05' @ 12.21 hrs Surf.Area= 645 sf Storage= 677 cf

Plug-Flow detention time= 387.1 min calculated for 0.034 af (85% of inflow)
Center-of-Mass det. time= 323.7 min (1,114.7 - 791.0)

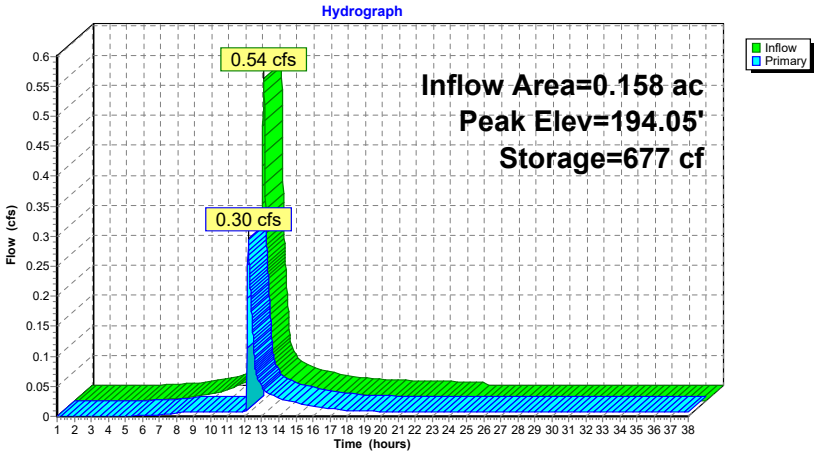
Volume	Invert	Avail.Storage	Storage Description
#1	193.00'	1,290 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
193.00	645	0	0
194.00	645	645	645
195.00	645	645	1,290

Device	Routing	Invert	Outlet Devices
#1	Primary	188.00'	**12.0" Round Culvert** L= 50.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 188.00' / 187.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	193.00'	**0.500 in/hr Exfiltration over Horizontal area**
#3	Device 1	194.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.29 cfs @ 12.21 hrs HW=194.05' (Free Discharge)
└**1=Culvert** (Passes 0.29 cfs of 7.03 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)
└**3=Orifice/Grate** (Weir Controls 0.28 cfs @ 0.72 fps)

Pond 15P: (new Pond)



Time span=1.00-38.00 hrs, dt=0.01 hrs, 3701 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PDA-1: PDA-1 Runoff Area=464 sf 45.04% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=94 Runoff=0.07 cfs 0.005 af

Subcatchment PDA-10: PDA-10 Runoff Area=4,882 sf 52.09% Impervious Runoff Depth=5.19"
Tc=6.0 min CN=88 Runoff=0.65 cfs 0.048 af

Subcatchment PDA-2: PDA-2 Runoff Area=1,414 sf 15.06% Impervious Runoff Depth=4.74"
Tc=6.0 min CN=84 Runoff=0.18 cfs 0.013 af

Subcatchment PDA-3: PDA-3 Runoff Area=8,796 sf 65.25% Impervious Runoff Depth=5.64"
Tc=6.0 min CN=92 Runoff=1.24 cfs 0.095 af

Subcatchment PDA-4: PDA-4 Runoff Area=6,885 sf 90.57% Impervious Runoff Depth=5.64"
Tc=6.0 min CN=92 Runoff=0.97 cfs 0.074 af

Subcatchment PDA-5: PDA-5 Runoff Area=7,877 sf 63.06% Impervious Runoff Depth=5.53"
Tc=6.0 min CN=91 Runoff=1.10 cfs 0.083 af

Subcatchment PDA-6: PDA-6 Runoff Area=29,013 sf 63.93% Impervious Runoff Depth=5.64"
Tc=6.0 min CN=92 Runoff=4.10 cfs 0.313 af

Subcatchment PDA-7: PDA-7 Runoff Area=36,457 sf 80.95% Impervious Runoff Depth=5.87"
Tc=6.0 min CN=94 Runoff=5.26 cfs 0.410 af

Subcatchment PDA-8: PDA-8 Runoff Area=3,362 sf 51.16% Impervious Runoff Depth=4.52"
Tc=6.0 min CN=82 Runoff=0.40 cfs 0.029 af

Subcatchment PDA-9: PDA-9 Runoff Area=4,929 sf 31.61% Impervious Runoff Depth=3.68"
Tc=6.0 min CN=74 Runoff=0.49 cfs 0.035 af

Reach DP1: Design Point 1 Inflow=4.17 cfs 0.376 af
Outflow=4.17 cfs 0.376 af

Reach DP2: Design Point 2 Inflow=9.37 cfs 0.723 af
Outflow=9.37 cfs 0.723 af

Pond 2P: (new Pond) Peak Elev=180.32' Inflow=0.40 cfs 0.029 af
12.0" Round Culvert n=0.013 L=107.7' S=0.0030 '/' Outflow=0.40 cfs 0.029 af

Pond 3P: (new Pond) Peak Elev=180.04' Inflow=0.89 cfs 0.064 af
24.0" Round Culvert n=0.013 L=57.0' S=0.0049 '/' Outflow=0.89 cfs 0.064 af

Pond 6P: (new Pond) Peak Elev=179.61' Inflow=0.89 cfs 0.064 af
24.0" Round Culvert n=0.013 L=95.0' S=0.0025 '/' Outflow=0.89 cfs 0.064 af

Pond 7P: (new Pond) Peak Elev=179.11' Inflow=4.17 cfs 0.376 af
24.0" Round Culvert n=0.013 L=77.7' S=0.0069 '/' Outflow=4.17 cfs 0.376 af

Pond 8P: (new Pond) Peak Elev=184.43' Inflow=0.65 cfs 0.048 af
15.0" Round Culvert n=0.013 L=53.2' S=0.0372 '/' Outflow=0.65 cfs 0.048 af

Pond 9P: (new Pond) Peak Elev=182.25' Inflow=3.18 cfs 0.239 af
12.0" Round Culvert n=0.013 L=37.9' S=0.0230 '/' Outflow=3.18 cfs 0.239 af

Pond 10P: (new Pond) Peak Elev=181.93' Inflow=1.10 cfs 0.083 af
12.0" Round Culvert n=0.013 L=50.1' S=0.0136 '/' Outflow=1.10 cfs 0.083 af

Pond 11P: (new Pond) Peak Elev=182.39' Inflow=1.24 cfs 0.095 af
12.0" Round Culvert n=0.013 L=34.8' S=0.0144 '/' Outflow=1.24 cfs 0.095 af

Pond 12P: (new Pond) Peak Elev=179.28' Inflow=0.93 cfs 0.131 af
24.0" Round Culvert n=0.013 L=27.0' S=0.0026 '/' Outflow=0.93 cfs 0.131 af

Pond 13P: (new Pond) Peak Elev=179.13' Inflow=0.93 cfs 0.131 af
24.0" Round Culvert n=0.013 L=71.6' S=0.0080 '/' Outflow=0.93 cfs 0.131 af

Pond 14P: (new Pond) Peak Elev=185.62' Storage=0.030 af Inflow=0.96 cfs 0.068 af
Outflow=0.06 cfs 0.067 af

Pond 15P: (new Pond) Peak Elev=194.11' Storage=716 cf Inflow=0.97 cfs 0.074 af
Outflow=0.96 cfs 0.068 af

Total Runoff Area = 2.389 ac Runoff Volume = 1.105 af Average Runoff Depth = 5.55"
31.55% Pervious = 0.754 ac 68.45% Impervious = 1.636 ac

Summary for Subcatchment PDA-1: PDA-1

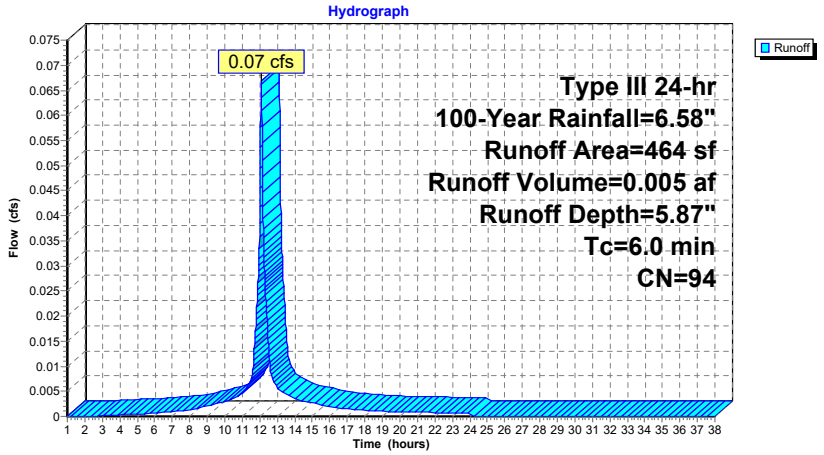
Runoff = 0.07 cfs @ 12.08 hrs, Volume= 0.005 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
209	98	Paved parking, HSG D
165	96	Gravel surface, HSG D
0	61	>75% Grass cover, Good, HSG B
90	80	>75% Grass cover, Good, HSG D
464	94	Weighted Average
255		54.96% Pervious Area
209		45.04% Impervious Area

