Storm Water Pollution Prevention Plan
for

Proposed Moore Storage

Town of Dryden
Ithaca, New York

May 2020

Prepared by:

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For:

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Ithaca, NY 14852

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ATTACHMENTS

1.0 EXECUTIVE SUMMARY

The engineer, owner and all contractors involved with construction activity that disturb site soil or who implement pollutant control measures identified in the Storm Water Pollution Prevention Plan (SWPPP) are responsible for complying with the requirements set forth in the New York State Department of Environmental Conservations SPDES General Permit from Construction Activity Permit No. GP-0-20-001 and any local and/or state governing agencies having jurisdiction with regards to erosion and sediment control. The requirements of the SPDES Permit are as follows:

A. **Owner:**

Michael Moore
P.O. Box 3094
Ithaca, NY 14852
(607) 327-2526
mcmoore@warrenhomes.com

Project Site:

Moore Storage
1400 Dryden Road
Ithaca, NY 14850

A project that is subject to the requirements of a regulated, traditional land use control MS4 must meet conditions 1-4 before authorization is given to discharge stormwater. A project not subject to the requirements of a regulated, traditional land use control MS4 shall meet conditions 2-4.

1. An owner or operator that is subject to the requirements of a regulated, traditional land use control MS4, must have its SWPPP reviewed and accepted by the regulated MS4 prior to submitting the NOI to the Department. The owner or operator shall then have the "MS4 SWPPP Acceptance Form," as provided in Attachment A, authorized by the MS4 and submitted to the Department along with the NOI for approval.

2. Complete the Notice of Intent (NOI) provided in Attachment A and forward to the recipients following this section. 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 preopared in conformance with the design criteria in the technical standard referenced in Part III.B.1. of the SPDES General Permit and the performance cirteria in the technical standard referenced in Parts III.B., 2 or 3 of the SPDES general permit, for construction activities that require

post-construction stormwater management practices pursuant to Part III.C. of the SPDES General Permit; or

3. 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;

4. 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 technical standard referenced in Part III.B.1. or, for construction activities that require post-construction stormwater.

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

Town of Dryden – Town Hall
93 E. Main Street
Dryden, New York 13053
(607) 844-8888

All notifications shall be sent via certified mail with return receipt. Copies of mailing receipts shall be kept on record at the project site with the SWPPP and shall be considered part of the contract documents.

The Town's representative shall be included in the pre-construction meeting. Copies of the SWPPP must be provided to the Town of Dryden once all signatures and attachments are complete.

B. A copy of the General Construction Permit (GP-0-20-001), Notice of Intent (NOI), NOI acknowledgement letter received by the DEC, and MS4 Acceptance Form (if applicable), shall be posted in a prominent place for public viewing at the project site.

C. A complete copy of the SWPPP, NOI, NOI Acknowledgement letter, MS4 Acceptance form (if applicable), including copies of all inspection reports, plan revisions, etc., must be retained at the project site at all times during working hours and kept as part of the permanent project records for a duration of no less than five (5) years following submission of the Notice of Termination (NOT).

D. The site development contractors must provide names and addresses of all subcontractors working on the project who will be involved with the major construction activities that will result in soil disturbance. The Owner shall ensure that each contracting firm identifies one trained individual who will be responsible for implementation of the SWPPP. The owner shall also ensure that at least one trained individual is on site daily when soil disturbance activities are being performed. This information must be retained as part of the SWPPP.

E. The site development contractor and all subcontractors involved with the major construction activities that disturb site soil must sign a copy of the appropriate certification statement included in Attachment C along with the identity of the appropriate trained individual as described in paragraph D of this section.

F. Regular inspections must be made to determine effectiveness of the SWPPP. It would be modified as needed to prevent pollutants from discharging from the site. The inspector must be a person familiar with the site, the nature of the major construction activities, and qualified to evaluate both overall system performance and individual component performance. Additionally, the inspector must either be someone empowered to implement modifications to the SWPPP and the pollutant control devices, if needed, in order to increase effectiveness to an acceptable level, or someone with the authority to cause such events to happen.

G. This SWPPP must be updated each time there is a significant modification to the pollutant prevention system or a change of contractors working on the project who may disturb site soil. The site development contractor must notify the governing agency(s) as soon as these modifications are implemented.

H. Discharge of oil or other hazardous substances into the storm water is subject to reporting and cleanup requirements. Refer to Part I.B.1.d of the SPDES General Permit for additional information. Copies of the SPDES General Permit and the Notice of Intent Forms may be found on-line.

I. **Notice of Termination (NOT)** - Once the site reaches final stabilization upon completion of the project, Michael Moore as Owner, may terminate coverage of SPDES permit coverage by submitting a Notice of Termination, Form (included in Attachment B), when one or more of the following conditions are met:

1. Total Project Completion - All construction activity identified in the SWPPP has been completed; and all disturbance has achieved final stabilization by establishing a uniform, perennial vegetative cover, with a density of eighty (80) percent over the entire pervious surface. In

addition, 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.

2. Planned shutdown with partial project completion – All soil disturbance activities have ceased; and all areas disturbed as of the project shut down date 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.

3. A new owner or operator has obtained coverage under the General SPDES Permit in accordance with Part II.F.

4. The owner or operator obtains coverage under an alternative SPDES General Permit or individual SPDES permit.

For construction activities meeting 1.0.I above, the owner or operator shall have a 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 requirements of the SPDES General Permit have been met. Further, construction activities subject to the requirements of a regulated, transitional land use control MS4, must have the MS4 sign the "MS4 acceptance" statement on the NOT, indicating that the project has been constructed in accordance SPDES General Permit requirements.

Lastly, for construction activities that require post-construction stormwater management practices, the owner or operator must, prior to submitting the NOT, ensure one of the following:

1. The post-construction stormwater management practices and any right of ways needed to maintain such practices have been deeded to the municipality in which the practice is located.

2. An executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practices.

3. If the post-constructed management practices are privately owned, the owner or operator must have a mechanism in place that requires operation and maintenance of the practices in accordance with the operation and maintenance plan, such as a deed covenant in the owner or operator's deed of record.

4. If the post-constructed practices are owned by a public or private institution, government agency or authority, or public utility, the owner or operator has policy and procedure in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

J. This SWPPP intends to control water-borne and liquid pollutant discharges by some combination of interception, filtration, and containment. The general contractor and subcontractors implementing this SWPPP must remain alert to the need to periodically refine and update the SWPPP in order to accomplish the intended goals.

K. This SWPPP must be amended as necessary during the course of construction in order to keep it current with the pollutant control measures utilized at the site. Amending the SWPPP does not mean that it has to be reprinted. It is acceptable to add addenda, sketches, new sections, and/or revised drawings.

L. A record of the dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated must be maintained until the NOT is filed. A log for keeping such records is included in the Attachments. A different form for the log may be substituted if it is found to be more useful.

2.0 INTRODUCTION

This SWPPP has been prepared for major activities associated with the construction of a single 102' x 167' 4-season climate control storage building, associated gravel parking and driveway accesses, utilities and general landscaping on a 3.07-AC parcel. The Moore Storage building is located in the Town of Dryden, Ithaca, New York approximately 500 feet northeast of the intersection of Pinckney Road and State Highway 13 and 3,650 feet southwest of the intersection of Pine Woods Hill Road and State Highway 13. The total land disturbance will be approximately 1.13-AC acres over a single construction phase. The total impervious cover added to the site will be 10.88% based on the calculated ratio of proposed new impervious surface area to existing pervious. Reference the Project Plans for the permanent stormwater management facilities planned. This SWPPP includes the elements necessary to comply with the national baseline general permit for construction activities administered 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.

Construction phase pollutant sources anticipated at the site are disturbed (bare) 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 storm water.

Aside from the residential construction, the project includes, gravel access, parking and driveways, and landscaping, as well as connections to other service utilities ie. (gas, electric, phone). Permanent stormwater management facilities are proposed including two (2) grassed channels for pretreatment and general stormwater conveyance into a single infiltration basin. This will address runoff reduction volume requirements and provide site water quality volume.

A downstream analysis comparing pre and post development scenarios was performed for the 10 and 100 year storms. The combination of all practices provides the quantity attenuation necessary to control runoff to less than pre-developed conditions as required by the NYSDEC General SPDES Permit. Please see Attachment J for this information.

A. Purpose

The major goal of pollution prevention efforts during project construction is to control the migration of soil and pollutants that originate on-site and prevent them from impacting surface waters and the environment. The purpose of this SWPPP is to provide guidelines for achieving that goal. A successful pollution prevention program also relies upon careful inspection and adjustments during the construction process in order to enhance its effectiveness.

B. Scope

This SWPPP must be implemented before construction begins on the site. It primarily addresses the impact of storm rainfall and runoff in areas of the ground surface disturbed during the construction process. In addition, there are recommendations for controlling other sources of pollution that could accompany the major construction activities. This SWPPP will terminate when disturbed areas are stabilized, construction activities covered herein have ceased, and a completed Notice of Termination (NOT) is mailed to the governing agency requiring the NOT. See Section 1.0.I for specific NOT eligibility requirements.

Particular forms are included which are necessary for implementing the SWPPP.

The SPDES General Permit for Storm Water Discharges from Construction Activities prohibits most non-storm water discharges during the construction phase. Allowable non-storm water discharges that could occur during construction on this project, which would therefore be covered by the General Permit, include:

1. Discharges from fire fighting activities;

2. Fire hydrant flushing;

3. Waters to which cleansers or other components have not been added that are used to wash vehicles or control dust;

4. Routine external building washdown which does not use detergents;

5. Irrigation drainage;

6. Uncontaminated discharges from construction site de-watering operations;

7. External building wash down which does not use detergents;

8. Runoff from pavement wash down where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents have not been used;

9. Air conditioning condensate;

10. Springs and uncontaminated groundwater; and

11. Foundation or footing drains where flows are not contaminated with process materials such as solvents.

The techniques described in this SWPPP focus on providing control of pollutant discharges with practical approaches that utilize readily available expertise, materials, and equipment.

The Owner/Developer referred to in this SWPPP is Michael Moore who will be responsible for full development and build-out of the subject parcel.

3.0 PROJECT DESCRIPTION

Described below are the major construction activities that are subject to this SWPPP. The Owner shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the DEC, or, in areas under the jurisdiction of a regulated MS4, authorization by that municipality. They are presented in the order (or sequence) they are expected to begin, but each activity will not necessarily be completed before the next begins. Install erosion and sediment control measures as shown on Drainage, Sediment and Erosion Control Plans, down slope from construction activities that disturb site soil before disturbance of soil;

CONSTRUCTION EACH PHASE (under no circumstances shall this project disturb >5-AC at any given time.)

A. All erosion and sediment controls must be installed prior to any land disturbance.

B. Construction of stabilized construction entrance(s);

C. Placement of silt fence;

D. Initial rough excavation of infiltration basin. The sequence of various phases of basin construction shall be coordinated with the project construction schedule. A program should schedule rough excavation for the basin (to not less than 2' from final grade) with the rough grading phase of the project to permit use of the material as fill in earthwork areas. The partially excavated basin, however, cannot serve as a sedimentation basin. Basin excavation may be carried to within 2' of the final elevation of the basin floor.

E. Construction of grassed conveyance channels.

F. Construction activities for the development of the building and associated driveway/parking area(s):

   a. Construct driveways and individual lot temporary parking;

   b. Construct general utility services (ie. water and sewer piping, storm piping, etc.)

   c. Construct buildings;

   d. Construct other utility service connections (gas, electric, phone);

Note: For all Underground Utilities – Sediment barriers such as silt fencing, proper seeding and mulching will be utilized as required to bind the down slope side of utility construction and soil stockpiles;

G. Return property to permanent lines and grades;

H. At the earliest point when construction is complete and the area of disturbance is stabilized and/or protected, final installation of the infiltration basin may occur. All accumulated sediment from the construction project shall be removed. Using light tracked equipment to avoid compaction of the basin floor, install basin sub-layers as shown on plan ST-4.

I. Establish a dense layer of vegetation on the side slopes and floor of the infiltration basin, in accordance with NRCS Standards and Specifications or local Standards and Specifications for Soil and Erosion and Sediment Control.

J. Final Grading Mulching & Seeding – Sediment barriers will be maintained down slope from disturbed soil during these operations;

K. Completion of site stabilization, ie. Vegetative cover, driveway surface. Sediment & Erosion Controls to remain in place until vegetative cover reaches 80% density.

L. Notes on soil restoration –

a. Areas with no soil disturbance or minimal disturbance activities do not need to follow special restoration procedures.

b. Areas where topsoil is stripped away only (with no changes in grade), shall apply 6" of new top soil (HSG A & B soils). If HSG C&D soils, aerate with use of tractor-drawn implements with coulters by making a narrow slit in the soil, or a roller with spikes making indentations in the soil, the apply 6" of topsoil.

c. HSG A&B soils that have been cut or filled shall be restored with aeration followed by 6" of top soil. C&D soils shall apply full soil restoration as per "Deep Ripping and De-compaction, DEC 2008."

d. Heavy traffic areas, particularly in an area 5-25' around buildings shall apply full soil restoration.

e. Areas where runoff reduction and/or infiltration practices are applied need no restoration but may be applied to enhance the reduction specified for appropriate practices.

f. Redevelopment projects require soil restoration where existing impervious areas will be converted to pervious areas.

4.0 RUNOFF REDUCTION VOLUME

This project follows guidelines set forth by the DEC for runoff reduction. Chapter 3 of the New York State Stormwater Management Design Manual requires a five step planning process to document compliance with required processes.

Step 1 – Protect natural resources and utilize site hydrology

This planning step is designed to preserve area natural resources by protecting areas, avoiding sensitive locations, and minimizing grading and soil disturbances. There were no erodible soils, critical areas, wetlands, riparian buffer areas, or locally listed protected areas.

Another component of the planning process is an evaluation of all green infrastructure practices that might be acceptable for runoff reduction on site. This project will utilize infiltration based practices.

The selection process is described as follows:

- Conservation of natural areas – Pre-development hydrology and water quality characteristics of undisturbed natural areas remains unaltered.

- Sheetflow to riparian buffers – None were available on-site.

- Vegetated open swales – Site runoff will be collected and directed to a specific treatment practice by way of two (2) grassed channels. These will provide pretreatment for the infiltration basin and incorporate permanent check dams to retain sediment and prevent migration.

- Tree planting/tree box – This was not a specific reduction practice considered for this project.

- Disconnection of rooftop runoff – No opportunity available.

- Stream daylighting for redevelopment projects – None on site.

- Bioswale – An infiltration basin has been designed for quality and quantity treatment.

- Green roof – This practice was cost prohibitive to the project and is impractical for individual homes. As such, this option was not considered.

- Stormwater planters – An infiltration basin is utilized to control runoff from rooftop, parking, and driveway areas due to the large surface areas involved.

- Rain cistern – This practice was considered impractical for the overall usage and square footage of the developed parcels. Source control measures using an infiltration basin and two grassed channels was considered instead.

- Porous pavement - This practice was cost prohibitive to the project and as such, this was not considered.

Step 2 – Determine Overall Water Quality Treatment Volume (WQv)

See Attachment J for the calculation summary.

Step 3 – Runoff reduction by applying green infrastructure technology and standard SMPs.

Green infrastructure techniques were evaluated to potentially reduce the overall water quality volume. Green infrastructure practices used for this project were identified in Steps 1 and 2. The majority of site controls was through the use of grassed channels and an infiltration basin. As shown in Attachment J, minimum requirements for runoff reduction volume were met.

Step 4 – Provide standard practices to address remaining water quality volume

Practices named in Step 3 control 100% of the water quality volume. As such, additional treatment is unnecessary.

Reference Attachment J for the overall treatment calculations.

Step 5 – Apply volume and peak rate control practices if still required

Peak rate control are met with the infiltration basin and grassed channels. These practices reduce runoff from the proposed development to less than pre-developed conditions. See modeling report output for further information.

5.0 STORM WATER POLLUTION PREVENTION MEASURES AND CONTROLS

Various erosion and sediment control measures have been incorporated into the design of the project, Reference Stormwater, Sediment and Erosion Control Plans accompanying this SWPPP. These measures will be implemented during construction to minimize soil erosion and to protect the character and integrity of downstream receiving waters. Two grassed channels with permanent check dams and an infiltration basin will remain upon completion of the project to control the quality and quantity of storm water runoff from the developed site.

The site development contractor shall take all appropriate precautions to prevent soil erosion and discharge of sediment and other pollutants to receiving water bodies and wetlands. Specific measures are outlined in this plan. In general, disturbance areas shall be limited to the smallest practical areas at any given time, and the areas are to be reseeded as soon as possible. During construction the measures outlined in this document and shown on the plans are to be installed as described. Additional measures may be warranted or required by site and climatic conditions.

Specific erosion control measures, designed to minimize soil loss, and sediment control measures devised to retain eroded soil and prevent it from reaching water bodies or adjoining properties have been developed in accordance with the New *York State Stormwater Management Design Manual*, 2015, NYSDEC and *New York Standards & Specifications for Erosion and Sedimentation Control*, November 2016. Reference Attachment G for copy of *Vegetative and Structural, Measures for Erosion*

and Sediment Control, New York State Standards & Specifications for Erosion and Sedimentation Control. (Vegetative; November 2016, Structural; August 2005)

A variety of storm water pollutant controls are recommended for this project. Some controls are intended to function temporarily and will be used as needed for pollutant control during the construction period. These include temporary sediment and erosion control measures as shown on the plans and permanent stormwater facilities including, the grassed channels and infiltration basin. For all disturbed areas, permanent stabilization will be accomplished by covering the disturbed soil with vegetation, pavement, or commercial structures.

A. Erosion and Sediment Controls

1. Soil Stabilization – The purpose of soil stabilization is to prevent soil from leaving the site. In the natural condition, soil is stabilized by native vegetation. The primary technique to be used under this project for stabilizing site soil will be to provide a protective cover of turf grass, pavement, or building structure.

    a. Temporary Seeding - Where land disturbance is necessary, temporary seeding with fast-germinating temporary seed and a protection of mulch must be used on areas which will be exposed for more than 14 days.

    b. Permanent Seeding – All areas at final grade must be seeded and mulched within 7 days after completion of the major activity.

    c. Structural Controls – The storm water will be managed on site utilizing proposed site grading, two grassed channels and an infiltration basin. Their design is shown on the Project Site Stormwater Plans.

    Final site stabilization is achieved when there is a uniform 80 percent density of permanent vegetation on all previously disturbed soil surfaces, exclusive of areas that have been paved.

B. Other Pollutant Controls

Control of sediments has been described previously. Other aspects of this SWPPP are listed below:

1. Dust Control – Construction traffic must enter and exit the site at the stabilized construction/driveway entrance. The purpose is to trap dust and mud that would otherwise be carried off-site by construction traffic.

Dust control must be provided by the general contractor to a degree that is acceptable to the Owner, and in compliance with applicable local and state dust control regulations. After construction, the site will be stabilized (as described elsewhere), which will reduce the potential for dust generation.

2. Solid Waste Disposal – No solid materials, including building materials, are allowed to be discharged from the site with storm water. All solid waste, including disposable materials incidental to the major construction activities, must be collected and placed in containers. The containers will be emptied periodically by a contract 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 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.

3. Sanitary Facilities – All personnel involved with construction activities must comply with state and local sanitary or septic system regulations. Temporary sanitary facilities will be provided at the site throughout the construction phase. They must be utilized by all construction personnel and will be serviced by a commercial contractor.

4. Water Source – Non-storm water 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 State Health Department. Water used for construction that does not originate from an approved public supply must not discharge from the site. It can be retained in temporary ponds until it infiltrates and evaporates.

5. Long-Term Pollutant Controls – Storm water pollutant control measures installed during construction that will also provide benefits after construction, include two (2) grassed channels and one (1) infiltration basin. Those sediment barriers, such as check dams, that do not interfere with normal operations and appear to provide long-term benefits can be left in place after construction is completed. All silt fencing must be removed once the site has received proper stabilization.

C. Construction Phase "Best Management Practices"

During the construction phase, the general contractor will implement the following measures:

1. Permanent traffic corridors shall be established and "routes of convenience" shall be avoided;

2. Preservation of existing vegetation as much as possible. Following the completion of construction activities in any portion of the site permanent vegetation shall be established an all exposed soils;

3. Site preparation activities shall be planned to minimize the area and duration of soil disruption;

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

5. Material resulting from the clearing and grubbing operation will be stockpiled up slope from adequate sedimentation controls.

6. The general contractor will designate areas for equipment cleaning, maintenance, and repair. The general contractor and subcontractors will utilize those areas. The areas will be protected by a temporary perimeter berm.

7. Use of detergents for large scale washing is prohibited (i.e., vehicles, buildings, pavement surfaces, etc.)

8. 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 at an approved solid waste or chemical disposal facility.

6.0 LOCAL PLANS

In addition to this SWPPP, construction activities associated with this project must comply with any guidelines set forth by local and state regulatory agencies. Reference Project Plans and the Stormwater Management Design Summary (Attachment J) prepared to meet Local and State requirements for post-development stormwater quantity & quality.

7.0 NYSHPO

A search was conducted on the New York State Parks, Recreation and Historic Preservation Office website to identify whether the subject parcel is listed under natural or historic places registration, or if the area resides within an archaeologically sensitive location. Attachment D, includes a "circles and squares map" showing that the property is not found to be within this type of area designation.

8.0 INSPECTIONS AND SYSTEM MAINTENANCE

Between the time this SWPPP is implemented and final site stabilization is achieved, all disturbed areas and pollutant controls must be inspected at least once every seven calendar days by a licensed professional or Qualified Inspector, as identified by the SPDES General Permit. The purpose of site inspections is to assess performance of pollutant controls. The inspections will be conducted by an independent third party Qualified Inspector to be provided by the Owner. The Owner/Operator will also be required to arrange for a designated Trained Contractor (as defined by the SPDES General Permit) to be responsible for the management of this SWPPP during construction, while on-site. Based on these inspections, the Trained Contractor 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 storm water runoff. The Trained 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.

A. Construction of stormwater facilities. Insure facilities are constructed substantially in accordance with the plans. (Also, Reference Attachment H for sample inspection checklist - NYSDEC Stormwater Construction Checklist):

B. 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.

C. 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.

D. 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.

E. 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.

F. All discharge points must be inspected to determine whether erosion control measures are effective in preventing significant impacts to receiving waters.

Based on inspection results, any modification necessary to increase effectiveness of this SWPPP to an acceptable level must be made within seven calendar days of the inspection. 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.

Inspection reports must be kept on file by the Trained Contractor as an integral part of this SWPPP for at least five years from the date of completion and filing of NOT for the project.

Ultimately, it is the responsibility of the site Trained 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 plans. (For example, localized concentrations of runoff could make it necessary to install additional sediment barriers.) 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.

9.0 POST CONSTRUCTION INSPECTION, OPERATION AND MAINTENANCE PLAN

A. Maintenance Responsibility

Short and Long term maintenance responsibilities for the infiltration basins, dry well (including sump and associated storm piping and catch basins, and interceptor swales that collected runoff and direct to practices, will be under Michael Moore.

Specifically, Michael Moore as Owner, is aware that the following shall be incorporated into the project as part of an O&M post construction management plan:

1. A sign shall be erected in a conspicuous area (ie. close proximity to each developed practice) to identify each stormwater management practice including: the infiltration basin and grassed channels. The sign shall be of a size not less than 18" x 24" (or 10" x 12" for footprints smaller than 400 SF) bearing the following information:

   STORMWATER MANAGEMENT PRACTICE
   Project Identification (*SPDES Permit #*)
   [Infiltration basins] and [Grassed Channels], (insert structure description as appropriate)
   Must be maintained in Accordance with O&M Plan

2. Maintenance responsibility for the infiltration basin and grassed channels, shall lie with Michael Moore.

3. Copies of the practice designs and details shall be kept on record and be made available at all times. Copies shall also be forwarded to the Town of Dryden for archival purposes.

B. Sediment & Debris Removal

For the infiltration basin and grassed channel systems, sediment shall be cleaned out when it accumulates to a depth of more than six inches. Vegetation within the practices shall be limited to a height of 18 inches. Trash and debris shall be removed as necessary.

C. Inspection & Periodic Maintenance

To ensure the continued operation and long term performance of the proposed stormwater management system(s), inspections shall be conducted periodically for the first few months following construction and then on an annual basis. Site inspection should also be performed following major storm events (i.e., intense storms, thunder storms, cloud bursts, etc.). Items to check for include, but are not

limited to the following: (Reference Attachment I for complete inspection checklist - NYSDEC Stormwater Operation, Maintenance and Management Inspection Checklists):

i) Embankment & Structural;

- Check basin embankments, outlets and spillways note cracks, bulges, animal burrows, differential settlement, damage to or fatigue of stormwater pipe, structures and permanent erosion control. Components of the system that require repair or replacement should be addressed immediately following identification. Check pipes, channels, grates, inlet structures and spillways to insure design capacity. Look for objects or accumulations of sediments and debris obstructing flow path.

ii) Vegetation;

- Preclude deep rooted woody plant growth on structure embankment by mowing at least once annually.

- Maintain a dense vigorous growth of grass cover. Spot seed, mulch and fertilize where necessary.

Attachment A:
Notice of Intent, (NOI) and
MS4 Acceptance Form (if applicable)

NOI for coverage under Stormwater General Permit for Construction Activity

Alternate ID Moore Storage **Submission** HNZ-R0YZ-1THZC **Revision** 1 **Form Version** 1.23

Review

This step allows you to review the form to confirm the form is populated completely and accurately, prior to certification and submission.

Please note: Any work you perform filling out a form will not be accessible by NYSDEC staff or the public until you actually submit the form in the 'Certify & Submit' step.

OWNER/OPERATOR INFORMATION

Owner/Operator Name (Company/Private Owner/Municipality/Agency/Institution, etc.)
Michael Moore

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

Owner/Operator Contact Person First Name
Michael

Owner/Operator Mailing Address
P.O. Box 3094

City
Ithaca

State
NY

Zip
14852

Phone
6073272526

Email
mcmoore@warrenhomes.com

Federal Tax ID

None Specified

PROJECT LOCATION

Project/Site Name
Moore Storage

Street Address (Not P.O. Box)
1400 Dryden Road

Side of Street
North

City/Town/Village (THAT ISSUES BUILDING PERMIT)
(T) Dryden

State
NY

Zip
14850

County
TOMPKINS

DEC Region
7

Name of Nearest Cross Street
Pinckney Road

Distance to Nearest Cross Street (Feet)
500

Project In Relation to Cross Street
East

Tax Map Numbers Section-Block-Parcel
None Specified

Tax Map Numbers
None Specified

1. Coordinates

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

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

Latitude	Longitude
42.47166296231261	-76.40253910609695

PROJECT DETAILS

2. What is the nature of this project?
New Construction

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

Pre-Development Existing Landuse
Forest

Post-Development Future Land Use
Commercial

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

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

Total Site Area (acres)
3.07

Total Area to be Disturbed (acres)
1.13

Existing Impervious Area to be Disturbed (acres)
0.29

Future Impervious Area Within Disturbed Area (acres)
0.61

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

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

A (%)
27

B (%)
0

C (%)
0

D (%)
73

7. Is this a phased project?
No

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

Start Date
7/15/2020

End Date
07/15/2021

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

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

Other Waterbody Type Off Site Description
None Specified

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

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

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters?
Yes

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?

No

If Yes, what is the acreage to be disturbed?
None Specified

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

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

16. What is the name of the municipality/entity that owns the separate storm sewer system?
None Specified

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

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

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

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

REQUIRED SWPPP COMPONENTS

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)?
Yes

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)?
Yes

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

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual?
Yes

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

SWPPP Preparer
Larry Fabbroni, PE

Contact Name (Last, Space, First)
Gibson, Scott

Mailing Address
5 Orchard Avenue

City
Watkins Glen

State
New York

Zip
14891

Phone
6072280662

Email
scottgibson198@gmail.com

Download SWPPP Preparer Certification Form

Please take the following steps to prepare and upload your preparer certification form:

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

Download SWPPP Preparer Certification Form

Please upload the SWPPP Preparer Certification

No files uploaded

Comment
None Specified

At least one file is required.

EROSION & SEDIMENT CONTROL CRITERIA

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

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

Temporary Structural
Silt Fence
Stabilized Construction Entrance

Biotechnical
None

Vegetative Measures
Mulching
Seeding
Topsoiling

Permanent Structural
Diversion

Other
Permanent Check Dams

POST-CONSTRUCTION CRITERIA

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

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.
Parking Reduction
Reduction of Clearing and Grading

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).
All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout). (Acre-feet)
0.05

29. Post-construction SMP Identification

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

Identify the SMPs to be used by providing the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use the Post-Construction SMP Identification section to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29. (acre-feet)
0.05

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

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

32. Provide the Minimum RRv required based on HSG. [Minimum RRv Required = (P) (0.95) (Ai) / 12, Ai=(s) (Aic)] (acre-feet)
None Specified

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?
None Specified

If Yes, go to question 33.

Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.

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

33. SMPs

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

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

NOTE: Use the Post-construction SMP Identification section to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question #29. (acre-feet)
None Specified

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

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a).
None Specified

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)?
None Specified

If Yes, go to question 36.