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

Subcatchment PDA-1: PDA-1



Summary for Subcatchment PDA-10: PDA-10

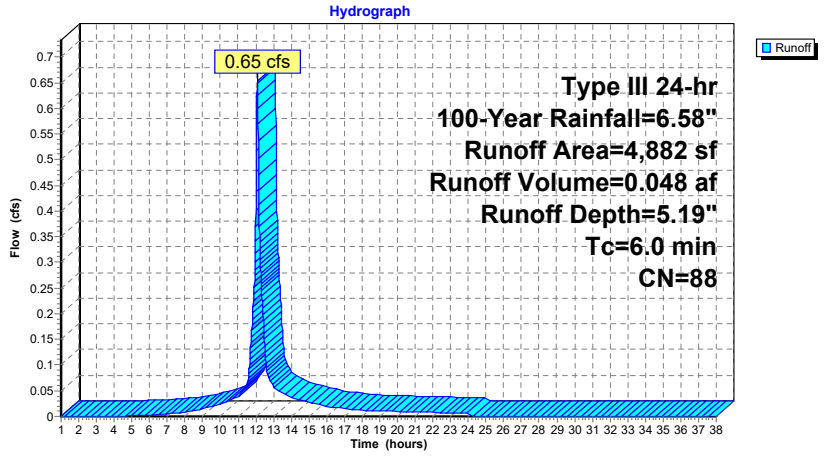
Runoff = 0.65 cfs @ 12.08 hrs, Volume= 0.048 af, Depth= 5.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
2,543	98	Paved parking, HSG D
392	96	Gravel surface, HSG D
798	61	>75% Grass cover, Good, HSG B
1,149	80	>75% Grass cover, Good, HSG D
4,882	88	Weighted Average
2,339		47.91% Pervious Area
2,543		52.09% Impervious Area

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

Subcatchment PDA-10: PDA-10



Summary for Subcatchment PDA-2: PDA-2

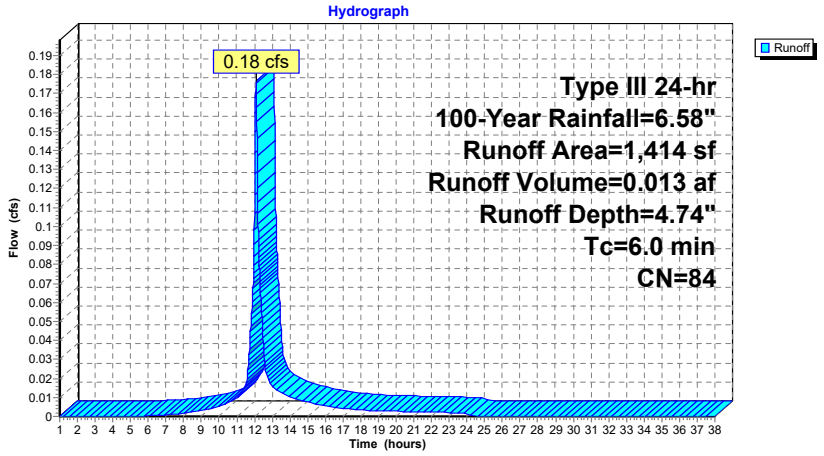
Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 4.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
213	98	Paved parking, HSG D
119	96	Gravel surface, HSG D
0	61	>75% Grass cover, Good, HSG B
1,082	80	>75% Grass cover, Good, HSG D
1,414	84	Weighted Average
1,201		84.94% Pervious Area
213		15.06% Impervious Area

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

Subcatchment PDA-2: PDA-2



Summary for Subcatchment PDA-3: PDA-3

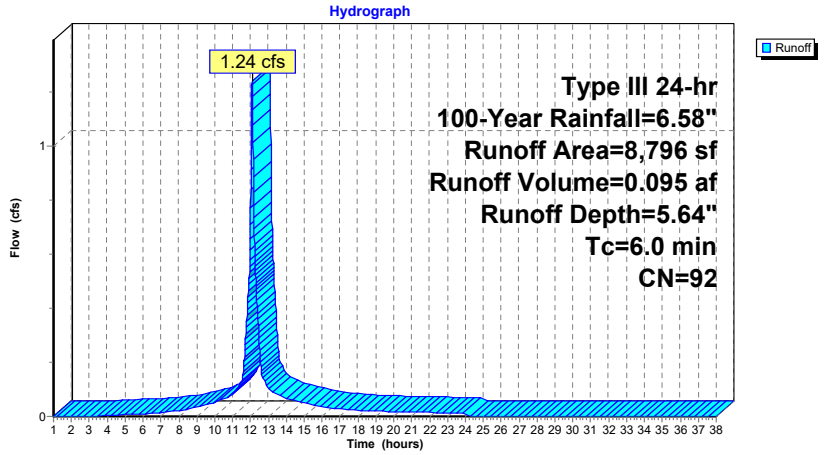
Runoff = 1.24 cfs @ 12.08 hrs, Volume= 0.095 af, Depth= 5.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
5,739	98	Paved parking, HSG D
106	96	Gravel surface, HSG D
0	61	>75% Grass cover, Good, HSG B
2,951	80	>75% Grass cover, Good, HSG D
8,796	92	Weighted Average
3,057		34.75% Pervious Area
5,739		65.25% Impervious Area

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

Subcatchment PDA-3: PDA-3



Summary for Subcatchment PDA-4: PDA-4

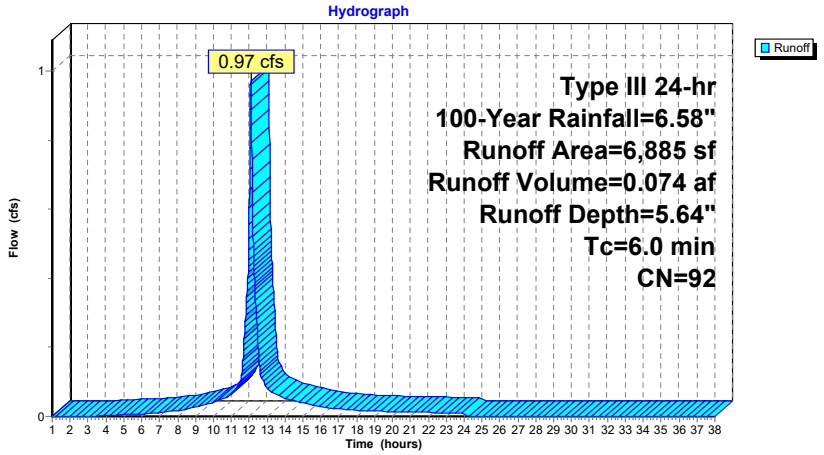
Runoff = 0.97 cfs @ 12.08 hrs, Volume= 0.074 af, Depth= 5.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
6,236	98	Unconnected roofs, HSG D
649	39	>75% Grass cover, Good, HSG A
6,885	92	Weighted Average
649		9.43% Pervious Area
6,236		90.57% Impervious Area
6,236		100.00% Unconnected

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

Subcatchment PDA-4: PDA-4



Summary for Subcatchment PDA-5: PDA-5

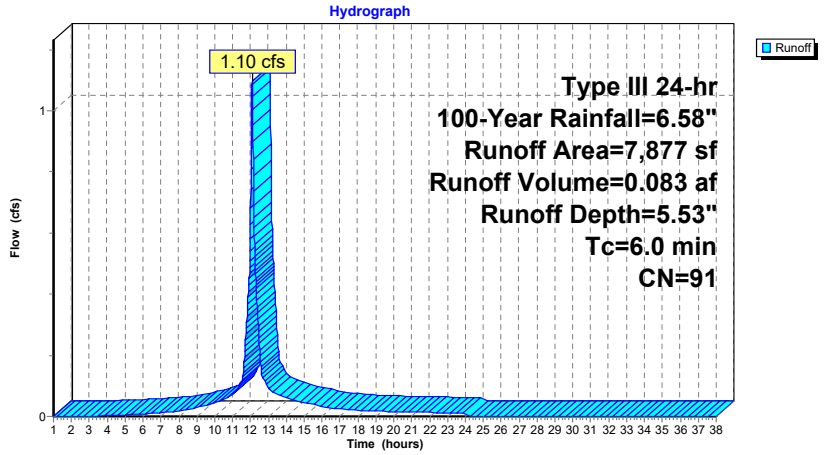
Runoff = 1.10 cfs @ 12.08 hrs, Volume= 0.083 af, Depth= 5.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
4,967	98	Paved parking, HSG D
115	96	Gravel surface, HSG D
237	61	>75% Grass cover, Good, HSG B
2,558	80	>75% Grass cover, Good, HSG D
7,877	91	Weighted Average
2,910		36.94% Pervious Area
4,967		63.06% Impervious Area

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

Subcatchment PDA-5: PDA-5



Summary for Subcatchment PDA-6: PDA-6

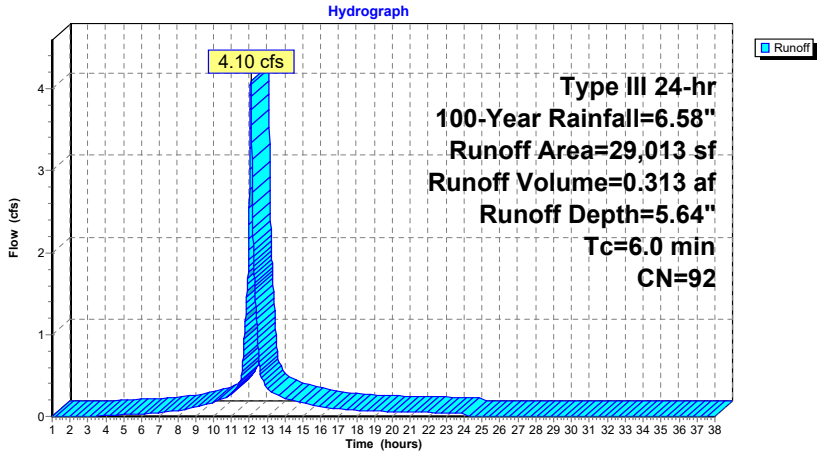
Runoff = 4.10 cfs @ 12.08 hrs, Volume= 0.313 af, Depth= 5.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
18,548	98	Paved parking, HSG D
118	96	Gravel surface, HSG D
51	61	>75% Grass cover, Good, HSG B
10,296	80	>75% Grass cover, Good, HSG D
29,013	92	Weighted Average
10,465		36.07% Pervious Area
18,548		63.93% Impervious Area