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

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

CPv Required (acre-feet)
None Specified

CPv Provided (acre-feet)
None Specified

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

Overbank Flood Control Criteria (Qp)

Pre-Development (CFS)
2.28

Post-Development (CFS)
1.72

Total Extreme Flood Control Criteria (Qf)

Pre-Development (CFS)
7.07

Post-Development (CFS)
3.41

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

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

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

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). (See question #32a) This space can also be used for other pertinent project information.
None Specified

POST-CONSTRUCTION SMP IDENTIFICATION

Runoff Reduction (RR) Techniques, Standard Stormwater Management Practices (SMPs) and Alternative SMPs

Identify the Post-construction SMPs to be used by providing the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

RR Techniques (Area Reduction)

Round to the nearest tenth

Total Contributing Acres for Conservation of Natural Area (RR-1)
None Specified

Total Contributing Impervious Acres for Conservation of Natural Area (RR-1)
None Specified

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

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

Total Contributing Acres for Tree Planting/Tree Pit (RR-3)
None Specified

Total Contributing Impervious Acres for Tree Planting/Tree Pit (RR-3)
None Specified

Total Contributing Acres for Disconnection of Rooftop Runoff (RR-4)
None Specified

RR Techniques (Volume Reduction)

Total Contributing Impervious Acres for Disconnection of Rooftop Runoff (RR-4)
None Specified

Total Contributing Impervious Acres for Vegetated Swale (RR-5)
None Specified

Total Contributing Impervious Acres for Rain Garden (RR-6)
None Specified

Total Contributing Impervious Acres for Stormwater Planter (RR-7)
None Specified

Total Contributing Impervious Acres for Rain Barrel/Cistern (RR-8)
None Specified

Total Contributing Impervious Acres for Porous Pavement (RR-9)
None Specified

Total Contributing Impervious Acres for Green Roof (RR-10)
None Specified

Standard SMPs with RRv Capacity

Total Contributing Impervious Acres for Infiltration Trench (I-1)
None Specified

Total Contributing Impervious Acres for Infiltration Basin (I-2)
0.61

Total Contributing Impervious Acres for Dry Well (I-3)
None Specified

Total Contributing Impervious Acres for Underground Infiltration System (I-4)
None Specified

Total Contributing Impervious Acres for Bioretention (F-5)
None Specified

Total Contributing Impervious Acres for Dry Swale (O-1)
None Specified

Standard SMPs

Total Contributing Impervious Acres for Micropool Extended Detention (P-1)
None Specified

Total Contributing Impervious Acres for Wet Pond (P-2)
None Specified

Total Contributing Impervious Acres for Wet Extended Detention (P-3)
None Specified

Total Contributing Impervious Acres for Multiple Pond System (P-4)
None Specified

Total Contributing Impervious Acres for Pocket Pond (P-5)
None Specified

Total Contributing Impervious Acres for Surface Sand Filter (F-1)
None Specified

Total Contributing Impervious Acres for Underground Sand Filter (F-2)
None Specified

Total Contributing Impervious Acres for Perimeter Sand Filter (F-3)
None Specified

Total Contributing Impervious Acres for Organic Filter (F-4)
None Specified

Total Contributing Impervious Acres for Shallow Wetland (W-1)
None Specified

Total Contributing Impervious Acres for Extended Detention Wetland (W-2)
None Specified

Total Contributing Impervious Acres for Pond/Wetland System (W-3)
None Specified

Total Contributing Impervious Acres for Pocket Wetland (W-4)
None Specified

Total Contributing Impervious Acres for Wet Swale (O-2)
None Specified

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

Total Contributing Impervious Area for Hydrodynamic
None Specified

Total Contributing Impervious Area for Wet Vault
None Specified

Total Contributing Impervious Area for Media Filter
None Specified

"Other" Alternative SMP?
None Specified

Total Contributing Impervious Area for "Other"
None Specified

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

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

Manufacturer of Alternative SMP
None Specified

Name of Alternative SMP
None Specified

OTHER PERMITS

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

If SPDES Multi-Sector GP, then give permit ID
None Specified

If Other, then identify
None Specified

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

If "Yes," then indicate Size of Impact, in acres, to the nearest tenth
None Specified

42. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned.
None Specified

MS4 SWPPP ACCEPTANCE

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

If No, skip question 44

44. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI?
Yes

MS4 SWPPP Acceptance Form Download

Download form from the link below. Complete, sign, and upload.

MS4 SWPPP Acceptance Form

MS4 Acceptance Form Upload

No files uploaded

Comment

None Specified

OWNER/OPERATOR CERTIFICATION

The owner/operator must download, sign, and upload the certification form in order to complete this application.

Owner/Operator Certification Form Download

Download the certification form by clicking the link below. Complete, sign, scan, and upload the form.

Owner/Operator Certification Form (PDF, 45KB)

Upload Owner/Operator Certification Form

No files uploaded

Comment

None Specified

At least one file is required.

New York State Department of Environmental Conservation Division of Water 625 Broadway, 4th Floor Albany, New York 12233-3505 MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form for Construction Activities Seeking Authorization Under SPDES General Permit *(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)

I. Project Owner/Operator Information
1. Owner/Operator Name:
2. Contact Person:
3. Street Address:
4. City/State/Zip:
II. Project Site Information
5. Project/Site Name:
6. Street Address:
7. City/State/Zip:
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

Attachment B:
Notice of Termination, (NOT)

New York State Department of Environmental Conservation Division of Water 625 Broadway, 4th Floor Albany, New York 12233-3505 ***(NOTE: Submit completed form to address above)*** **NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity**

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

I. Owner or Operator Information

1. Owner/Operator Name:

2. Street Address:

3. City/State/Zip:

4. Contact Person: | 4a.Telephone:

5. Contact Person E-Mail:

II. Project Site Information

5. Project/Site Name:

6. Street Address:

7. City/Zip:

8. County:

III. Reason for Termination

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

9b. G 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. G 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? G yes G no (If no, go to question 10f.)

10b. Have all post-construction stormwater management practices included in the final SWPPP been constructed? G yes G 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? G yes G no

10e. Indicate the method used to ensure long-term operation and maintenance of the post-construction stormwater management practice(s): G Post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality. G Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s). G For post-construction stormwater management practices that are privately owned, the deed of record has been modified to include a deed covenant that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan. G For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, college, university), or government agency or authority, 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? G yes G 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:

Attachment C:
Certification Forms

CONTRACTOR and SUBCONTRACTOR CERTIFICATION STATEMENT

for the New York State Department of Environmental Conservation (DEC) State Pollutant Discharge Elimination System Permit for Stormwater Discharges from Construction Activity (GP-0-10-001)

As per *Part III.A.6* on page 13 of *GP-0-10-001* (effective January 29, 2010):

'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 sub-contractors 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 contractor and subcontractor involved in soil disturbance sign a copy of the following certification statement before they commence <u>any</u> *construction activity*:

_____	**NYR** _____	_____
Name of Construction Site	*DEC Permit ID*	*Municipality (MS4)*

"I hereby certify that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the 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 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.

Responsible Corporate Officer/Partner Signature	Date
Name of above Signatory	Name of Company
Title of above Signatory	Mailing Address
Telephone of Company	City, State and Zip

Identify the specific elements of the SWPPP the contractor or subcontractor is responsible for:

***'TRAINED CONTRACTOR'* FOR THE CERTIFIED CONTRACTOR OR SUBCONTRACTOR**

_____	_____	_____
Name of Trained Employee	*Title of Trained Employee*	*NYSDEC SWT #*

A copy of this signed contractor certification statement must be maintained at the SWPPP on site

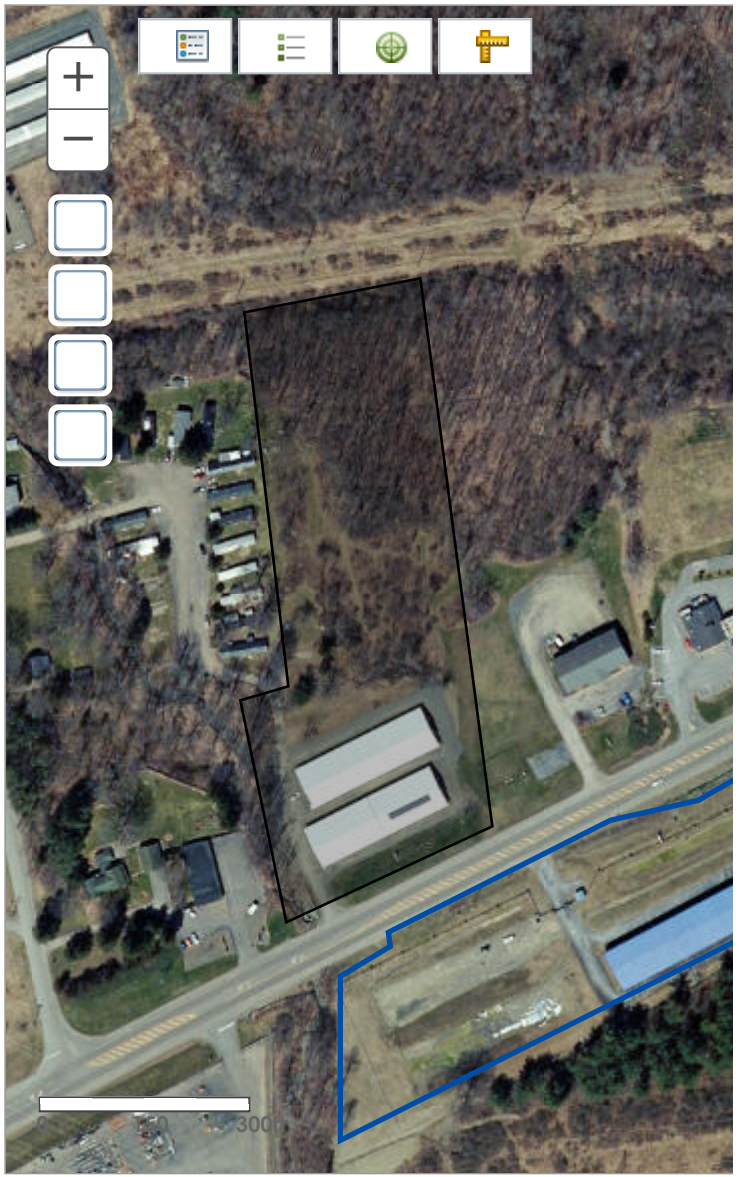
Attachment D:
Circles and Squares Map

CRIS NYS Cultural Resource Information System

HOME SUBMIT SEARCH COMMUNICATE

Criteria | Spatial | Results

No Spatial Features were found



Attachment E:
Inspection Report (Sample Form)

Town of , NY

Construction Stormwater Inspection Report for SPDES General Permit GP-0-20-001

Project Name and Location:		Date:	Weather: Soil Conditions:
		Permit # (if any): NY R	
Municipality:	County:	Entry Time:	Exit Time:
Name of SPDES Permittee: Contacted: Yes No Phone Number:		Inspection Type: Compliance Referral Complaint NOT	
On-site Representative(s) and Company(s): Phone Number(s):			

SPDES Authority

	Yes	No	N/A		Citation
1.				Does the project have permit coverage?	GP-0-20-001: I.A & II. B.
2.				Is a copy of the NOI and Acknowledgment Letter available on site and accessible for viewing?	GP-0-20-001: II.C. 2.
3.				Is a copy of the MS4 SWPPP Acceptance Form available on site and accessible for viewing?	GP-0-20-001: II.C. 2.
4.				Is an up-to-date copy of the signed SWPPP retained at the construction site?	GP-0-20-001: II.C. 2. & III.A.4.
5.				Is a copy of the SPDES General Permit retained at the construction site?	GP-0-20-001: II.C. 2.
6.				Does the NOI accurately report the number of acres to be disturbed?	GP-0-20-001: II.B.5.

SWPPP Content

	Yes	No	N/A		Citation
7.				Does the SWPPP describe and identify the erosion and sediment control measures to be employed?	GP-0-20-001: III.B.1.e
8.				Does the SWPPP provide an inspection schedule and maintenance requirements for the E&SC measures?	GP-0-20-001: III.B.1 h. & i.
9.				Does the SWPPP describe and identify the stormwater management practices to be employed?	GP-0-20-001: III.B.2.
10.				Does the SWPPP identify the contractor(s) and subcontractor(s) responsible for each measure?	GP-0-20-001: III.A.6.
11.				Does the SWPPP identify at least one trained individual from each contractor(s) and subcontractor(s) companies?	GP-0-20-001: III.A.6.
12.				Does the SWPPP include all the necessary Contractor Certification Statements and signatures?	GP-0-20-001: III.A.6.
13.				Is the SWPPP signed by the permittee?	GP-0-20-001: VII.H.2.
14.				Is the SWPPP prepared by a qualified professional (if post-construction stormwater management required)?	GP-0-20-001: III.A.3.
15.				Do the SMPs conform to the Enhanced Phosphorus Removal Standards (projects in TMDL watersheds)?	GP-0-20-001: III.B.3.

Recordkeeping

	Yes	No	N/A		Citation
16.				Are self-inspections performed as required by the permit (weekly, or twice weekly for >5 acres disturbed)?	GP-0-20-001:IV.C.2.a. & b.
17.				Are the self-inspections performed by and signed by a qualified inspector and retained on site?	GP-0-20-01:II.C.2 &IV.C.6 &VII.H.3
18.				Do the qualified inspector's reports include the minimum reporting requirements?	GP-0-20-001: IV.C.4.
19.				Do inspection reports identify corrective measures that have not been implemented or are recurring?	GP-0-20-001: IV.C.5.

Visual Observations

	Yes	No	N/A		Citation
20.				Are all erosion and sediment control measures installed properly?	GP-0-20-001: VII.L.
21.				Are all erosion and sediment control measures being maintained properly?	GP-0-20-001: IV.A.1
22.				Was written authorization issued for any disturbance greater than 5 acres?	GP-0-20-001: II.C.3.
23.				Have stabilization measures been implemented in inactive areas per Permit (>5 acres) and E&SC Standards?	GP-0-20-001: II.C.3.b. & III.B.1.f.
24.				Are post-construction stormwater management practices constructed/installed correctly?	GP-0-20-001: II.C.1. & III.B.2.
25.				Has final site stabilization been achieved and temporary E&SC measures removed prior to NOT submittal?	GP-0-20-001: V.A.2.
26.				Was there a discharge from the site on the day of inspection?	
27.				Is there evidence that a discharge caused or contributed to a violation of water quality standards?	ECL 17-0501, 6 NYCRR 703.2, GP-0-20-001: I.B.

Water Quality Observations

Describe the discharge(s): location, source(s), impact on receiving water(s), etc.

Describe the quality of the receiving water(s) both upstream and downstream of the discharge

Describe any other water quality standards or permit violations

Additional Comments

Photographs attached

Overall Inspection Rating: Satisfactory Marginal Unsatisfactory	
Name/Agency of Lead Inspector:	Signature of Lead Inspector:
Names/Agencies of Other Inspectors:	

Attachment F:
Record of Stabilization and Construction Activity Dates
(Sample Form)

SITE STABILIZATION
and
CONSTRUCTION ACTIVITY DATES

A record of dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated shall be maintained until final site stabilization is achieved and the Notice of Termination is filed. The dates can be entered in the following form, or on a different form.

MAJOR GRADING ACTIVITIES:

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Description of Activity: _____
Begin (date): _____ Site Contractor: _____
Location: _____
End (date): _____

Attachment G:
Vegetative and Structural Measures For Erosion and Sediment Control

(NYS Standards & Specifications for Erosion & Sediment Control)

(Reference)

STANDARD AND SPECIFICATIONS FOR MULCHING

Definition and Scope

Applying coarse plant residue or chips, or other suitable materials, to cover the soil surface to provide initial erosion control while a seeding or shrub planting is establishing. Mulch will conserve moisture and modify the surface soil temperature and reduce fluctuation of both. Mulch will prevent soil surface crusting and aid in weed control. Mulch can also be used alone for temporary stabilization in non-growing months. Use of stone as a mulch could be more permanent and should not be limited to non-growing months.

Conditions Where Practice Applies

On soils subject to erosion and on new seedings and shrub plantings. Mulch is useful on soils with low infiltration rates by retarding runoff.

Criteria

Site preparation prior to mulching requires the installation of necessary erosion control or water management practices and drainage systems.

Slope, grade and smooth the site to fit needs of selected mulch products.

Remove all undesirable stones and other debris to meet the needs of the anticipated land use and maintenance required.

Apply mulch after soil amendments and planting is accomplished or simultaneously if hydroseeding is used.

Select appropriate mulch material and application rate or material needs. Hay mulch shall not be used in wetlands or in areas of permanent seeding. Clean straw mulch is preferred alternative in wetland application. Determine local availability.

Select appropriate mulch anchoring material.

NOTE: The best combination for grass/legume establishment is straw (cereal grain) mulch applied at 2 ton/ acre (90 lbs./1000sq.ft.) and anchored with wood fiber mulch (hydromulch) at 500 – 750 lbs./acre (11 – 17 lbs./1000 sq. ft.). The wood fiber mulch must be applied through a hydroseeder immediately after mulching.

Table 4.2
Guide to Mulch Materials, Rates, and Uses

Mulch Material	Quality Standards	per 1000 Sq. Ft.	per Acre	Depth of Application	Remarks
Wood chips or shavings	Air-dried. Free of objectionable coarse material	500-900 lbs.	10-20 tons	2-7”	Used primarily around shrub and tree plantings and recreation trails to inhibit weed competition. Resistant to wind blowing. Decomposes slowly.
Wood fiber cellulose (partly digested wood fibers)	Made from natural wood usually with green dye and dispersing agent	50 lbs.	2,000 lbs.	—	Apply with hydromulcher. No tie down required. Less erosion control provided than 2 tons of hay or straw.
Gravel, Crushed Stone or Slag	Washed; Size 2B or 3A—1 1/2”	9 cu. yds.	405 cu. yds.	3”	Excellent mulch for short slopes and around plants and ornamentals. Use 2B where subject to traffic. (Approximately 2,000 lbs./cu. yd.). Frequently used over filter fabric for better weed control.
Hay or Straw	Air-dried; free of undesirable seeds & coarse materials	90-100 lbs. 2-3 bales	2 tons (100-120 bales)	cover about 90% surface	Use small grain straw where mulch is maintained for more than three months. Subject to wind blowing unless anchored. Most commonly used mulching material. Provides the best micro-environment for germinating seeds.
Jute twisted yarn	Undyed, unbleached plain weave. Warp 78 ends/yd., Weft 41 ends/yd. 60-90 lbs./roll	48” x 50 yds. or 48” x 75 yds.	—	—	Use without additional mulch. Tie down as per manufacturers specifications. Good for center line of concentrated water flow.
Excelsior wood fiber mats	Interlocking web of excelsior fibers with photodegradable plastic netting	4’ x 112.5’ or 8’ x 112.5’.	—	—	Use without additional mulch. Excellent for seeding establishment. Anchor as per manufacturers specifications. Approximately 72 lbs./roll for excelsior with plastic on both sides. Use two sided plastic for centerline of waterways.
Straw or coconut fiber, or combination	Photodegradable plastic net on one or two sides	Most are 6.5 ft. x 3.5 ft.	81 rolls	—	Designed to tolerate higher velocity water flow, centerlines of waterways, 60 sq. yds. per roll.

Table 4.3
Mulch Anchoring Guide

Anchoring Method or Material	Kind of Mulch to be Anchored	How to Apply
1. Peg and Twine	Hay or straw	After mulching, divide areas into blocks approximately 1 sq. yd. in size. Drive 4-6 pegs per block to within 2" to 3" of soil surface. Secure mulch to surface by stretching twine between pegs in criss-cross pattern on each block. Secure twine around each peg with 2 or more tight turns. Drive pegs flush with soil. Driving stakes into ground tightens the twine.
2. Mulch netting	Hay or straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manufacturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
3. Wood cellulose fiber	Hay or straw	Apply with hydroseeder immediately after mulching. Use 500 lbs. wood fiber per acre. Some products contain an adhesive material ("tackifier"), possibly advantageous.
4. Mulch anchoring tool	Hay or straw	Apply mulch and pull a mulch anchoring tool (blunt, straight discs) over mulch as near to the contour as possible. Mulch material should be "tucked" into soil surface about 3".
5. Tackifier	Hay or straw	Mix and apply polymeric and gum tackifiers according to manufacturer's instructions. Avoid application during rain. A 24-hour curing period and a soil temperature higher than 45^0 Fahrenheit are required.

STANDARD AND SPECIFICATIONS FOR PERMANENT CONSTRUCTION AREA PLANTING

Definition & Scope

Establishing **permanent** grasses with other forbs and/or shrubs to provide a minimum 80% perennial vegetative cover on areas disturbed by construction and critical areas to reduce erosion and sediment transport. Critical areas may include but are not limited to steep excavated cut or fill slopes as well as eroding or denuded natural slopes and areas subject to erosion.

Conditions Where Practice Applies

This practice applies to all disturbed areas void of, or having insufficient, cover to prevent erosion and sediment transport. See additional standards for special situations such as sand dunes and sand and gravel pits.

Criteria

All water control measures will be installed as needed prior to final grading and seedbed preparation. Any severely compacted sections will require chiseling or disking to provide an adequate rooting zone, to a minimum depth of 12", see Soil Restoration Standard. The seedbed must be prepared to allow good soil to seed contact, with the soil not too soft and not too compact. Adequate soil moisture must be present to accomplish this. If surface is powder dry or sticky wet, postpone operations until moisture changes to a favorable condition. If seeding is accomplished within 24 hours of final grading, additional scarification is generally not needed, especially on ditch or stream banks. Remove all stones and other debris from the surface that are greater than 4 inches, or that will interfere with future mowing or maintenance.

Soil amendments should be incorporated into the upper 2 inches of soil when feasible. **The soil should be tested to determine the amounts of amendments needed.** Apply ground agricultural limestone to attain a pH of 6.0 in the upper 2 inches of soil. If soil must be fertilized before results of a soil test can be obtained to determine fertilizer needs, apply commercial fertilizer at 600 lbs. per acre of 5-5 -10 or equivalent. If manure is used, apply a quantity to meet the nutrients of the above fertilizer. This requires an appropriate manure analysis prior to applying to the site. Do not use manure on sites to be planted with birdsfoot trefoil or in the path of concentrated water flow.

Seed mixtures may vary depending on location within the state and time of seeding. Generally, warm season grasses should only be seeded during early spring, April to May. These grasses are primarily used for vegetating excessively drained sands and gravels. See Standard and Specification for Sand and Gravel Mine Reclamation. Other grasses may be seeded any time of the year when the soil is not frozen and is workable. When legumes such as birdsfoot trefoil are included, spring seeding is preferred. See Table 4.4, "Permanent Construction Area Planting Mixture Recommendations" for additional seed mixtures.

General Seed Mix:	**Variety**	**lbs./ acre**	**lbs/1000 sq. ft.**
Red Clover[1] OR	Acclaim, Rally, Red Head II, Renegade	8[2]	0.20
Common white clover[1]	Common	8	0.20
PLUS			
Creeping Red Fescue	Common	20	0.45
PLUS			
Smooth Bromegrass OR	Common	2	0.05
Ryegrass (perennial)	Pennfine/Linn	5	0.10

[1] add inoculant immediately prior to seeding
[2] Mix 4 lbs each of Empire and Pardee OR 4 lbs of Birdsfoot and 4 lbs white clover per acre. All seeding rates are given for Pure Live Seed (PLS)

Pure Live Seed, or (PLS) refers to the amount of live seed in a lot of bulk seed. Information on the seed bag label includes the type of seed, supplier, test date, source of seed, purity, and germination. Purity is the percentage of pure seed. Germination is the percentage of pure seed that will produce normal plants when planted under favorable conditions.

To compute Pure Live Seed multiply the "germination percent" times the "purity" and divide that by 100 to get Pure Live Seed.

$$\text{Pure Live Seed (PLS)} = \frac{\%\,\text{Germination} \times \%\,\text{Purity}}{100}$$

For example, the PLS for a lot of Kentucky Blue grass with 75% purity and 96% germination would be calculated as follows:

$$\frac{(96) \times (75)}{100} = 72\%\ \text{Pure Live Seed}$$

For 10lbs of PLS from this lot =

$$\frac{10}{0.72} = 13.9\ \text{lbs}$$

Therefore, 13.9 lbs of seed is the actual weight needed to meet 10lbs PSL from this specific seed lot.

Time of Seeding: The optimum timing for the general seed mixture is early spring. Permanent seedings may be made any time of year if properly mulched and adequate moisture is provided. Late June through early August is not a good time to seed, but may facilitate covering the land without additional disturbance if construction is completed. Portions of the seeding may fail due to drought and heat. These areas may need reseeding in late summer/fall or the following spring.

Method of seeding: Broadcasting, drilling, cultipack type seeding, or hydroseeding are acceptable methods. Proper soil to seed contact is key to successful seedings.

Mulching: Mulching is essential to obtain a uniform stand of seeded plants. Optimum benefits of mulching new seedings are obtained with the use of small grain straw applied at a rate of 2 tons per acre, and anchored with a netting or tackifier. See the Standard and Specifications for Mulching for choices and requirements.

Irrigation: Watering may be essential to establish a new seeding when a drought condition occurs shortly after a new seeding emerges. Irrigation is a specialized practice and care must be taken not to exceed the application rate for the soil or subsoil. When disconnecting irrigation pipe, be sure pipes are drained in a safe manor, not creating an erosion concern.

80% Perennial Vegetative Cover

50% Perennial Vegetative Cover

Table 4.4
Permanent Construction Area Planting Mixture Recommendations

Seed Mixture	Variety	Rate in lbs./acre (PLS)	Rate in lbs./ 1, 000 ft^2
Mix #1			
Creeping red fescue	Ensylva, Pennlawn, Boreal	10	.25
Perennial ryegrass	Pennfine, Linn	10	.25
*This mix is used extensively for shaded areas.			
Mix #2			
Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	20	.50
*This rate is in pure live seed, this would be an excellent choice along the upland edge of a wetland to filter runoff and provide wildlife benefits. In areas where erosion may be a problem, a companion seeding of sand lovegrass should be added to provide quick cover at a rate of 2 lbs. per acre (0.05 lbs. per 1000 sq. ft.).			
Mix #3			
Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	4	.10
Big bluestem	Niagara	4	.10
Little bluestem	Aldous or Camper	2	.05
Indiangrass	Rumsey	4	.10
Coastal panicgrass	Atlantic	2	.05
Sideoats grama	El Reno or Trailway	2	.05
Wildflower mix		.50	.01
*This mix has been successful on sand and gravel plantings. It is very difficult to seed without a warm season grass seeder such as a Truax seed drill. Broadcasting this seed is very difficult due to the fluffy nature of some of the seed, such as bluestems and indiangrass.			
Mix #4			
Switchgrass	Shelter, Pathfinder, Trailblazer, or Blackwell	10	.25
Coastal panicgrass	Atlantic	10	.25
*This mix is salt tolerant, a good choice along the upland edge of tidal areas and roadsides.			
Mix #5			
Saltmeadow cordgrass (Spartina patens)—This grass is used for tidal shoreline protection and tidal marsh restoration. It is planted by vegetative stem divisions. 'Cape' American beachgrass can be planted for sand dune stabilization above the saltmeadow cordgrass zone.			
Mix #6			
Creeping red fescue	Ensylva, Pennlawn, Boreal	20	.45
Chewings Fescue	Common	20	.45
Perennial ryegrass	Pennfine, Linn	5	.10
Red Clover	Common	10	.45
*General purpose erosion control mix. Not to be used for a turf planting or play grounds.			

STRUCTURAL MEASURES FOR EROSION AND SEDIMENT CONTROL

General

Uncontrolled runoff and excess erosion often occurs in urban developments, particularly during the construction stage. This erosion forms rills and gullies; washes out roads; scours cut and fill areas; fills road ditches, storm drains, and streams; and does other damage that is costly to the developers and damaging to land and water users below. Careful inclusion of proven conservation practices in the development plan can prevent or alleviate much of this damage and should be a part of every development plan.

These practices will usually be a combination of vegetative and structural measures. They may be temporary and serve only during the construction stage or they may be permanent in nature and become a part of the completed development. Permanent structural practices should be installed as early as possible in the construction stage. This section deals with the more common structural measures that may be used. Adequate designs, plans, and specification should be prepared for the measures to be used. A number of measures and specifications are included throughout this section. The designer shall determine those elements to be installed to control erosion (Section 2) and follow the criteria included in these standards and specifications.

Introduction

Structural erosion and sediment control practices have been classified as either temporary or permanent, according to how they are used. Temporary structural practices are used during construction to prevent offsite sedimentation. The length of time that temporary practices are functional varies from project to project, since the sediment control strategy may change as construction activity progresses. Permanent structural practices are used to convey surface water runoff to a safe outlet. Permanent structural practices will remain in place and continue to function after the completion of construction.

Regardless of whether the practices are temporary or permanent, runoff control measures should be the first items constructed when grading begins, and be completely functional before downslope land disturbance takes place. Earthen structures such as diversions, dikes, and swales should be stabilized before being considered functional. Only after the runoff control structures are operational and sediment control measures are in place, should clearing and grading on the rest of the construction site begin.