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

Subcatchment PDA-6: PDA-6



Summary for Subcatchment PDA-7: PDA-7

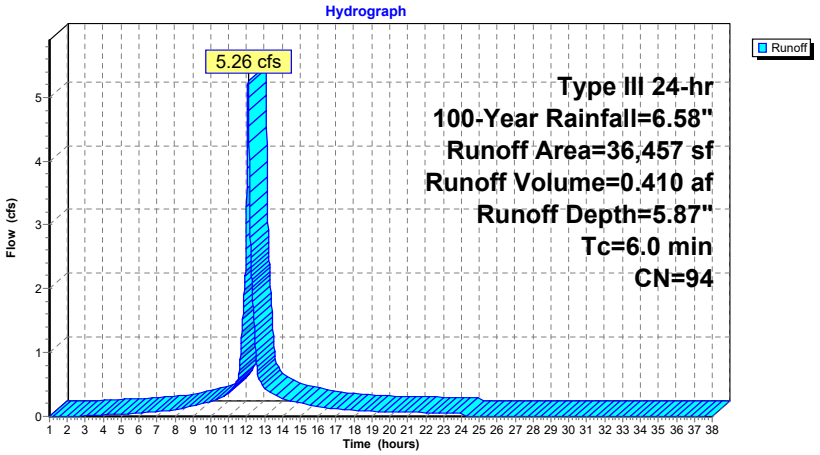
Runoff = 5.26 cfs @ 12.08 hrs, Volume= 0.410 af, Depth= 5.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
29,513	98	Paved parking, HSG D
49	96	Gravel surface, HSG D
1,834	61	>75% Grass cover, Good, HSG B
5,061	80	>75% Grass cover, Good, HSG D
36,457	94	Weighted Average
6,944		19.05% Pervious Area
29,513		80.95% Impervious Area

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

Subcatchment PDA-7: PDA-7



Summary for Subcatchment PDA-8: PDA-8

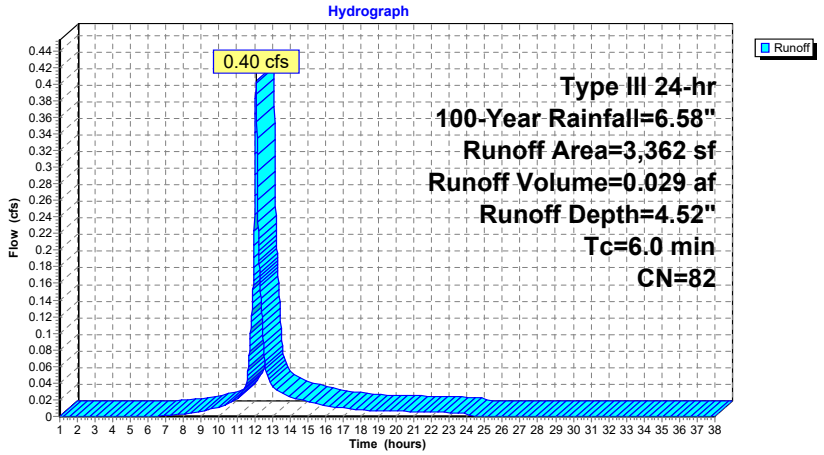
Runoff = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af, Depth= 4.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
1,720	98	Paved parking, HSG D
244	96	Gravel surface, HSG D
1,398	61	>75% Grass cover, Good, HSG B
0	80	>75% Grass cover, Good, HSG D
3,362	82	Weighted Average
1,642		48.84% Pervious Area
1,720		51.16% Impervious Area

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

Subcatchment PDA-8: PDA-8



Summary for Subcatchment PDA-9: PDA-9

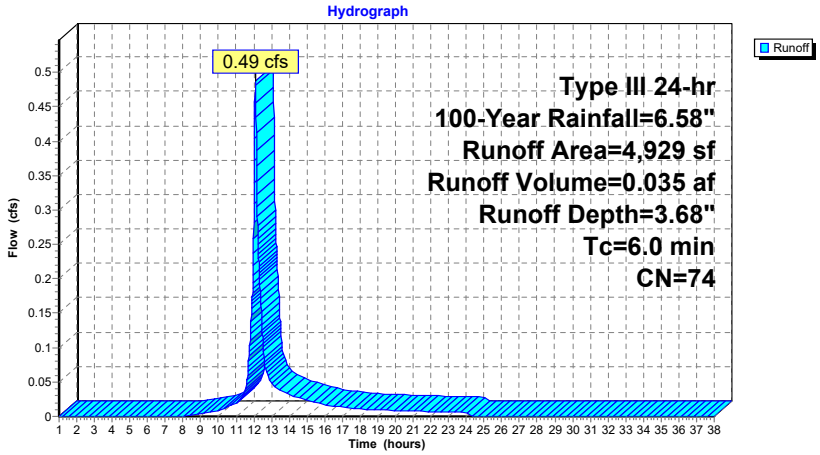
Runoff = 0.49 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=6.58"

Area (sf)	CN	Description
1,558	98	Paved parking, HSG D
131	96	Gravel surface, HSG D
3,240	61	>75% Grass cover, Good, HSG B
0	80	>75% Grass cover, Good, HSG D
4,929	74	Weighted Average
3,371		68.39% Pervious Area
1,558		31.61% Impervious Area

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

Subcatchment PDA-9: PDA-9



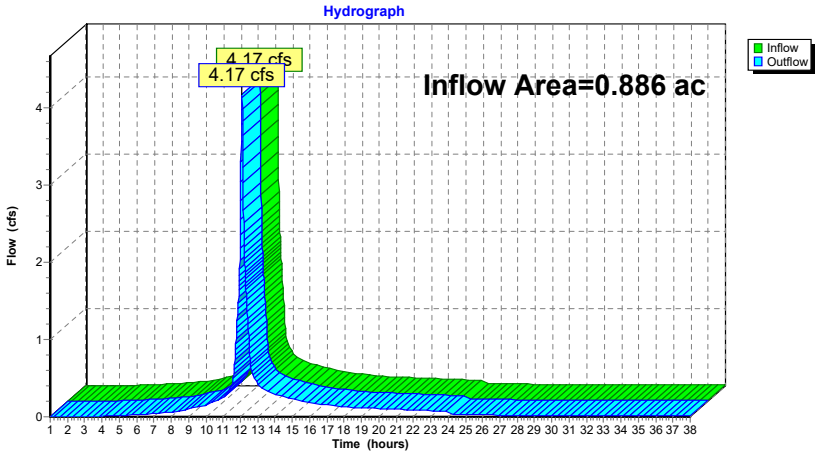
Summary for Reach DP1: Design Point 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.886 ac, 60.05% Impervious, Inflow Depth > 5.09" for 100-Year event
Inflow = 4.17 cfs @ 12.09 hrs, Volume= 0.376 af
Outflow = 4.17 cfs @ 12.09 hrs, Volume= 0.376 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs

Reach DP1: Design Point 1



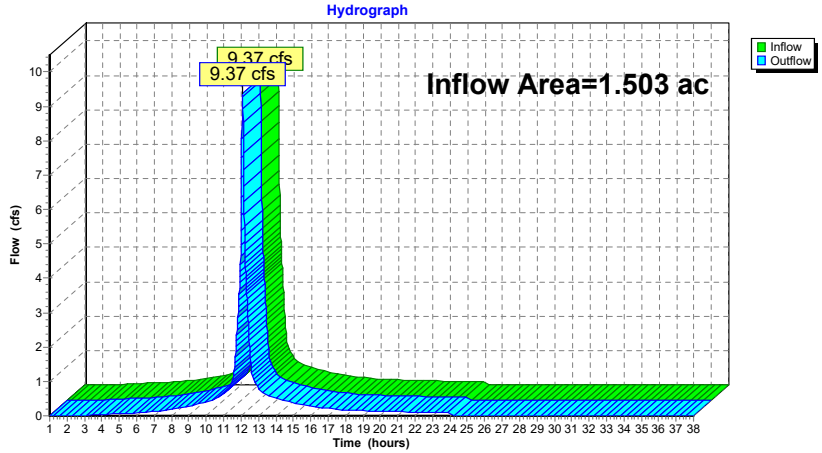
Summary for Reach DP2: Design Point 2

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.503 ac, 73.41% Impervious, Inflow Depth = 5.77" for 100-Year event
Inflow = 9.37 cfs @ 12.08 hrs, Volume= 0.723 af
Outflow = 9.37 cfs @ 12.08 hrs, Volume= 0.723 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs

Reach DP2: Design Point 2



Summary for Pond 2P: (new Pond)

[57] Hint: Peaked at 180.32' (Flood elevation advised)

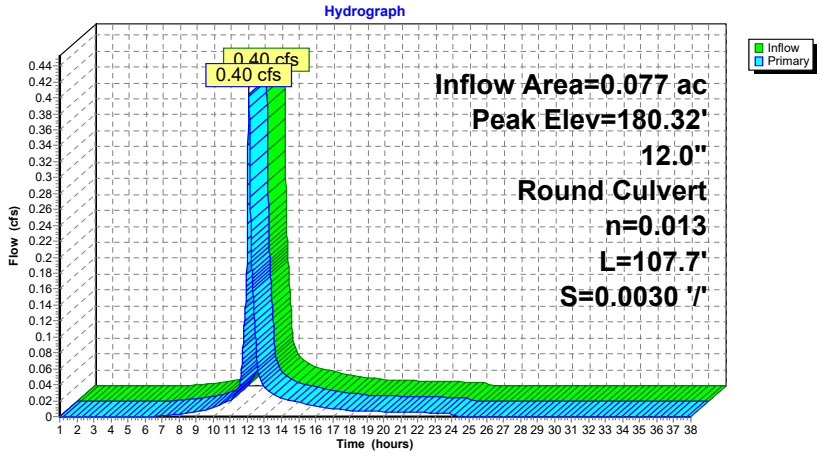
Inflow Area = 0.077 ac, 51.16% Impervious, Inflow Depth = 4.52" for 100-Year event
Inflow = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af
Outflow = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min
Primary = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 180.32' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	179.90'	**12.0" Round Culvert** L= 107.7' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.90' / 179.58' S= 0.0030 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.40 cfs @ 12.09 hrs HW=180.32' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.40 cfs @ 1.93 fps)