While clearing and grading the site, it is important to minimize the amount of sediment that is produced. In general, it is advantageous to clear only as much area as is necessary to accommodate construction needs. Grade and stabilize large sites in stages whenever possible. Limiting the amount of disturbed area limits the amount of sediment that is generated, thus decreasing the amount of maintenance required on sediment control measures.

Sediment generated during the construction of cut and fill slopes can also be minimized through design and grading techniques. When designing either a cut or fill slope, factors to consider include slope length and steepness, soil type, and upslope drainage area. In general, it is important to leave soil surfaces on disturbed slopes in a roughened condition and to construct a water diversion practice at the top of slopes. Rough soil surfaces do not erode as readily as smooth soil surfaces.

Although design and grading techniques can reduce soil erosion, they cannot eliminate it entirely. Therefore, practices must be installed to prevent offsite sedimentation.

Even though the specific conditions of each site determine what measures are necessary to control erosion and sedimentation, some general principles apply to the selection and placement of sediment control measures.

1. Prevent clean water from becoming turbid, by diverting runoff from upslope areas away from disturbed areas. Earth dikes, temporary swales, perimeter dike/swales, or diversions that outlet in stable areas can be used in this capacity.

2. Remove sediment from turbid water before the water leaves the site. The method of sediment removal depends upon how the water drains from the site. Concentrated flow must be diverted to a trapping device so that suspended sediment can be deposited. Dikes or swales that outlet into traps or basins can accomplish this. A storm drain system may be used to convey concentrated sediment laden water only if the system empties into a trap or basin. Otherwise, all storm drain inlets must be protected so that sediment laden water cannot enter the drainage system before being treated to remove the sediment.

3. Surface runoff draining in sheet flow must be controlled and treated before the water leaves the site. Straw bale dikes, silt fences, or vegetative buffer strips can be used to treat sheet flow.

All practices designed and implemented must be properly maintained in order to remain functional. Sediment accumulated in basins and traps must be removed and disposed of in a manner that stabilizes them on the construction site.

Other factors should be observed during construction in order to make erosion and sediment control measures more effective in pollution control.

These are:

1. Sprinkle or apply dust suppressors. Keep dust down to a tolerable limit on construction sites and haul roads.

2. Use temporary bridges or culverts where fording of streams is objectionable. Avoid borrow areas where pollution from this operation is inevitable.

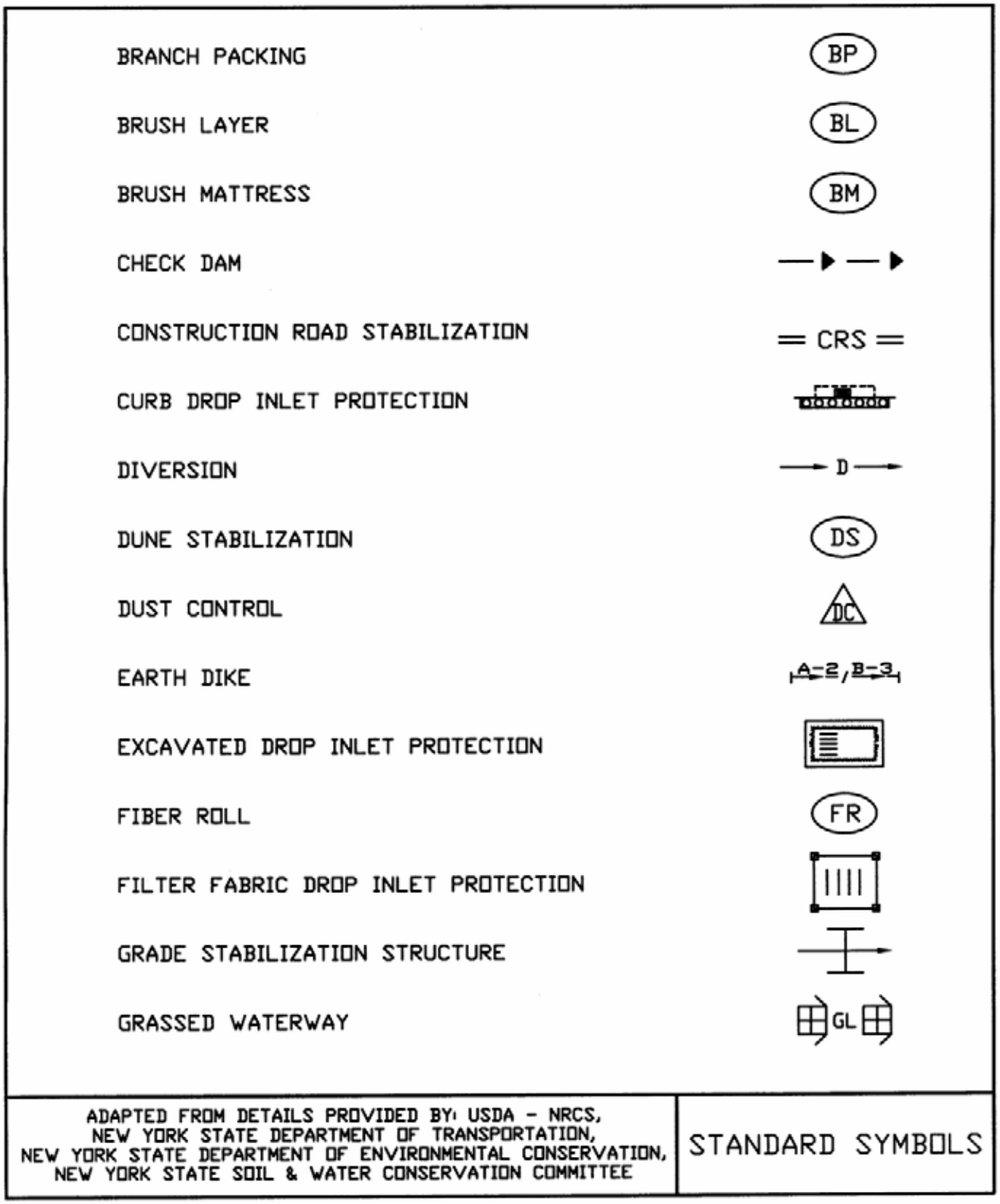
3. Protect streams from chemicals, fuel, lubricants, sewage, or other pollutants.

4. Avoid disposal of fill in floodplains or drainage ways. This reduces the capacity of these areas to pass flood flows.

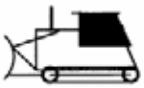
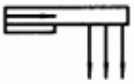
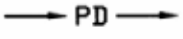
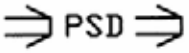
5. Do not locate sanitary facilities over, or adjacent to, waterways, wells, or springs.

6. Locate storage yards and stockpiles where erosion and sediment hazards are slight. Where this is not possible, apply necessary erosion control practices.

STANDARD SYMBOLS

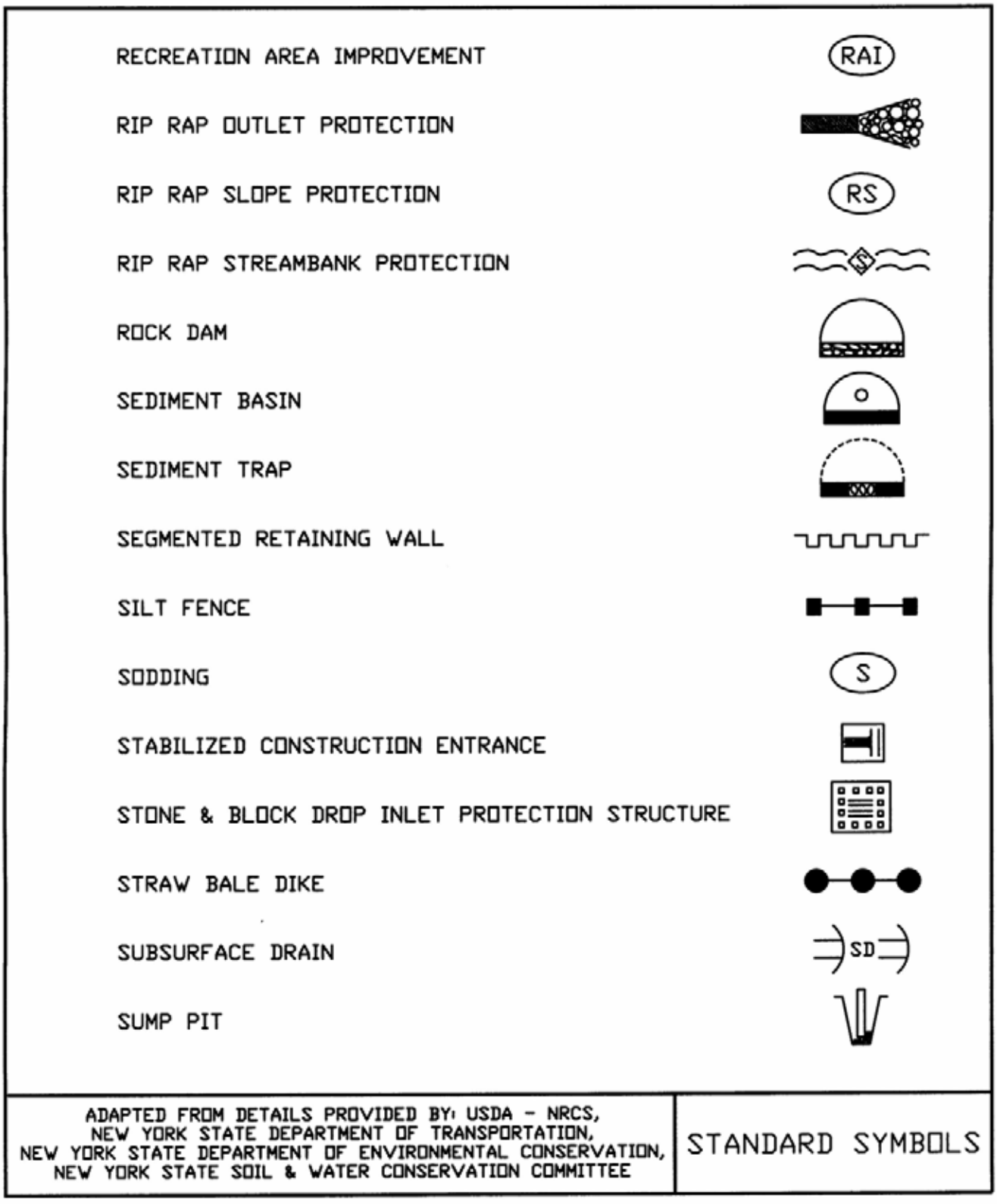


STANDARD SYMBOLS (cont'd)

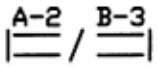
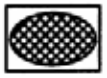
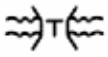
LAND GRADING	
LEVEL SPREADER	
LINED WATERWAY	
LIVE CRIBWALL	
LIVE CUTTINGS/LIVE STAKES PLANTING	
LIVE FASCINE	
MULCHING	
OPTIONAL SEDIMENT TRAP DEWATERING DEVICE	
PAVED FLUME	
PERIMETER DIKE OR SWALE	
PERMANENT SEEDING	
PIPE OUTLET SEDIMENT TRAP	
PIPE SLOPE DRAIN FLEXIBLE	
PORTABLE SEDIMENT TANK	
PROTECTING VEGETATION	

ADAPTED FROM DETAILS PROVIDED BY: USDA – NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STANDARD SYMBOLS

STANDARD SYMBOLS (cont'd)



STANDARD SYMBOLS (cont'd)

SURFACE ROUGHENING	
TEMPORARY SEEDING	
TEMPORARY SWALE	
TOPSOILING	
TREE REVETMENT	
TURBIDITY CURTAIN	
VEGETATED ROCK GABIONS	
WATER BAR	
WATERWAY CROSSING	

ADAPTED FROM DETAILS PROVIDED BY: USDA – NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STANDARD SYMBOLS

Attachment H:
NYSDEC Stormwater Construction Checklists (Sample Form)

Infiltration Basin Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
1. Pre-Construction		
Runoff diverted		
Soil permeability tested		
Groundwater / bedrock depth		
2. Excavation		
Size and location		
Side slopes stable		
Excavation does not compact subsoils		
3. Embankment		
Barrel		
Anti-seep collar or Filter diaphragm		
Fill material		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
4. Final Excavation		
Drainage area stabilized		
Sediment removed from facility		
Basin floor tilled		
Facility stabilized		
5. Final Inspection		
Pretreatment facility in place		
Inlets / outlets		
Contributing watershed stabilized before flow is routed to the factility		

Comments:

Actions to be Taken:

Open Channel System Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Pre-Construction		
Pre-construction meeting		
Runoff diverted		
Facility location staked out		
2. Excavation		
Size and location		
Side slope stable		
Soil permeability		
Groundwater / bedrock		
Lateral slopes completely level		
Longitudinal slopes within design range		
Excavation does not compact subsoils		
3. Check dams		
Dimensions		
Spacing		
Materials		

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
4. Structural Components		
Underdrain installed correctly		
Inflow installed correctly		
Pretreatment devices installed		
5. Vegetation		
Complies with planting specifications		
Topsoil adequate in composition and placement		
Adequate erosion control measures in place		
6. Final inspection		
Dimensions		
Check dams		
Proper outlet		
Effective stand of vegetation and stabilization		
Contributing watershed stabilized before flow is routed to the factility		

Comments:

Actions to be Taken:

Attachment I:
NYSDEC
Operation & Maintenance
Checklist
(Sample Form)

Open Channel Operation, Maintenance, and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY/ UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Contributing areas clean of debris		
2. Check Dams or Energy Dissipators (Annual, After Major Storms)		
No evidence of flow going around structures		
No evidence of erosion at downstream toe		
Soil permeability		
Groundwater / bedrock		
3. Vegetation (Monthly)		
Mowing done when needed		
Minimum mowing depth not exceeded		
No evidence of erosion		
Fertilized per specification		
4. Dewatering (Monthly)		
Dewaters between storms		

MAINTENANCE ITEM	SATISFACTORY/ UNSATISFACTORY	COMMENTS
5. Sediment deposition (Annual)		
Clean of sediment		
6. Outlet/Overflow Spillway (Annual)		
Good condition, no need for repairs		
No evidence of erosion		

Comments:

Actions to be Taken:

Attachment J:
Stormwater Management
Summary

INDEX

Stormwater Management Summary

STORMWATER MANAGEMENT SUMMARY

SITE DATA - GENERAL

Site Notes: This summary is for a proposed four season storage facility consisting of a single 102' x 167' commercial structure and associated gravel parking/driveway area. The project is situated on a 133,785-SF (3.07-AC) parcel in the Town of Dryden, Dryden, NY. The project will disturb roughly 49,406-SF (1.13-AC) of former woods, brush, and manmade fill type areas. Overall, the project will add 13,890-SF of impervious cover over existing surfaces (12,527-SF) representing a site increase of 10.88%.