Pond 2P: (new Pond)



Summary for Pond 3P: (new Pond)

[79] Warning: Submerged Pond 2P Primary device # 1 INLET by 0.14'

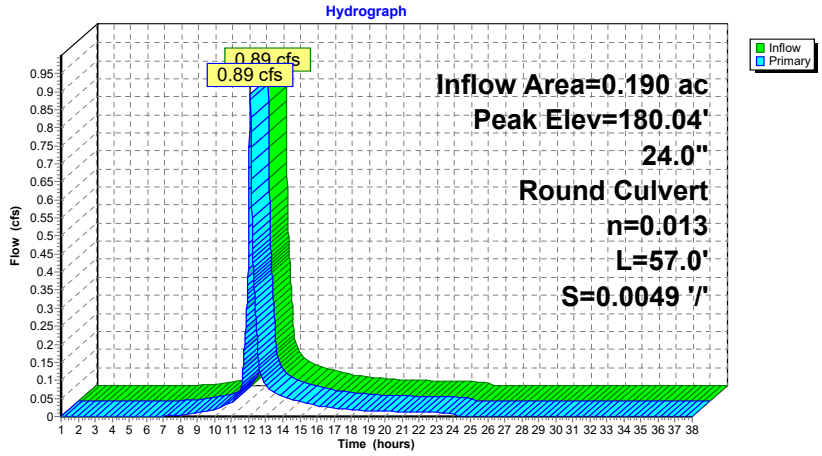
Inflow Area = 0.190 ac, 39.54% Impervious, Inflow Depth = 4.02" for 100-Year event
Inflow = 0.89 cfs @ 12.09 hrs, Volume= 0.064 af
Outflow = 0.89 cfs @ 12.09 hrs, Volume= 0.064 af, Atten= 0%, Lag= 0.0 min
Primary = 0.89 cfs @ 12.09 hrs, Volume= 0.064 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 180.04' @ 12.09 hrs
Flood Elev= 189.68'

Device	Routing	Invert	Outlet Devices
#1	Primary	179.58'	**24.0" Round Culvert** L= 57.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.58' / 179.30' S= 0.0049 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.88 cfs @ 12.09 hrs HW=180.04' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.88 cfs @ 2.47 fps)

Pond 3P: (new Pond)



Summary for Pond 6P: (new Pond)

[79] Warning: Submerged Pond 3P Primary device # 1 INLET by 0.03'

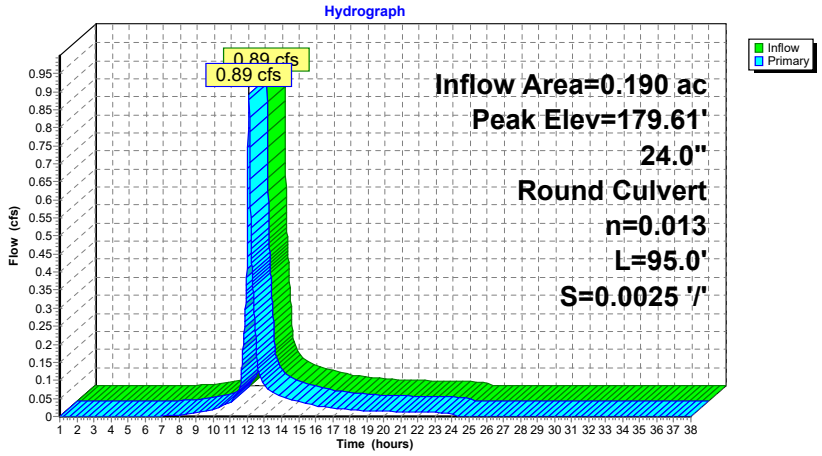
Inflow Area = 0.190 ac, 39.54% Impervious, Inflow Depth = 4.02" for 100-Year event
Inflow = 0.89 cfs @ 12.09 hrs, Volume= 0.064 af
Outflow = 0.89 cfs @ 12.09 hrs, Volume= 0.064 af, Atten= 0%, Lag= 0.0 min
Primary = 0.89 cfs @ 12.09 hrs, Volume= 0.064 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 179.61' @ 12.09 hrs
Flood Elev= 189.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	179.10'	**24.0" Round Culvert** L= 95.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 179.10' / 178.86' S= 0.0025 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.89 cfs @ 12.09 hrs HW=179.61' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.89 cfs @ 2.13 fps)

Pond 6P: (new Pond)



Summary for Pond 7P: (new Pond)

[57] Hint: Peaked at 179.11' (Flood elevation advised)
[79] Warning: Submerged Pond 13P Primary device # 1 INLET by 0.42'

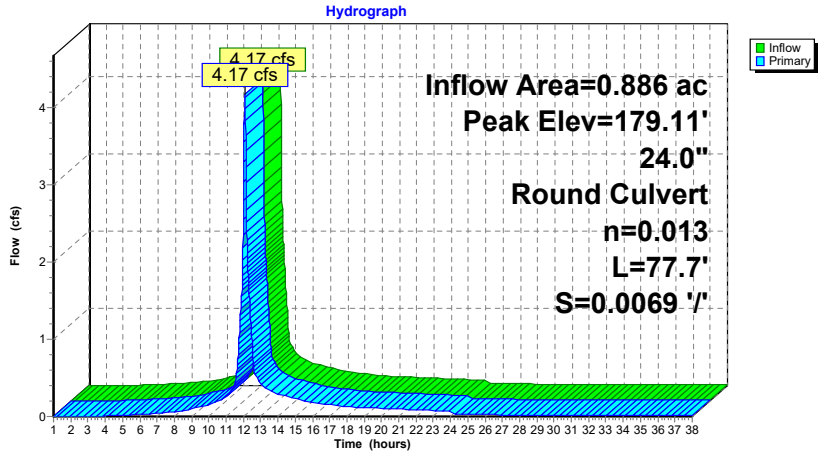
Inflow Area = 0.886 ac, 60.05% Impervious, Inflow Depth > 5.09" for 100-Year event
Inflow = 4.17 cfs @ 12.09 hrs, Volume= 0.376 af
Outflow = 4.17 cfs @ 12.09 hrs, Volume= 0.376 af, Atten= 0%, Lag= 0.0 min
Primary = 4.17 cfs @ 12.09 hrs, Volume= 0.376 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 179.11' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.12'	**24.0" Round Culvert** L= 77.7' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 178.12' / 177.58' S= 0.0069 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 3.14 sf

Primary OutFlow Max=4.17 cfs @ 12.09 hrs HW=179.11' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.17 cfs @ 2.68 fps)

Pond 7P: (new Pond)



Summary for Pond 8P: (new Pond)

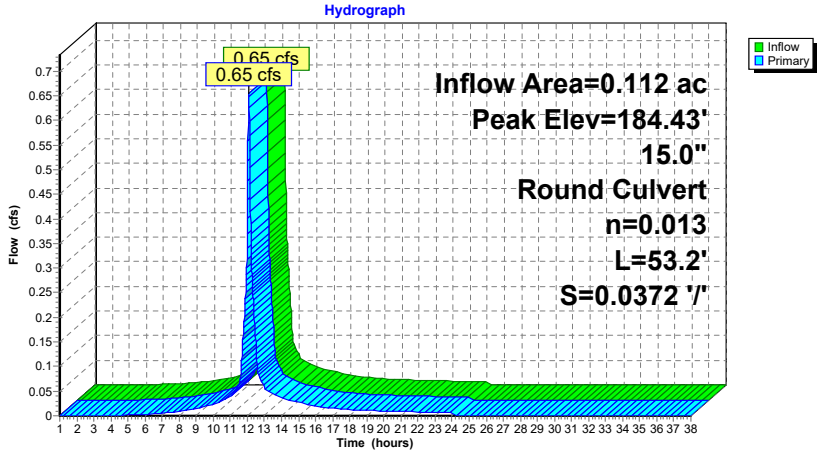
Inflow Area = 0.112 ac, 52.09% Impervious, Inflow Depth = 5.19" for 100-Year event
Inflow = 0.65 cfs @ 12.08 hrs, Volume= 0.048 af
Outflow = 0.65 cfs @ 12.08 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.0 min
Primary = 0.65 cfs @ 12.08 hrs, Volume= 0.048 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 184.43' @ 12.08 hrs
Flood Elev= 187.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	184.00'	**15.0" Round Culvert** L= 53.2' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 184.00' / 182.02' S= 0.0372 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 1.23 sf

Primary OutFlow Max=0.65 cfs @ 12.08 hrs HW=184.43' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.65 cfs @ 1.76 fps)

Pond 8P: (new Pond)



Summary for Pond 9P: (new Pond)

[57] Hint: Peaked at 182.25' (Flood elevation advised)
[79] Warning: Submerged Pond 8P Primary device # 1 OUTLET by 0.23'
[81] Warning: Exceeded Pond 10P by 0.32' @ 12.08 hrs
[79] Warning: Submerged Pond 11P Primary device # 1 INLET by 0.53'

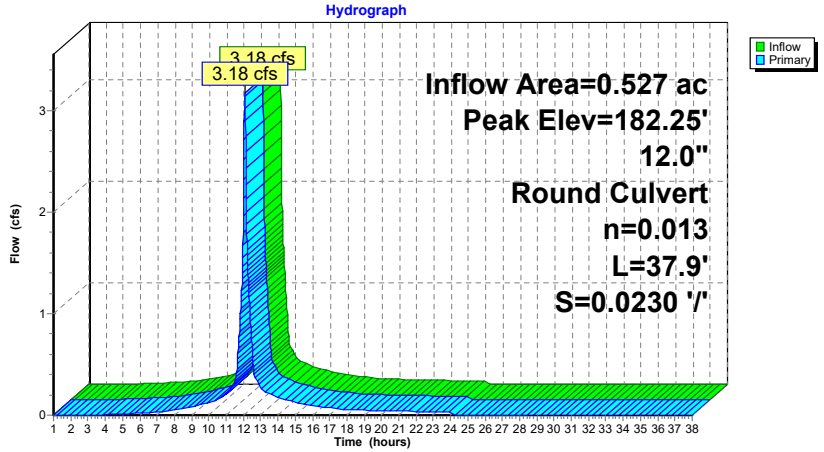
Inflow Area = 0.527 ac, 58.61% Impervious, Inflow Depth = 5.45" for 100-Year event
Inflow = 3.18 cfs @ 12.08 hrs, Volume= 0.239 af
Outflow = 3.18 cfs @ 12.08 hrs, Volume= 0.239 af, Atten= 0%, Lag= 0.0 min
Primary = 3.18 cfs @ 12.08 hrs, Volume= 0.239 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 182.25' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	180.62'	**12.0" Round Culvert** L= 37.9' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 180.62' / 179.75' S= 0.0230 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Primary OutFlow Max=3.17 cfs @ 12.08 hrs HW=182.25' (Free Discharge)
1=Culvert (Inlet Controls 3.17 cfs @ 4.04 fps)

Pond 9P: (new Pond)



Summary for Pond 10P: (new Pond)

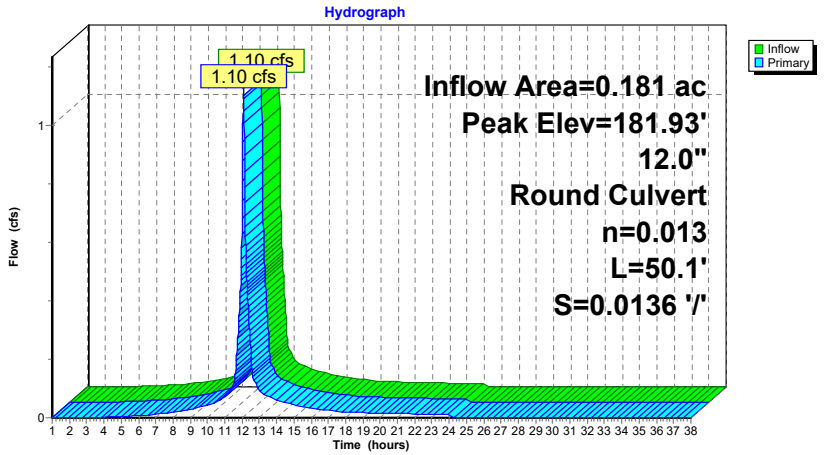
Inflow Area = 0.181 ac, 63.06% Impervious, Inflow Depth = 5.53" for 100-Year event
Inflow = 1.10 cfs @ 12.08 hrs, Volume= 0.083 af
Outflow = 1.10 cfs @ 12.08 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.0 min
Primary = 1.10 cfs @ 12.08 hrs, Volume= 0.083 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 181.93' @ 12.08 hrs
Flood Elev= 184.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	181.30'	**12.0" Round Culvert** L= 50.1' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 181.30' / 180.62' S= 0.0136 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.79 sf

Primary OutFlow Max=1.10 cfs @ 12.08 hrs HW=181.93' (Free Discharge)
1=Culvert (Inlet Controls 1.10 cfs @ 2.13 fps)

Pond 10P: (new Pond)



Summary for Pond 11P: (new Pond)

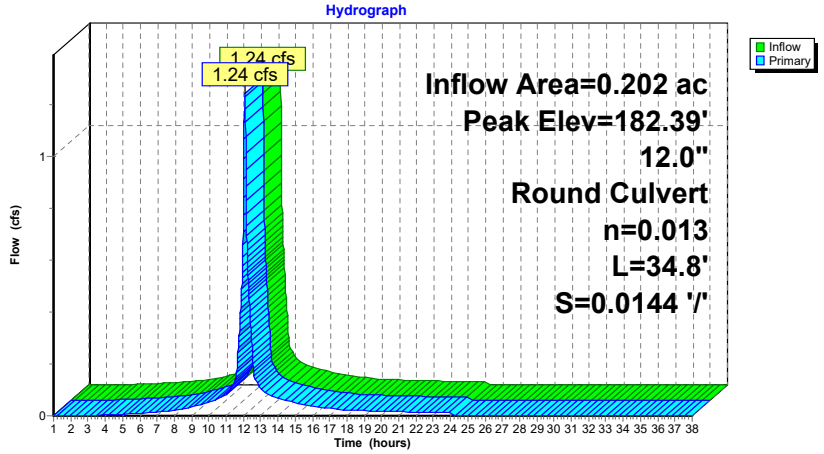
Inflow Area = 0.202 ac, 65.25% Impervious, Inflow Depth = 5.64" for 100-Year event
Inflow = 1.24 cfs @ 12.08 hrs, Volume= 0.095 af
Outflow = 1.24 cfs @ 12.08 hrs, Volume= 0.095 af, Atten= 0%, Lag= 0.0 min
Primary = 1.24 cfs @ 12.08 hrs, Volume= 0.095 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 182.39' @ 12.08 hrs
Flood Elev= 184.22'

Device	Routing	Invert	Outlet Devices
#1	Primary	181.72'	**12.0" Round Culvert** L= 34.8' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 181.72' / 181.22' S= 0.0144 '/' Cc= 0.900 n= 0.013 Clay tile, Flow Area= 0.79 sf

Primary OutFlow Max=1.24 cfs @ 12.08 hrs HW=182.39' (Free Discharge)
1=Culvert (Inlet Controls 1.24 cfs @ 2.21 fps)

Pond 11P: (new Pond)



Summary for Pond 12P: (new Pond)

[57] Hint: Peaked at 179.28' (Flood elevation advised)
[79] Warning: Submerged Pond 6P Primary device # 1 INLET by 0.18'

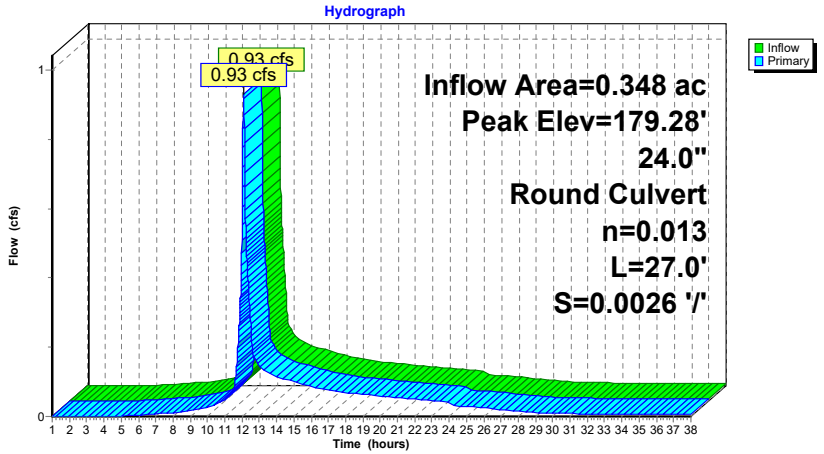
Inflow Area = 0.348 ac, 62.69% Impervious, Inflow Depth > 4.52" for 100-Year event
Inflow = 0.93 cfs @ 12.09 hrs, Volume= 0.131 af
Outflow = 0.93 cfs @ 12.09 hrs, Volume= 0.131 af, Atten= 0%, Lag= 0.0 min
Primary = 0.93 cfs @ 12.09 hrs, Volume= 0.131 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 179.28' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.76'	**24.0" Round Culvert** L= 27.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 178.76' / 178.69' S= 0.0026 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.93 cfs @ 12.09 hrs HW=179.28' (Free Discharge)
1=Culvert (Barrel Controls 0.93 cfs @ 2.14 fps)

Pond 12P: (new Pond)



Summary for Pond 13P: (new Pond)

[57] Hint: Peaked at 179.13' (Flood elevation advised)
[79] Warning: Submerged Pond 12P Primary device # 1 INLET by 0.37'

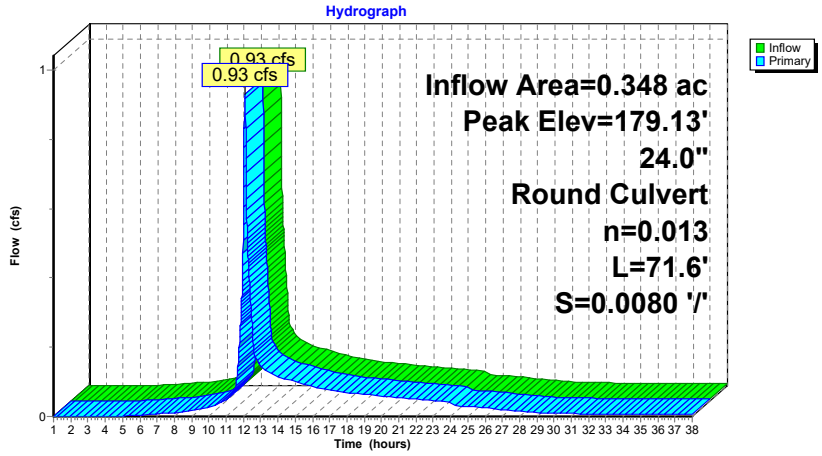
Inflow Area = 0.348 ac, 62.69% Impervious, Inflow Depth > 4.52" for 100-Year event
Inflow = 0.93 cfs @ 12.09 hrs, Volume= 0.131 af
Outflow = 0.93 cfs @ 12.09 hrs, Volume= 0.131 af, Atten= 0%, Lag= 0.0 min
Primary = 0.93 cfs @ 12.09 hrs, Volume= 0.131 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 179.13' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	178.69'	**24.0" Round Culvert** L= 71.6' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 178.69' / 178.12' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=0.93 cfs @ 12.09 hrs HW=179.13' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.93 cfs @ 1.79 fps)

Pond 13P: (new Pond)



Summary for Pond 14P: (new Pond)