Subcatchment Evaluation: There is one pre-developed (existing) watershed subcatchment (ESC-1) for this site totaling 61,335-SF (1.41-AC). Generally, existing topography moves in a south to north direction starting from an adjacent property south of the project over a single steep slope. Flow then runs over gentle terrain of between 0.5 and 1.0% across the site where it terminates at a single design point, (DP-1) northeast of the parcel. The entire watershed is tributary to Fall Creek.

The proposed development will disturb approximately 1.13-AC of land. Drainage areas impacted by construction have been divided into 3 separate subcatchments (PSC-1 – PSC-3). PSC-2 and 3 represent those areas impacted by construction which will require water quality treatment and quantity attenuation to reduce runoff rates to less than or equal to existing conditions. Driveway and parking runoff as well as the western half of the building rooftop will be directed into a new pretreatment grassed channel installed along the western property line. The swale will terminate at the north end of the site into an engineered infiltration basin. Similarly, roof runoff from the eastern half of the building rooftop as well as a small portion of the southern lot will be directed into a grassed channel along the eastern border. This swale will also terminate at the practice.

The infiltration basin has been sized for 100% water quality volume. Additional site runoff quantity controls for the 10 and 100 yr storms are unnecessary as the cumulative reduction provided by this green infrastructure control also reduces the overall site runoff to less than pre-developed conditions.

PSC-1 represents off-site runoff which would normally flow unchecked across the construction project. Instead, the subcatchment will be collected by a newly constructed west to east diversion swale along the southern border. The channel will eventually join an existing drainageway which runs just off-site to the east.

Site Control Methods: This project follows the newer DEC design standards on runoff reduction by applying green infrastructure techniques and standard stormwater management practices to provide source control for impervious surfaces. The site incorporates a single infiltration basin to meet water quality and quantity needs.

Site Soils: There is one site soil type in the hydrologic soil group A located throughout the drainage area. Chenango is a gravely silt loam with rapid permeability range of 0.57 – 5.95"/hr.

Soils data was obtained from the USDA Soil Conservation Service web soil survey.

Site Topography: The site as a whole has an average gentle slope of 1% primarily moving downhill from south to north.

Site Watershed: Of the 1.41-acre watershed, the area of disturbance will be approximately 1.13-acres. A diversion swale will be located along the site's southern property line to capture off-site runoff and direct it into an existing swale at the southeast corner of the property. Similarly, two (2) 216-LF x 4' x 1' (864-CF) grassed channels will run along the site's western and eastern property lines to capture and direct on-site runoff into an infiltration basin at the northern edge of the project. The grassed channels will act as pretreatment practices with a combined sizing providing near 90% of the required site water quality volume.

Rainfall: Rainfall data used in the modeling and analysis was taken from Technical Paper No. 40, Rainfall Frequency Atlas of the U.S. Weather Bureau, published by the U.S. Department of Agriculture. Rainfall data specific to Tompkins County under consideration, for various 24-hour storm events tabled below:

RAINFALL DATA

STORM	24-HOUR RAINFALL
1-year	2.01 inches
10-year	3.43 inches
100-year	5.94 inches

These values were used in modeling for the evaluation of existing and proposed stormwater run-off conditions.

DP-1

RUNOFF REDUCTION VOLUME MANAGEMENT STRATEGY

1. **Water Quality Volume and Runoff Reduction Stormwater Management Strategy** - *Reference modeling results and WQv/RRv worksheets which follow this summary:*

The total site water quality volume for DP-1 is

WQv = 2,176 cu-ft (0.05af)

Of this amount, there was no potential for the conservation of natural areas, protection of riparian areas, tree planting, rooftop disconnection, etc. that would lend to a reduction in total WQv.

WQv credit = 0 *cuft (0.00 af)*

The minimum RRv was based on the following calculation:

Soil group for site:

A – 0.38-AC S = 55%
D – 0.63-AC S = 20%

Minimum RRv:

S = 0.33 (total)
Impervious Area = 0.61-AC
Precipitation = 1.0 in
Rv = 0.95

Minimum Rv = [(P)(Rv)(A)] /12 = ((1.0 **** 0.95"/AC * 0.61AC)/12)0.33*** =

698 cuft or, 0.0159-acft

2. **Water Quality Volume Treatment Practices**

One infiltration basin has been designed to the minimum total volume specifications as calculated in the attached practice worksheets. A summary of total runoff reduction volumes is provided in the table below:

Subcatchment	Required RRv (cuft)	RRv Applied (Cuft)	Practice
PSC2 and PSC3	2,176	2,176	IB
	2,176	2,176	

3. Total of RRv

Total RRv provided by practices 2,176 cuft (0.05-AF)
Total Remaining Storage Volume for practices (after RRv) 2,176 cuft - 2,176 cuft = 0 cuft (0.00af)

Is provided RRv > adjusted WQv from #1? 0.05 acft > 0.05 acft **YES**
Is provided RRv > minimum RRv for A and D soils from #1? 0.05 acft > 0.0159 acft **YES**

Is volume available within practices for remaining untreated WQv?

Total design point WQv 0.05 AF
RRv 0.05 AF
Remaining WQv 0.000AF

Additional volume available in infiltration basin. (Remaining storage volume in addition to storage required for WQv in bioretention area 1 to primary overflow) – NA cuft (NA) AF **N/A**

Is all of the watershed drainage area treated by either area reduction or source control practices? **YES**

Is all of the watershed impervious area treated with either reduction or source control practices? **YES**

Minimum runoff reduction requirements are met for this project.

Design Point 1 Summary (DP-1)

Channel Protection (Cpv)
Default Criterion:

Cpv = 24 hour extended detention of post-developed 1-year, 24-hour
Storm event (**2.01-inch rainfall Tompkins County**) after runoff reduction (RRv). **1 yr Cpv 0.038-AF – RRv 0.05 AF = -0.012 AF (-523-CF).**

The **Cpv** Channel Protection Volume is met through runoff reduction volume practices. Requirement has been waived.

Overbank Flood (Qp) – DP1

Qp = Controls the peak discharge from the 10-year storm **(3.43-inch rainfall Tompkins County)** to 10-year predevelopment rates.

Pre-developed max rate = **2.28-CFS**, Total Volume = 0.09AF (3,920-CF). Post-developed w/o controls max rate = 3.76-CFS, Total Volume = 0.182 -AF (7,928-CF). **The maximum post-developed run-off rate with the grassed channels and infiltration basin in-line is 1.72-CFS, and the total run-off volume is 0.070-AF (3,049-CF).**

The **Qp** Overbank Flood control criterion is met with the basin as designed.

Extreme Storm (Qf) – DP1

Control the peak discharge from the 100-year storm **(5.94-inch rainfall Tomkins County)** to 100-year predevelopment rates. Safely pass the 100-year storm event.

Pre-developed max run-off rate = **7.07-CFS**, Total Volume = 0.277-AF (12,066-CF). Post-developed w/o controls max rate = 8.40-CFS, Total Volume = 0.422 -AF (18,382-CF). The infiltration basin and its outlets were sized to attenuate the run-off from the post-developed 100-year storm event to that of less than or equal to pre-developed 100 year storm event. **The maximum post-developed run-off rate with the forebays and pocket pond in line is 3.41-CFS, and the total run-off volume is 0.281-AF (12,240-CF).**

The **Qf** Extreme Storm control criterion is met with the grassed channels and infiltration basin as designed.

METHODOLOGY

The methodology used for the hydrologic and hydraulic analysis was obtained from the United States Department of Agriculture (USDA) Soil Conservation Service's (SCS) Technical Release No. 20, as implemented by the application program HydroCAD. HydroCAD, developed by Applied Microcomputer Systems of Chocorua, 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. It utilizes the latest modeling techniques to predict the consequences of any given storm.

HydroCAD has the capability of computing hydrographs and routing flows through pipes, streams and ponds. Hydrographs represent discharge rates characteristic of specified watershed conditions, precipitation and geologic factors.

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

Subcatchment: A relatively homogeneous area of land, which produces a volume and rate of surface run-off unique to that area.

Reach: Uniform streams, channels or pipes which convey stormwater from one distinct point to another reach or pond.

Pond: Natural or man-made impoundment (ie. pond), which temporarily stores stormwater run-off and empties in a manner determined by its geometry and the hydraulic structure located at its outlet(s).

Subcatchments, reaches and ponds are represented by hexagons, squares and triangles, respectively, on the watershed routing diagrams provided with the computations reference modeling results attached.

Modeling Results Tabled:

EXISTING
EXISTING FLOW CONDITIONS AT DESIGN POINT (DP1)

STORM EVENT	*PEAK FLOW (CFS)*	*TOTAL VOLUME (AF)*
1-year	*0.38*	*0.020*
10-year	*2.28*	*0.090*
100-year	*7.07*	*0.277*

PROPOSED
WITHOUT STORMWATER MANAGEMENT
FLOW CONDITIONS AT DESIGN POINT (DP1)

STORM EVENT	*PEAK FLOW (CFS)*	*TOTAL VOLUME (AF)*
1-year	*1.42*	*0.068*
10-year	*3.76*	*0.182*
100-year	*8.40*	*0.422*

PROPOSED
WITH GRASSED CHANNELS AND INFILTRATION BASIN IN-LINE
PROPOSED FLOW CONDITIONS AT DESIGN POINT (DP1)

STORM EVENT	*PEAK FLOW (CFS)*	*TOTAL VOLUME (AF)*
1-year	*0.78*	*0.030*
10-year	*1.72*	*0.070*
100-year	*3.41*	*0.281*

The run-off rates decrease for all the 10yr and 100yr storms as modeled.

INFILTRATION BASIN STAGE-STORAGE TABLE IB-1

STORM EVENT	*PEAK STORAGE (CF)*	*PEAK DEPTH (FT)*
WQv	*1,915*	*1.96'*
*1 year (***Cpv***)*	*869*	*0.78'*
10 year	*3,743*	*3.40'*
100 year	*6,126*	*4.09'*

Notes:
Invert Washed Stone Drainage Layer 0'
Invert of Soil Drainage Layer 1.5'
Bottom of Basin El. = 3.00'
6" Vertical Orifice Outlet Inv. = 3.50'
10' x 4' Broadcrested Weir = 4.50'
Top of Basin Embankment Elev. = 5.50'

APPENDIX 1

WATER QUALITY VOLUME/RUNOFF REDUCTION WORKSHEETS

Version 1.8
Last Updated: 11/09/2015

Total Water Quality Volume Calculation
WQv(acre-feet) = [(P)(Rv)(A)] /12

Is this project subject to Chapter 10 of the NYS Design Manual (i.e. WQv is equal to post-development 1 year runoff volume)?.....	No

Design Point:	1	
P=	1.00	*inch*

Manually enter P, Total Area and Impervious Cover.

Breakdown of Subcatchments

Catchment Number	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Rv	WQv *(ft^3)*	Description
1	1.01	0.61	60%	0.59	2,176	
2						
3						
4						
5						
6						
7						
8						
9						
10						
Subtotal (1-30)	1.01	0.61	60%	0.59	**2,176**	**Subtotal 1**
Total	1.01	0.61	60%	0.59	**2,176**	**Initial WQv**

Identify Runoff Reduction Techniques By Area

Technique	Total Contributing Area *(Acre)*	Contributing Impervious Area *(Acre)*	Notes
Conservation of Natural Areas	0.00	0.00	*minimum 10,000 sf*
Riparian Buffers	0.00	0.00	*maximum contributing length 75 feet to 150 feet*
Filter Strips	0.00	0.00	
Tree Planting	0.00	0.00	*Up to 100 sf directly connected impervious area may be subtracted per tree*
Total	**0.00**	**0.00**	

Recalculate WQv after application of Area Reduction Techniques

	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Runoff Coefficient Rv	WQv *(ft^3)*
"<<Initial WQv"	1.01	0.61	60%	0.59	2,176
Subtract Area	0.00	0.00			
WQv adjusted after Area Reductions	**1.01**	**0.61**	60%	0.59	2,176
Disconnection of Rooftops		0.00			
Adjusted WQv after Area Reduction and Rooftop Disconnect	1.01	0.61	60%	0.59	**2,176**
WQv reduced by Area Reduction techniques					0

Runoff Reduction Volume and Treated volumes						
	Runoff Reduction Techiques/Standard SMPs		**Total Contributing Area**	**Total Contributing Impervious Area**	**WQv Reduced (RRv)**	**WQv Treated**
			(acres)	**(acres)**	**cf**	**cf**
Area/Volume Reduction	Conservation of Natural Areas	RR-1	0.00	0.00		
	Sheetflow to Riparian Buffers/Filter Strips	RR-2	0.00	0.00		
	Tree Planting/Tree Pit	RR-3	0.00	0.00		
	Disconnection of Rooftop Runoff	RR-4		0.00		
	Vegetated Swale	RR-5	0.00	0.00	0	
	Rain Garden	RR-6	0.00	0.00	0	
	Stormwater Planter	RR-7	0.00	0.00	0	
	Rain Barrel/Cistern	RR-8	0.00	0.00	0	
	Porous Pavement	RR-9	0.00	0.00	0	
	Green Roof (Intensive & Extensive)	RR-10	0.00	0.00	0	
Standard SMPs w/RRv Capacity	Infiltration Trench	I-1	0.00	0.00	0	0
	Infiltration Basin	I-2	1.01	0.61	2176	0
	Dry Well	I-3	0.00	0.00	0	0
	Underground Infiltration System	I-4				
	Bioretention & Infiltration Bioretention	F-5	0.00	0.00	0	0
	Dry swale	O-1	0.00	0.00	0	0
Standard SMPs	Micropool Extended Detention (P-1)	P-1				
	Wet Pond (P-2)	P-2				
	Wet Extended Detention (P-3)	P-3				
	Multiple Pond system (P-4)	P-4				
	Pocket Pond (p-5)	P-5				
	Surface Sand filter (F-1)	F-1				
	Underground Sand filter (F-2)	F-2				
	Perimeter Sand Filter (F-3)	F-3				
	Organic Filter (F-4	F-4				
	Shallow Wetland (W-1)	W-1				
	Extended Detention Wetland (W-2	W-2				
	Pond/Wetland System (W-3)	W-3				
	Pocket Wetland (W-4)	W-4				
	Wet Swale (O-2)	O-2				
Totals by Area Reduction →			0.00	0.00	0	
Totals by Volume Reduction →			0.00	0.00	0	
Totals by Standard SMP w/RRV →			1.01	0.61	2176	0
Totals by Standard SMP →			0.00	0.00		0
Totals (Area + Volume + all SMPs) →			1.01	0.61	2,176	0
	Impervious Cover √	okay				

Minimum RRv

Enter the Soils Data for the site		
Soil Group	Acres	S
A	0.38	55%
B		40%
C		30%
D	**0.63**	20%
Total Area	1.01	
Calculate the Minimum RRv		
S =	**0.33**	
Impervious =	0.61	*acre*
Precipitation	1	*in*
Rv	0.95	
Minimum RRv	**698**	***ft3***
	0.02	af

NOI QUESTIONS

#	NOI Question	Reported Value	
		cf	af
28	Total Water Quality Volume (WQv) Required	2176	*0.050*
30	Total RRV Provided	2176	*0.050*
31	Is RRv Provided ≥WQv Required?	Yes	
32	Minimum RRv	698	*0.016*
32a	Is RRv Provided ≥ Minimum RRv Required?	Yes	
33a	Total WQv Treated	0	*0.000*
34	Sum of Volume Reduced & Treated	2176	*0.050*
34	Sum of Volume Reduced and Treated	2176	*0.050*
35	Is Sum RRv Provided and WQv Provided ≥WQv Required?	Yes	

Apply Peak Flow Attenuation			
36	Channel Protection	*Cpv*	
37	Overbank	*Qp*	
37	Extreme Flood Control	*Qf*	
	Are Quantity Control requirements met?		