Inflow Area = 0.158 ac, 90.57% Impervious, Inflow Depth > 5.17" for 100-Year event
Inflow = 0.96 cfs @ 12.10 hrs, Volume= 0.068 af
Outflow = 0.06 cfs @ 13.72 hrs, Volume= 0.067 af, Atten= 94%, Lag= 97.4 min
Primary = 0.06 cfs @ 13.72 hrs, Volume= 0.067 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 185.62' @ 13.72 hrs Surf.Area= 0.018 ac Storage= 0.030 af

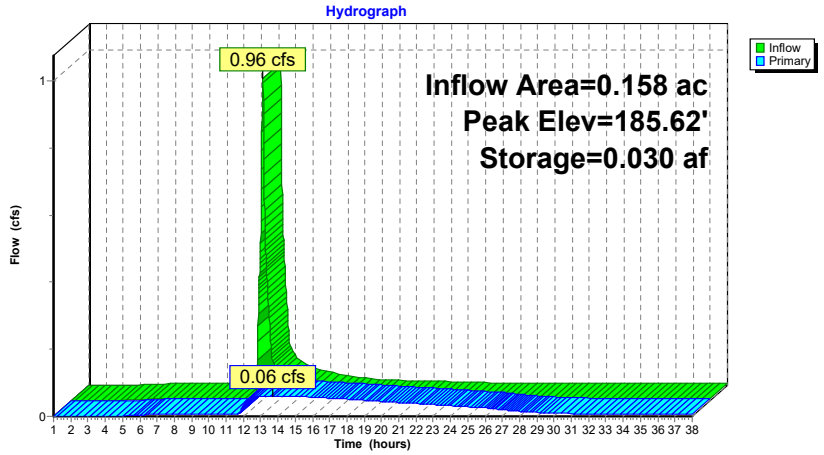
Plug-Flow detention time= 235.7 min calculated for 0.067 af (99% of inflow)
Center-of-Mass det. time= 223.5 min (1,169.0 - 945.5)

Volume	Invert	Avail.Storage	Storage Description
#1	183.00'	0.024 af	**16.75'W x 46.03'L x 4.50'H Prismatoid** 0.080 af Overall - 0.019 af Embedded = 0.061 af x 40.0% Voids
#2	183.50'	0.019 af	**ADS_StormTech SC-740 +Cap** x 18 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 3 Rows of 6 Chambers
		0.043 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	183.00'	**15.0" Round Culvert** L= 32.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 183.00' / 182.84' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	183.00'	**1.2" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.06 cfs @ 13.72 hrs HW=185.62' (Free Discharge)
└**1=Culvert** (Passes 0.06 cfs of 6.58 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 7.72 fps)

Pond 14P: (new Pond)



Summary for Pond 15P: (new Pond)

Inflow Area = 0.158 ac, 90.57% Impervious, Inflow Depth = 5.64" for 100-Year event
Inflow = 0.97 cfs @ 12.08 hrs, Volume= 0.074 af
Outflow = 0.96 cfs @ 12.10 hrs, Volume= 0.068 af, Atten= 1%, Lag= 0.8 min
Primary = 0.96 cfs @ 12.10 hrs, Volume= 0.068 af

Routing by Stor-Ind method, Time Span= 1.00-38.00 hrs, dt= 0.01 hrs
Peak Elev= 194.11' @ 12.10 hrs Surf.Area= 645 sf Storage= 716 cf

Plug-Flow detention time= 213.8 min calculated for 0.068 af (92% of inflow)
Center-of-Mass det. time= 171.0 min (945.5 - 774.5)

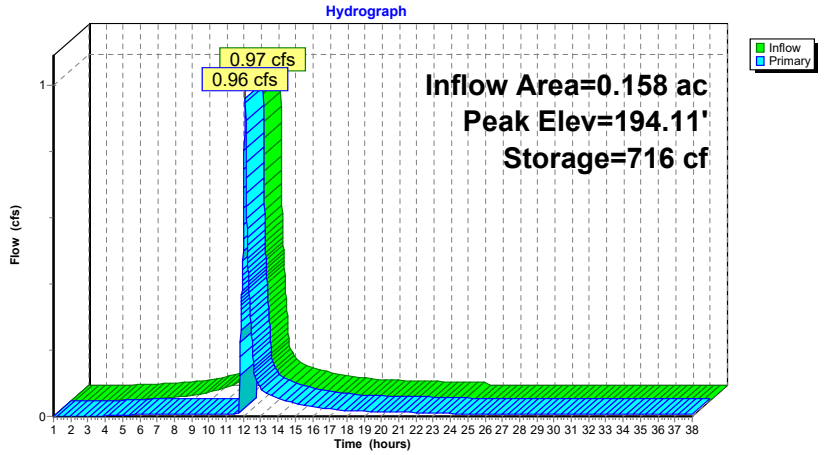
Volume	Invert	Avail.Storage	Storage Description
#1	193.00'	1,290 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
193.00	645	0	0
194.00	645	645	645
195.00	645	645	1,290

Device	Routing	Invert	Outlet Devices
#1	Primary	188.00'	**12.0" Round Culvert** L= 50.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 188.00' / 187.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	193.00'	**0.500 in/hr Exfiltration over Horizontal area**
#3	Device 1	194.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.96 cfs @ 12.10 hrs HW=194.11' (Free Discharge)
- **1=Culvert** (Passes 0.96 cfs of 7.07 cfs potential flow)
  - **2=Exfiltration** (Exfiltration Controls 0.01 cfs)
  - **3=Orifice/Grate** (Weir Controls 0.95 cfs @ 1.08 fps)

Pond 15P: (new Pond)



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Appendix K:
Project Evaluation and Design Calculations

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

Group	Practice	Description	Applicable	Project Specific Evaluation
Preservation of Natural Resources	**Preservation of Undisturbed Areas**	Delineate and place into permanent conservation undisturbed forests, native vegetated areas, riparian corridors, wetlands, and natural terrain.	**N/A**	The project does not propose permanent conservation of this area at this time.
	Preservation of Buffers	Define, delineate and preserve naturally vegetated buffers along perennial streams, rivers, shorelines and wetlands.	**N/A**	There are no perennial streams, rivers, shorelines, or wetlands on or adjacent to the project site. As such, this green planning measure does not apply.
	Reduction of Clearing and Grading	Limit clearing and grading to the minimum amount needed for roads, driveways, foundations, utilities and stormwater management facilities.	**N/A**	As a Redevelopment Project, the majority of the land in question had been previously cleared or graded for construction of the existing buildings, roadways, etc. Site clearing and grading required for redevelopment will be minor in nature. The limits of all proposed clearing will be demarcated in the field with orange construction fencing, prior to construction, to prevent unnecessary removal of trees.
	Locating Development in Less Sensitive Areas	Avoid sensitive resource areas such as floodplains, steep slopes, erodible soils, wetlands, mature forests and critical habitats by locating development to fit the terrain in areas that will create the least impact.	**N/A**	There are no floodplains, steep slopes, erodible soils, wetlands, mature forests and critical habitats located on the project site. As such, this green planning measure does not apply.
	Open Space Design	Use clustering, conservation design or open space design to reduce impervious cover, preserve more open space and protect water resources.	**N/A**	The site layout has been designed to maximize open space. Impervious surfaces have been minimized to the greatest extent practical.
	Soil Restoration	Restore the original properties and porosity of the soil by deep till and amendment with compost to reduce the generation of runoff and enhance the runoff reduction performance of practices such as downspout disconnections, grass channels, filter strips, and tree clusters.	**Yes**	Full soil restoration is proposed for all areas of disturbance that will not become hardscape. All areas will be stabilized with seed & mulch, and landscaped areas will be provided.
Reduction of Impervious Cover	**Roadway Reduction**	Minimize roadway widths and lengths to reduce site impervious area	**N/A**	Reducing the roadway width is not feasible for the intended use.
	Sidewalk Reduction	Minimize sidewalk lengths and widths to reduce site impervious area	**N/A**	Sidewalk widths have been minimized to 6-ft and quantity of sidewalk has been reduced to that required to ensure safe pedestrian access throughout the site.
	Driveway Reduction	Minimize driveway lengths and widths to reduce site impervious area	**N/A**	Reducing the driveway width is not feasible for the intended use.
	Cul-de-sac Reduction	Minimize the number of cul-de-sacs and incorporate landscaped areas to reduce their impervious cover.	**Yes**	No cul-de-sacs are proposed as part of this project.
	Building Footprint Reduction	Reduce the impervious footprint of residences and commercial buildings by using alternate or taller buildings while maintaining the same floor to area ratio.	**Yes**	All new building area has been allocated to efficiently implement the intended use.
	Parking Reduction	Reduce imperviousness on parking lots by eliminating unneeded spaces, providing compact car spaces and efficient parking lanes, minimizing stall dimensions, using porous pavement surfaces in overflow parking areas, and using multi-storied parking decks where appropriate.	**N/A**	no parking is proposed as part of the project.