Infiltration Basin Worksheet

Design Point:	1

Enter Site Data For Drainage Area to be Treated by Practice							
Catchment Number	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
1	1.01	0.61	0.60	0.59	2176.19	1.00	
Enter Impervious Area Reduced by Disconnection of Rooftops			60%	0.59	2,176	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						*ft^3*	

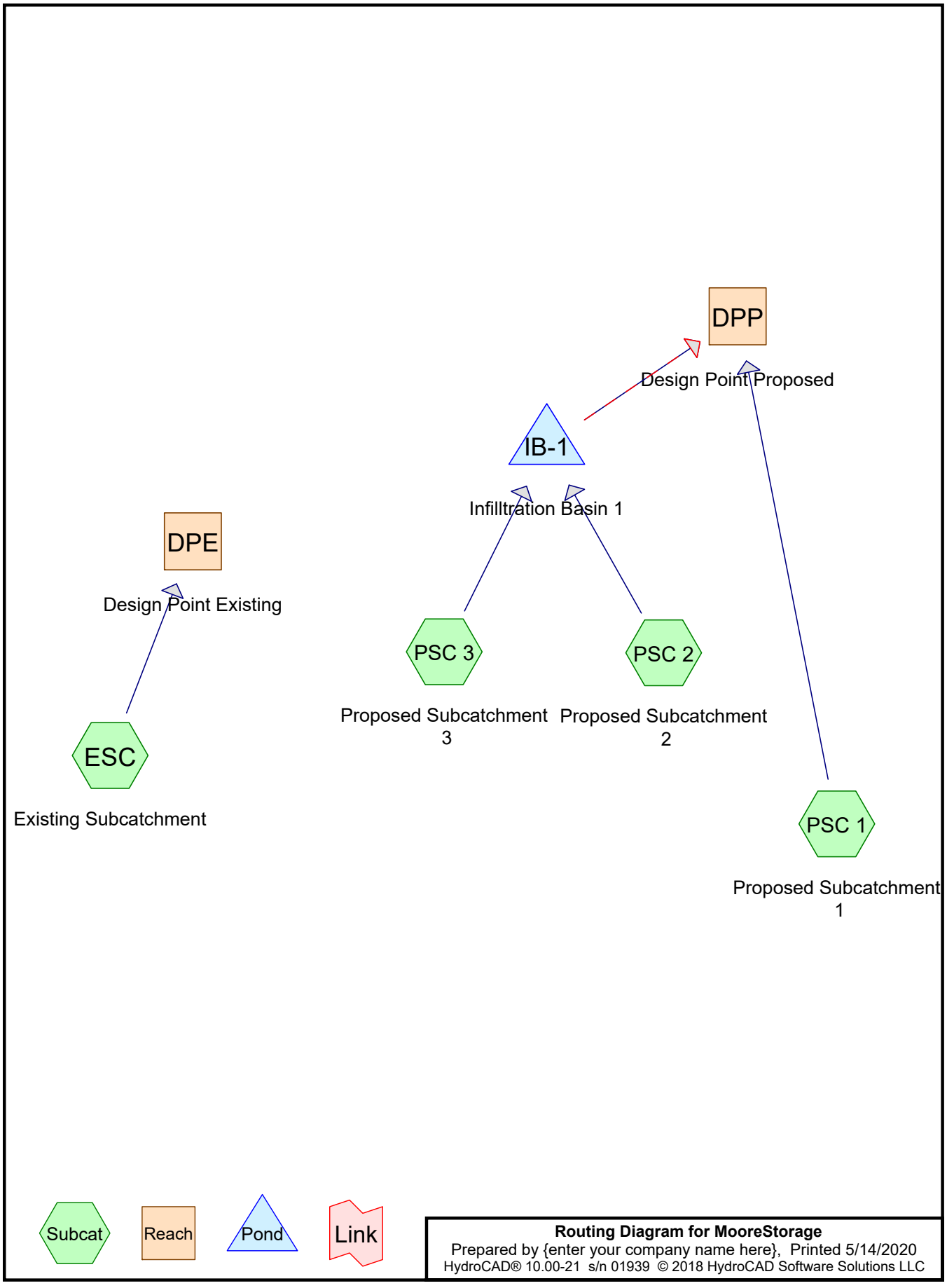
Pretreatment Techniques to Prevent Clogging			
Infiltration Rate	0.50	*in/hour*	*Okay*
Pretreatment Sizing	25	*% WQv*	*25% minimum;* *50% if >2 in/hr* *100% if >5in/hour*
Pretreatment Required Volume	544	*ft^3*	
Pretreatment Provided	1,725	*ft^3*	
Pretreatment Techniques utilized	*Grass Channel*		

Size An Infiltration Basin			
Design Volume	2,176	*ft^3*	WQv
Basal Area Required	1,088	*ft^2*	*Infiltration practices shall be designed to exfiltrate the entire WQv through the floor of each practice.*
Basal Area Provided	2,771	*ft^2*	
Design Depth	2.00	*ft*	
Volume Provided	5,542	*ft^3*	*Storage Volume provided in infiltration basin area (not including pretreatment.*

Determine Runoff Reduction			
RRv	**2,176**	***ft^3***	***90% of the storage provided in the basin or WQv whichever is smaller***
Volume Treated	0	*ft^3*	*This is the portion of the WQv that is not reduced/infiltrated*
Sizing √	OK		*The infiltration basin must provide storage equal to or greater than the WQv of the contributing area.*

APPENDIX 2

HYDRAULIC MODELING DATA


DPP
Design Point Proposed
IB-1
Infiltration Basin 1
DPE
Design Point Existing
PSC 3
PSC 2
Proposed Subcatchment 3
Proposed Subcatchment 2
ESC
Existing Subcatchment
PSC 1
Proposed Subcatchment 1
Subcat
Reach
Pond
Link
Routing Diagram for MooreStorage
Prepared by {enter your company name here}, Printed 5/14/2020
HydroCAD® 10.00-21 s/n 01939 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.323	39	>75% Grass cover, Good, HSG A (PSC 1, PSC 2, PSC 3)
0.236	80	>75% Grass cover, Good, HSG D (PSC 1, PSC 2)
0.790	73	Brush, Good, HSG D (ESC)
0.043	98	Existing Driveway, HSG A (ESC)
0.076	98	Gravel Drive & Roof, HSG A (PSC 3)
0.335	98	Gravel Drive & Roof, HSG D (PSC 3)
0.244	98	Gravel Drive and Roof, Good, HSG D (PSC 1)
0.244	98	Gravel Drive and Roof, HSG D (ESC)
0.195	98	Roof, HSG D (PSC 2)
0.331	30	Woods, Good, HSG A (ESC)
2.818	**75**	**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
0.323	0.000	0.000	0.236	0.000	0.559	>75% Grass cover, Good	PSC 1, PSC 2, PSC 3
0.000	0.000	0.000	0.790	0.000	0.790	Brush, Good	ESC
0.043	0.000	0.000	0.000	0.000	0.043	Existing Driveway	ESC
0.076	0.000	0.000	0.335	0.000	0.411	Gravel Drive & Roof	PSC 3
0.000	0.000	0.000	0.244	0.000	0.244	Gravel Drive and Roof	ESC
0.000	0.000	0.000	0.244	0.000	0.244	Gravel Drive and Roof, Good	PSC 1
0.000	0.000	0.000	0.195	0.000	0.195	Roof	PSC 2
0.331	0.000	0.000	0.000	0.000	0.331	Woods, Good	ESC
0.773	**0.000**	**0.000**	**2.045**	**0.000**	**2.818**	**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	IB-1	1,054.50	1,053.00	19.0	0.0789	0.013	6.0	0.0	0.0

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 ESC: Existing Runoff Area=61,335 sf 20.42% Impervious Runoff Depth>0.17"
Flow Length=288' Tc=1.5 min CN=68 Runoff=0.38 cfs 0.020 af

Subcatchment PSC 1: Proposed Runoff Area=17,773 sf 59.88% Impervious Runoff Depth>0.90"
Flow Length=534' Tc=1.3 min CN=88 Runoff=0.78 cfs 0.030 af

Subcatchment PSC 2: Proposed Runoff Area=16,671 sf 51.04% Impervious Runoff Depth>0.47"
Flow Length=350' Tc=16.0 min CN=79 Runoff=0.23 cfs 0.015 af

Subcatchment PSC 3: Proposed Runoff Area=26,972 sf 66.39% Impervious Runoff Depth>0.44"
Flow Length=330' Tc=1.4 min CN=78 Runoff=0.57 cfs 0.023 af

Reach DPE: Design Point Existing Inflow=0.38 cfs 0.020 af
Outflow=0.38 cfs 0.020 af

Reach DPP: Design Point Proposed Inflow=0.78 cfs 0.030 af
Outflow=0.78 cfs 0.030 af

Pond IB-1: Infilltration Basin 1 Peak Elev=1,051.78' Storage=869 cf Inflow=0.66 cfs 0.038 af
Discarded=0.03 cfs 0.022 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.022 af

Total Runoff Area = 2.818 ac Runoff Volume = 0.088 af Average Runoff Depth = 0.37"
59.60% Pervious = 1.680 ac 40.40% Impervious = 1.138 ac

Summary for Subcatchment ESC: Existing Subcatchment

[49] Hint: Tc<2dt may require smaller dt

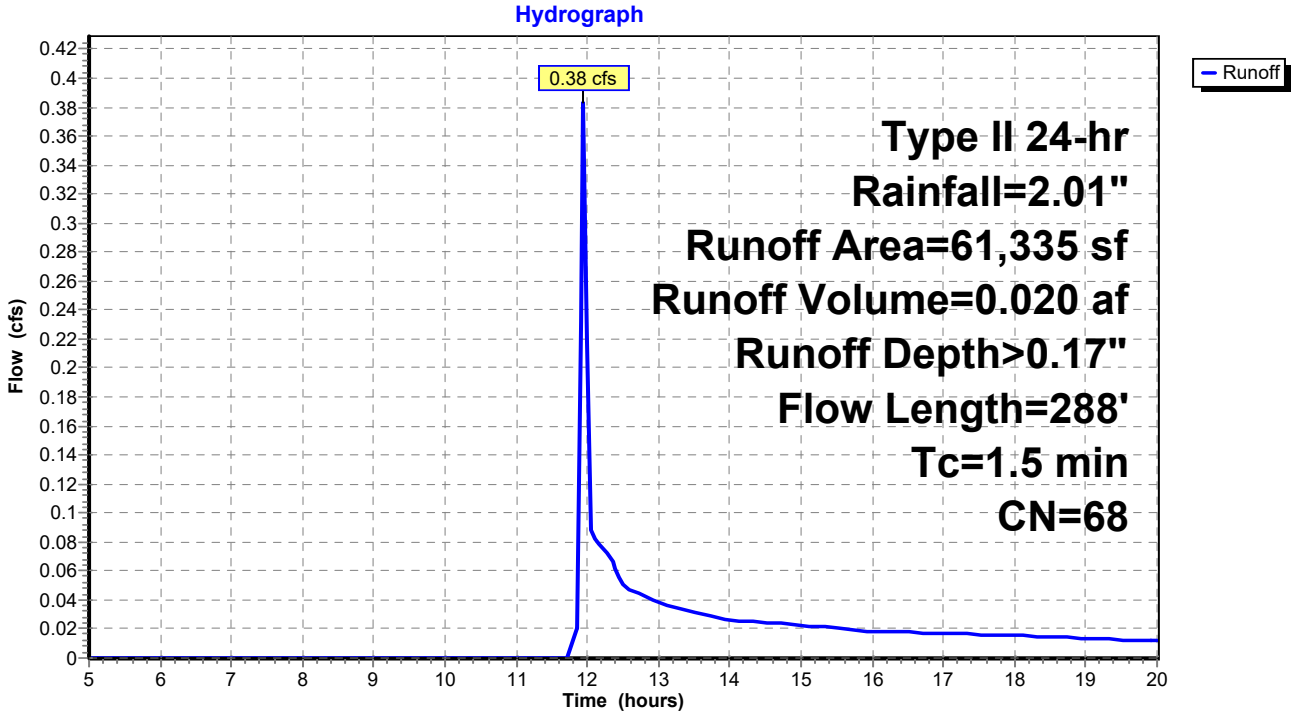
Runoff = 0.38 cfs @ 11.95 hrs, Volume= 0.020 af, Depth> 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.01"

	Area (sf)	CN	Description
*	10,643	98	Gravel Drive and Roof, HSG D
*	1,884	98	Existing Driveway, HSG A
	14,400	30	Woods, Good, HSG A
	34,408	73	Brush, Good, HSG D
	61,335	68	Weighted Average
	48,808		79.58% Pervious Area
	12,527		20.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	31	0.3000	2.95		**Sheet Flow, First 100' Flowpath** Smooth surfaces n= 0.011 P2= 2.70"
0.0	20	0.2500	7.50		**Shallow Concentrated Flow, Balance of Flow to fill** Grassed Waterway Kv= 15.0 fps
0.2	20	0.0100	1.61		**Shallow Concentrated Flow, Gravel Drive** Unpaved Kv= 16.1 fps
1.1	217	0.0500	3.35		**Shallow Concentrated Flow, Balance of Longest Flowpath** Grassed Waterway Kv= 15.0 fps
1.5	288	Total			