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

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

WQv = (P x Rv x A) / 12

where: WQv = Water Quality Volume (acre-feet)
P = 90% Rainfall Event Number (inches) (interpolated from Design Manual Fig 4.1)
Rv = 0.05 + 0.009 (I); min Rv = 0.2
I = Impervious Cover (%) within the drainage area contributing to the SMP
A = Drainage area (acres) contributing to the SMP

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

SMP ID	P	A	Impervious Cover	I	Rv	WQv	
	(inches)	(acres)	(acres)	(%)		(acre-feet)	(cubic feet)
Overall disturbed area (Existing)	1.20	0.500	0.225	45	0.46	0.023	1,000
Overall disturbed area (Proposed)	1.20	0.500	0.301	60	0.59	0.029	1,260
PDA 4 Building	1.20	0.143	0.143	100	0.95	0.014	610

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Appendix J - Table C
Step 3 - Evaluation of Green Infrastructure Techniques

Design Variant	Practice	Description	Applicable	Project Specific Evaluation/Justification
RR-1	**Conservation of Natural Areas**	Retain the pre-development hydrologic and water quality characteristics of undisturbed natural areas, stream and wetland buffers by restoring and/or permanently conserving these areas on a site.	**N/A**	The project site does not contain any significant natural resources. The majority of the site has been previously disturbed.
RR-2	**Sheet flow to Riparian Buffers or Filter Strips**	Undisturbed natural areas such as forested conservation areas and stream buffers or vegetated filter strips and riparian buffers can be used to treat and control stormwater runoff from some areas of a development project.	**N/A**	All stormwater enters On-site Storm Sewers
RR-3	**Tree Planting / Tree Box**	Plant or conserve trees to reduce stormwater runoff, increase nutrient uptake, and provide bank stabilization. Trees can be used for applications such as landscaping, stormwater management practice areas, and conservation areas.	**No**	The project proposes planting of numerous trees throughout the site, in order to reduce stormwater runoff, increase nutrient uptake, and provide bank stabilization. However, credit for these trees will not be taken toward an area reduction in the RRv calculations.
RR-4	**Disconnection of Rooftop Runoff**	Direct runoff from residential rooftop areas and upland overland runoff flow to designated pervious areas to reduce runoff volumes and rates.	**No**	The building roof(s) will be directed to downspouts with splash blocks, which will promote sheet flow and vegetative filtering. However, credit for rooftop disconnect will not be taken toward an impervious area reduction in the RRv calculations.
RR-5	**Vegetated Swale**	The natural drainage paths, or properly designed vegetated channels, can be used instead of constructing underground storm sewers or concrete open channels to increase time of concentration, reduce the peak discharge, and provide infiltration.	**No**	Vegetative swales are not appicable due to space constraints
RR-6	**Rain Garden**	Manage and treat small volumes of stormwater runoff using a conditioned planting soil bed and planting materials to filter runoff stored within a shallow depression.	**No**	Due to the limited area for to rain gardens , these facilities are not feasible for use on the project site.
RR-7	**Stormwater Planter**	Small landscaped stormwater treatment devices that can be designed as infiltration or filtering practices. Stormwater planters use soil infiltration and biogeochemical processes to decrease stormwater quantity and improve water quality.	**Yes**	Storm water planters are proposed as part of this project
RR-8	**Rain Barrels/Cisterns**	Capture and store stormwater runoff to be used for irrigation systems or filtered and reused for non-contact activities.	**No**	Rain Barrels/Cisterns are not proposed on-site due to the need for active management/maintenance and initial capital cost. In addition, the cold climate of the project area would require additional protection measures from freezing.
RR-9	**Porous Pavement**	Pervious types of pavements that provide an alternative to conventional paved surfaces, designed to infiltrate rainfall through the surface, thereby reducing stormwater runoff from a site and providing some pollutant uptake in the underlying soils.	**No**	Porous pavement is not proposed as part of this project due to low permeability of on-site soils, as well as concerns regarding winter maintenance.
RR-10	**Green Roof**	Capture runoff by a layer of vegetation and soil installed on top of a conventional flat or sloped roof. The rooftop vegetation allows evaporation and evapotranspiration processes to reduce volume and discharge rate of runoff entering conveyance system.	**No**	Green roofs are not being considered for use on-site, but have not been included in the stormwater design at this time. If the budget allows for inclusion of green roofs, then the stormwater management facilities identified in the project plans will not be installed and the SWPPP will be amended as appropriate.
	Stream Daylighting	Stream Daylight previously-culverted/piped streams to restore natural habitats, better attenuate runoff by increasing the storage size, promoting infiltration, and help reduce pollutant loads.	**No**	No stream daylighting opportunities are present on this site.

Appendix J - Table D
Step 4 - Determine Minimum Runoff Reduction Volume (RRv) Required

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

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

where: RRv_{min} = Minimum Runoff Reduction Volume Required (acre-feet)
P = 90% Rainfall Event Number (inches) (interpolated from Design Manual Fig 4.1)
$\bar{R}v$ = 0.05 + 0.009 (I), where I is 100% impervious = 0.95 constant
Aic = Total area of new impervious cover (acres)
S = Hydrologic Soil Group (HSG) Specific Reduction Factor
where:

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

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

SMP ID	P	Rv*	Specifc Reduction Factor (S)	Impervious Cover (Aic)	RRv	
	(inches)			(acres)	(acre feet)	(cubic feet)
Overall disturbed area (Existing)	1.2	0.95	0.2	0.225	0.004	170
Overall disturbed area (Proposed)	1.2	0.95	0.2	0.301	0.006	260
PDA 4 Building	1.2	0.95	0.2	0.143	0.003	130

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Appendix J EXISTING DRAINAGE AREAS

Drainage Area	Overall Area				Pave/Conc		Gravel		Building		Grass B		Grass D		IMPERVIOUS				PERVIOUS			
EDA1	463.80	sft	0.011	ac	208.88	sft	164.86	sft	0.00	sft	0.00	sft	90.07	sft	0.00	sft	0.000	acre	90.07	sft	0.002	acre
EDA2	1,139.53	sft	0.026	ac	209.11	sft	115.36	sft	0.00	sft	0.00	sft	815.06	sft	324.47	sft	0.007	acre	815.06	sft	0.019	acre
EDA3	13,063.16	sft	0.300	ac	7,377.01	sft	676.21	sft	0.00	sft	811.82	sft	4,198.12	sft	8,053.22	sft	0.185	acre	5,009.93	sft	0.115	acre
EDA4	3,659.14	sft	0.084	ac	769.04	sft	415.40	sft	0.00	sft	2,344.76	sft	129.93	sft	1,184.45	sft	0.027	acre	2,474.69	sft	0.057	acre
EDA5	7,908.18	sft	0.182	ac	5,913.81	sft	0.00	sft	31.89	sft	59.45	sft	1,903.04	sft	5,945.70	sft	0.136	acre	1,962.49	sft	0.045	acre
EDA6	29,978.00	sft	0.688	ac	18,333.70	sft	65.31	sft	0.00	sft	936.33	sft	10,642.66	sft	18,399.01	sft	0.422	acre	11,578.99	sft	0.266	acre
EDA7	39,521.55	sft	0.907	ac	29,632.58	sft	340.41	sft	1,824.11	sft	2,663.00	sft	5,061.44	sft	31,797.11	sft	0.730	acre	7,724.44	sft	0.177	acre
EDA8	3,363.05	sft	0.077	ac	1,720.24	sft	244.40	sft	0.00	sft	1,398.40	sft	0.00	sft	1,964.64	sft	0.045	acre	1,398.40	sft	0.032	acre
EDA9	4,988.21	sft	0.115	ac	1,090.13	sft	289.73	sft	0.00	sft	3,608.35	sft	0.00	sft	1,379.86	sft	0.032	acre	3,608.35	sft	0.083	acre
TOTAL	104,084.63	sft	2.389	ac	65,254.51	sft	2,311.69	sft	1,856.00	sft	11,822.12	sft	22,840.31	sft	69,048.46	sft	1.585	acre	34,662.43	sft	0.796	acre
DISTURBED AREA	21,768.66	sft	0.500	ac	6,581.54	sft	1,415.60	sft	1,824.11	sft	7,931.10	sft	4,016.30	sft	9,821.26	sft	0.225	acre	11,947.40	sft	0.274	acre

Total Impervious Area Within Disturbed	9,821.260 sft	0.2255 acre
25% WQv	2,455.315 sft	0.0564 acre

Appendix J PROPOSED DRAINAGE AREAS

Drainage Area	Overall Area		Pavement, Building & Concrete	Building	Gravel	STRM Planter	Grass B	Grass D	IMPERVIOUS		PERVIOUS	
PDA1	463.80 sft	0.01 acre	208.88 sft	0.00 sft	164.86 sft	0.00 sft	0.00 sft	90.07 sft	373.74 sft	0.01 acre	254.92 sft	0.01 acre
PDA2	1,413.71 sft	0.03 acre	213.22 sft	0.00 sft	118.95 sft	0.00 sft	0.00 sft	1081.54 sft	332.17 sft	0.01 acre	1200.49 sft	0.03 acre
PDA3	8,795.44 sft	0.20 acre	5738.80 sft	0.00 sft	105.50 sft	0.00 sft	0.00 sft	2951.15 sft	5844.29 sft	0.13 acre	3056.64 sft	0.07 acre
PDA4	6,885.22 sft	0.16 acre	0.00 sft	6236.44 sft	0.00 sft	648.78 sft	0.00 sft	0.00 sft	6236.44 sft	0.14 acre	648.78 sft	0.01 acre
PDA5	7,877.43 sft	0.18 acre	4966.78 sft	0.00 sft	115.17 sft	0.00 sft	237.36 sft	2558.12 sft	5081.95 sft	0.12 acre	2910.65 sft	0.07 acre
PDA6	29,013.90 sft	0.67 acre	18548.23 sft	0.00 sft	117.83 sft	0.00 sft	51.48 sft	10296.36 sft	18666.05 sft	0.43 acre	10465.67 sft	0.24 acre
PDA7	36,458.03 sft	0.84 acre	29513.25 sft	0.00 sft	49.02 sft	0.00 sft	1834.39 sft	5061.38 sft	29562.27 sft	0.68 acre	6944.78 sft	0.16 acre
PDA8	3,363.04 sft	0.08 acre	1720.24 sft	0.00 sft	244.40 sft	0.00 sft	1398.39 sft	0.00 sft	1964.64 sft	0.05 acre	1642.79 sft	0.04 acre
PDA9	4,928.99 sft	0.11 acre	1557.56 sft	0.00 sft	130.99 sft	0.00 sft	3240.44 sft	0.00 sft	1688.55 sft	0.04 acre	3371.43 sft	0.08 acre
PDA10	4,881.78 sft	0.11 acre	2543.05 sft	0.00 sft	391.84 sft	0.00 sft	798.14 sft	1148.75 sft	2934.89 sft	0.07 acre	2338.73 sft	0.05 acre
Total	104,081.35 sft	2.39 acre	65010.01 sft	6236.44 sft	1438.56 sft	648.78 sft	7560.20 sft	23187.37 sft	72685.01 sft	1.67 acre	32834.90 sft	0.75 acre

Disturbed Area	21,768.66 sft	0.50 acre	6336.01 sft	6236.44 sft	542.79 sft	0.00 sft	8653.42 sft	0.00 sft	12572.45 sft	0.29 acre	9196.21 sft	0.21 acre

Total Impervious Area Within Disturbed (Proposed)	13115.241 sft	0.3011 acre
Total Impervious Area Within Disturbed (existing)	9821.260 sft	0.2255 acre
Difference	3293.981 sft	0.0756 acre
100% (new) + 25% (Existign) WQv	5749.296 sft	0.0564 acre

Job:	Regeneron Building 81		
Job No.:	2018.016		
Description:	Stormwater Quality Practice Designs - Planter		
Prep. By:	CMB	Date:	10/1/2019
Check By:	CMB	Date:	

STORMWATER PLANTER

Determine Water Quality Volume

Water quality volume = 610 cf

Calculate Approximate Filter Bed Area

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

Af = Surface area of filter bed (sf)
WQv = Water quality volume (cf)
df = Filter bed depth (ft) - minimum of 18"
k = coefficient of permeability of filter media (ft/day) - 4 ft/day for planter Section 6.4.4.
hf = Average height of water above filter bed (up to 12" total)
tf = Design filter bed drain time (days) - 3 to 4 hours for planter
as per Section 6.4.4 of NYS Stormwater Design Manual

df =	1.5	ft
dd =	1	ft
k =	4	ft/day
hf =	0.5	ft
tf =	0.17	days

Min. Af =	673	sf
Provided Af =	645	sf
Provided Volume =	585	cf

Runoff Reduction

RRv = 585 ft^3

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Appendix L:
Stormwater Management Facilities Maintenance and Easement Agreement

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APPENDIX L - STORMWATER MANAGEMENT FACILITIES MAINTENANCE AND EASEMENT AGREEMENT

THIS AGREEMENT is made and entered into the ____ day of _____, 20__, by and between:

SHS HOLDING LLC - 4 Springhurst Drive, East Greewnbush NY 12061]

hereinafter referred to collectively as "the Facility Owner", and

the Town of East Greenbush, a municipal corporation with an address of

Town of East Greenbush
225 Columbia Turnpike
Rensselaer, New York
12144

hereinafter referred to as "the Town".

WITNESSETH:

WHEREAS, the Facility Owner will be the owner of certain proposed stormwater management facilities (the "Stormwater Management Facilities") to be located on certain land owned by the Facility Owner and situated at **1 Springhurst Drive Town of East Greenbush NY, TAX MAP number 177.08-04-11.121** in the Town of East Greenbush, County of Rensselaer and State of New York, more particularly described in Schedule A attached hereto (the "Property"); and

WHEREAS, the Property is intended to be improved **Pinecrest Plaza** and

WHEREAS, the Town and the Facility Owner desire that the Stormwater Management Facilities be constructed in accordance with the approved project documents listed in Paragraph 2 and, thereafter, be maintained, cleaned, repaired, replaced, and continued in perpetuity in order to ensure optimum performance of the components.

WHEREAS, therefore, the Town and the Facility Owner agree to the following:

1. The Facility Owner agrees to construct, operate, maintain, and continue the Stormwater Management Facilities for the lifetime of the facilities and in accordance with the following approved project documents:

    a. Plans approved by the Town Board / Planning Board on _____ consisting of a cover sheet and drawings **1** through **18**, prepared by **Hart Engineering**.

    b. Storm Water Pollution Prevention Plan (SWPPP) dated **March 2019** prepared by **Hart Engineering**.

2. The Facility Owner shall construct, operate, maintain, and continue the Stormwater Management Facilities in accordance with the latest revision of the New York State Stormwater Design Manual (NYSSMDM) and in compliance with the latest revisions of the New York State Department of Environmental Conservation ("NYSDEC") State Pollutant Discharge Elimination System ("SPDES") General Permit for Stormwater Discharges from Construction Activity Permit No. GP-0-15-002, the NYSDEC SPDES General Permit for Multiple Separate Storm Sewer Systems (MS4s) Permit No. GP-0-15-003, and any applicable local, state, or federal laws and regulations.

3. The Facility Owner shall be responsible for all expenses related to the construction, operation, maintenance, and continuation of the Stormwater Management Facilities.

4. The Facility Owner shall provide for the periodic inspection of the Stormwater Management Facilities not less than once in every twelve (12) months to determine the condition and integrity of the system. Such inspections shall be performed by a Professional Engineer licensed by the State of New York. The inspecting engineer shall prepare and submit to the Town within thirty (30) days of inspection, a written report of the findings including recommendations for those actions necessary for the preservation, operation, maintenance, and continuation of the system. The inspection engineer's report shall be certified and submitted to both the Facility Owner and the Town.

5. The Facility Owner hereby grants to the Town, its authorized agents, contractors and employees, a permanent easement which runs with the land to enter upon the Property at reasonable times to inspect the Stormwater Management Facilities whenever the Town deems necessary to ensure that the system is maintained in proper working condition to meet design standards, and to undertake such steps as the Town deems reasonably necessary for the preservation, operation, maintenance, or continuation of the Stormwater Management Facilities. It is expressly understood and agreed that the Town is under no obligation to construct or routinely maintain or repair the Stormwater Management Facilities, and in no event shall this Agreement be construed to impose any such obligation on the Town.

6. If the Facility Owner fails to maintain the Stormwater Management Facilities or to undertake any recommendations made by an inspecting engineer pursuant to Paragraph 4, or as otherwise determined by the Town pursuant to Paragraph 5, or as required under any local, state, or federal law or regulation, the Town may, at its option, perform whatever maintenance activities are required, or recommendations that have been made, and, at its own discretion, pay for such costs, whether in whole or in part, with any security provided pursuant to Paragraph 7 of this Agreement, or bill the costs, whether in whole or in part, thereof to the Facility Owner to be paid to the Town within ten (10) business days. In the event the Facility Owner fails to pay such costs, the Town may assess such costs against real property owned by the Facility Owner as delinquent taxes, and the Facility Owner by this agreement consents to the placement of a tax lien upon such real property owned by the Facility Owner. Said lien shall include interest to be assessed at the then highest lawful rate of interest, collection costs, administrative costs and reasonable attorneys' fees. In addition, and at its option, the Town shall have the right to obtain a judgment for all such delinquent amounts, including reasonable attorneys' fees. The actions described in this section are in addition to, and not in lieu of, any and all legal remedies as provided by law available to the Town as a result of the

Facility Owner's failure to construct, preserve, maintain, or continue the Stormwater Management Facilities in accordance with this Agreement or any applicable law or regulation.

7. The Facility Owner shall provide to the Town within thirty (30) days of this Agreement, a security for the maintenance and continuation of the Stormwater Management Facilities in the form of (a bond, letter of credit, or escrow account).

8. The Facility Owner and the Town agree that the points of contact for purposes of this Agreement, unless changed with written notification, are as follows:

Facility Owner
SHS Holding LLC
George Shannon
4 Springhurst Drive, Suite 4
(518)479-4012
NYTEXDEV@aol.com

Town of East Greenbush
Attn: MS4 Coordinator/Stormwater Management Officer
225 Columbia Turnpike
Rensselaer, New York, 12144
(518) 694-4011
SWPPP@eastgreenbush.org

9. The Facility Owner shall not authorize, undertake or permit alteration, abandonment, modification or discontinuation of the Stormwater Management Facilities except in accordance with written approval of the Town.

10. The Facility Owner agrees to defend, indemnify, and save harmless the Town and its officers, employees and agents, from and against all claims, actions, causes of action, injuries, damages, losses, liabilities, and expenses (including, without limitation, reasonable attorney's fees and court costs) arising out of, or in consequence of, any negligent or intentional act or omission of Facility Owner to the extent of its or their responsibility for such claims, actions, causes of action, injuries, damages, losses, liabilities, and expenses. The provisions of this section shall survive any termination or expiration of this Agreement.

11. This Agreement may not be amended except in writing, signed by the Town.

12. This Agreement shall constitute a covenant running with the land, and shall be binding on the Facility Owner, its administrators, executors, assigns, heirs, and any other successor in interest or transferee, taking possession or control of the Stormwater Management Facilities. The Facility Owner shall disclose this Agreement to any successor, assignee in interest, or other transferee. The Town shall be placed on written notice at least thirty (30) days prior to any such transfer or assignment. Such written notice shall include the contact information for any such successor, transferee, or assignee.

13. The Facility Owner shall record this Agreement in the Office of the Rensselaer County Clerk.

14. This Agreement shall be severable and if any phrase, clause, section, subsection, paragraph, subdivision, sentence, or provision is adjudged invalid or unconstitutional by a court of competent jurisdiction, or the applicability to any Facility Owner is held invalid, this shall not affect or invalidate the reminder of any phrase, clause, section, subsection, paragraph, subdivision, sentence, or provision of this Agreement.

15. The interpretation, validity, and enforcement of this Agreement shall be governed by and interpreted in accordance with the laws of the State of New York. Any suit, claim, or legal proceeding of any kind related to this Agreement shall be filed and heard in a court of competent jurisdiction in the County of Rensselaer.

IN WITNESS WHEREOF, the parties have executed this Agreement effective as of the date first above written.

INSERT PROPERTY OWNER NAME/ORGANIZATION

By: _____
Name:
Title:

STATE OF NEW YORK)
) ss.:
COUNTY OF RENSSELAER)

On this ___ day of _____, 20__, before me, the undersigned, personally appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he/she executed the same in his/her capacity, and that by his/her signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public – State of New York

TOWN OF EAST GREENBUSH

By: _____
Name:
Title:

STATE OF NEW YORK)
) ss.:
COUNTY OF RENSSELAER)

On this ___ day of _____, 20__, before me, the undersigned, personally appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he/she executed the same in his/her capacity, and that by his/her signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public – State of New York