Subcatchment ESC: Existing Subcatchment



Summary for Subcatchment PSC 1: Proposed Subcatchment 1

[49] Hint: Tc<2dt may require smaller dt

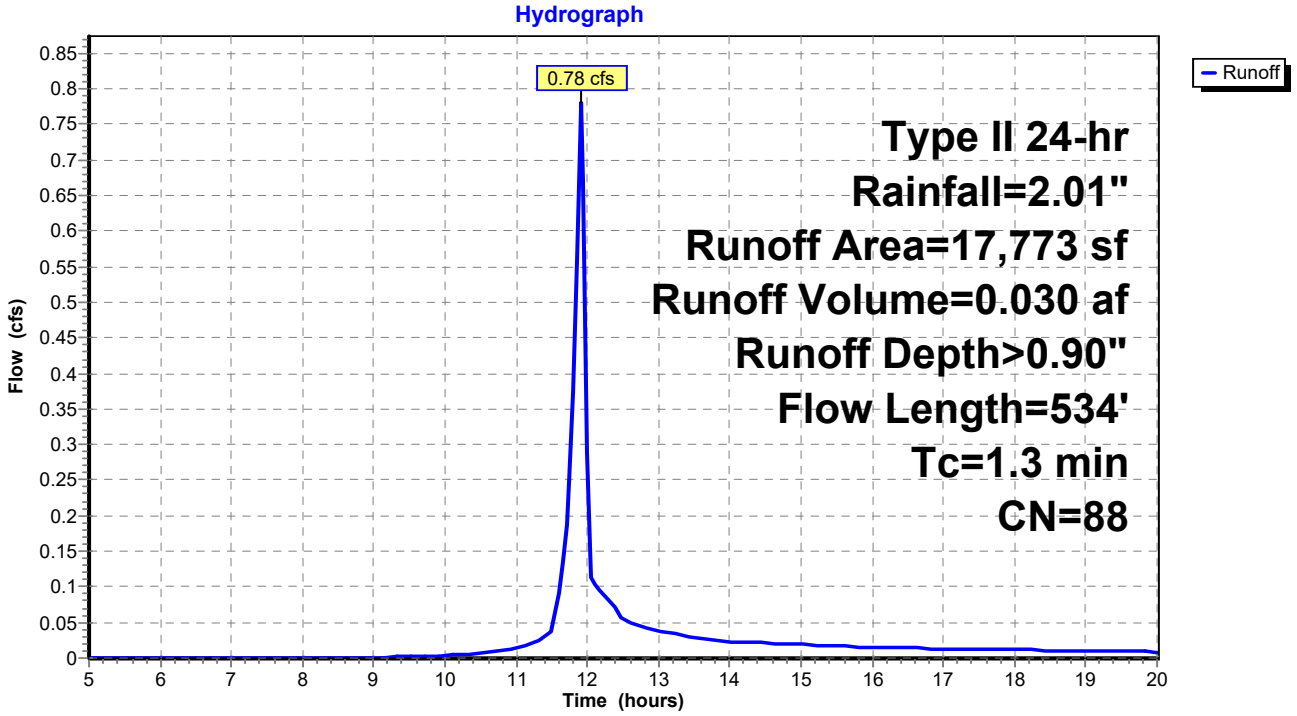
Runoff = 0.78 cfs @ 11.91 hrs, Volume= 0.030 af, Depth> 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.01"

	Area (sf)	CN	Description
	1,007	39	>75% Grass cover, Good, HSG A
*	10,643	98	Gravel Drive and Roof, Good, HSG D
	6,123	80	>75% Grass cover, Good, HSG D
	17,773	88	Weighted Average
	7,130		40.12% Pervious Area
	10,643		59.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	31	0.3000	2.95		**Sheet Flow, First 100' Flowpath** Smooth surfaces n= 0.011 P2= 2.70"
0.2	21	0.0100	1.61		**Shallow Concentrated Flow, Gravel Drive** Unpaved Kv= 16.1 fps
0.0	21	0.2500	7.50		**Shallow Concentrated Flow, Grassed Waterway to Channel** Grassed Waterway Kv= 15.0 fps
0.9	461	0.0280	8.79	140.65	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.030
1.3	534	Total			

Subcatchment PSC 1: Proposed Subcatchment 1



Summary for Subcatchment PSC 2: Proposed Subcatchment 2

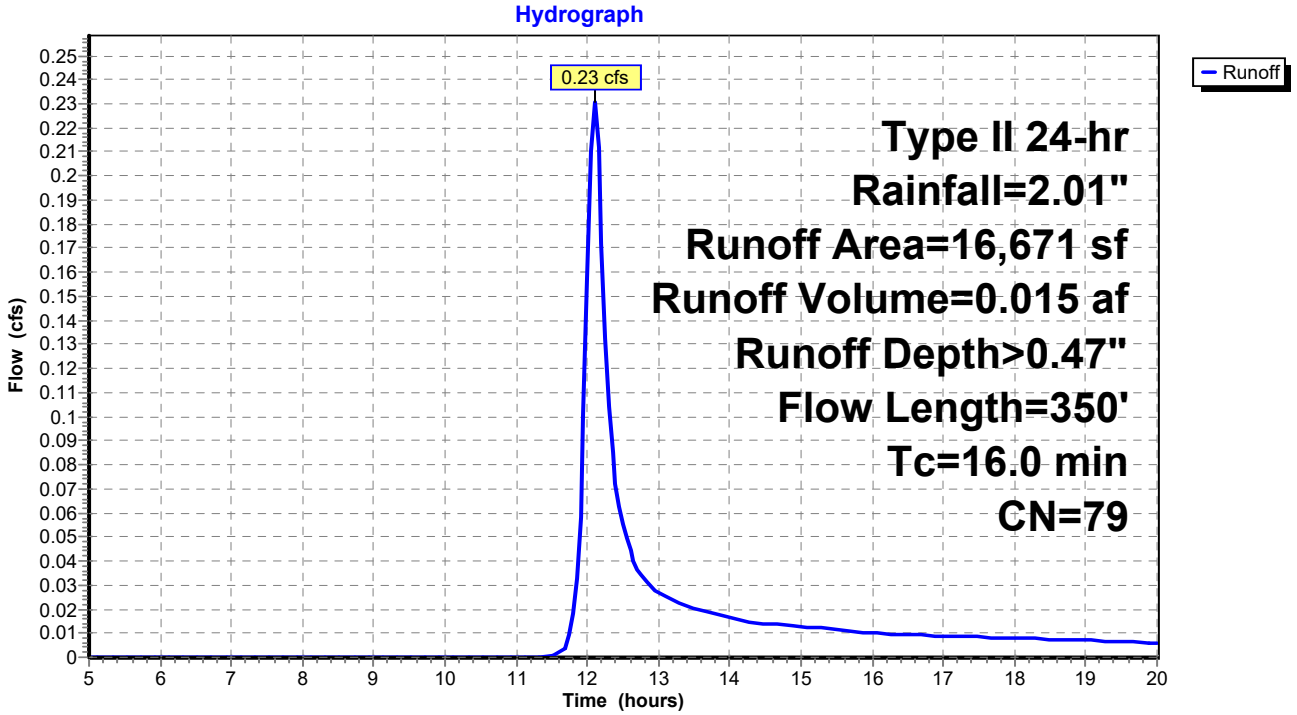
Runoff = 0.23 cfs @ 12.10 hrs, Volume= 0.015 af, Depth> 0.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.01"

	Area (sf)	CN	Description
*	8,509	98	Roof, HSG D
	4,001	39	>75% Grass cover, Good, HSG A
	4,161	80	>75% Grass cover, Good, HSG D
	16,671	79	Weighted Average
	8,162		48.96% Pervious Area
	8,509		51.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	100	0.0200	0.11		**Sheet Flow, First 100' Flowpath** Grass: Dense n= 0.240 P2= 2.70"
0.1	9	0.0200	2.12		**Shallow Concentrated Flow, Balance of Longest Flowpath** Grassed Waterway Kv= 15.0 fps
0.4	241	0.0330	9.54	152.69	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.030
16.0	350	Total			

Subcatchment PSC 2: Proposed Subcatchment 2



Summary for Subcatchment PSC 3: Proposed Subcatchment 3

[49] Hint: Tc<2dt may require smaller dt

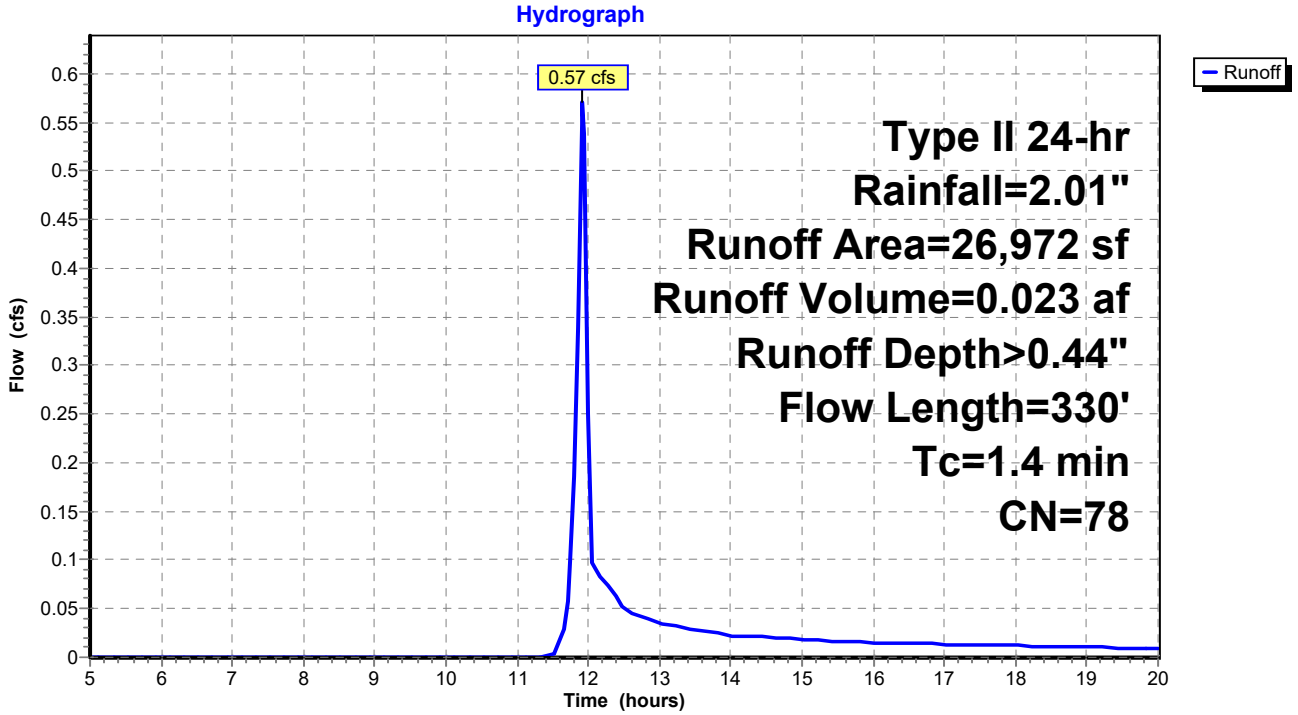
Runoff = 0.57 cfs @ 11.92 hrs, Volume= 0.023 af, Depth> 0.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=2.01"

	Area (sf)	CN	Description
*	14,594	98	Gravel Drive & Roof, HSG D
*	3,314	98	Gravel Drive & Roof, HSG A
	9,064	39	>75% Grass cover, Good, HSG A
	26,972	78	Weighted Average
	9,064		33.61% Pervious Area
	17,908		66.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	87	0.0340	1.52		**Sheet Flow, First 100' Flowpath** Smooth surfaces n= 0.011 P2= 2.70"
0.4	243	0.0410	10.64	170.20	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.030
1.4	330	Total			

Subcatchment PSC 3: Proposed Subcatchment 3



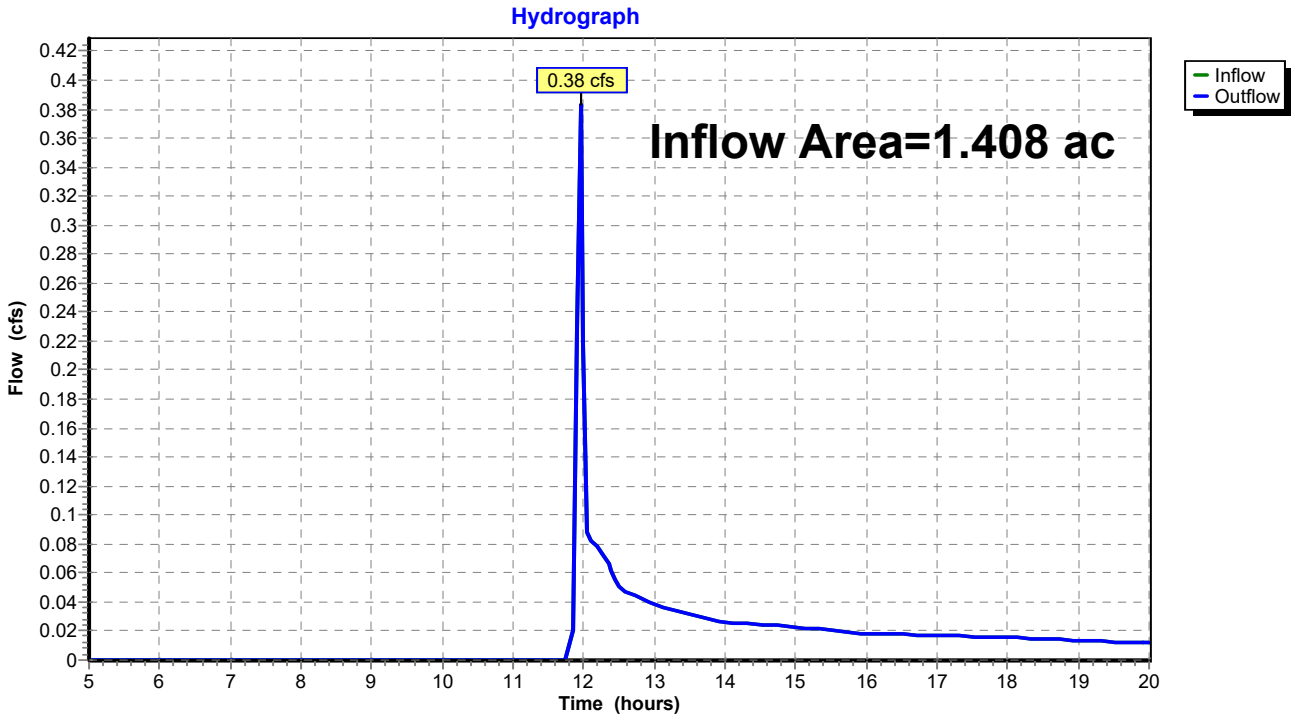
Summary for Reach DPE: Design Point Existing

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.408 ac, 20.42% Impervious, Inflow Depth > 0.17"
Inflow = 0.38 cfs @ 11.95 hrs, Volume= 0.020 af
Outflow = 0.38 cfs @ 11.95 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DPE: Design Point Existing



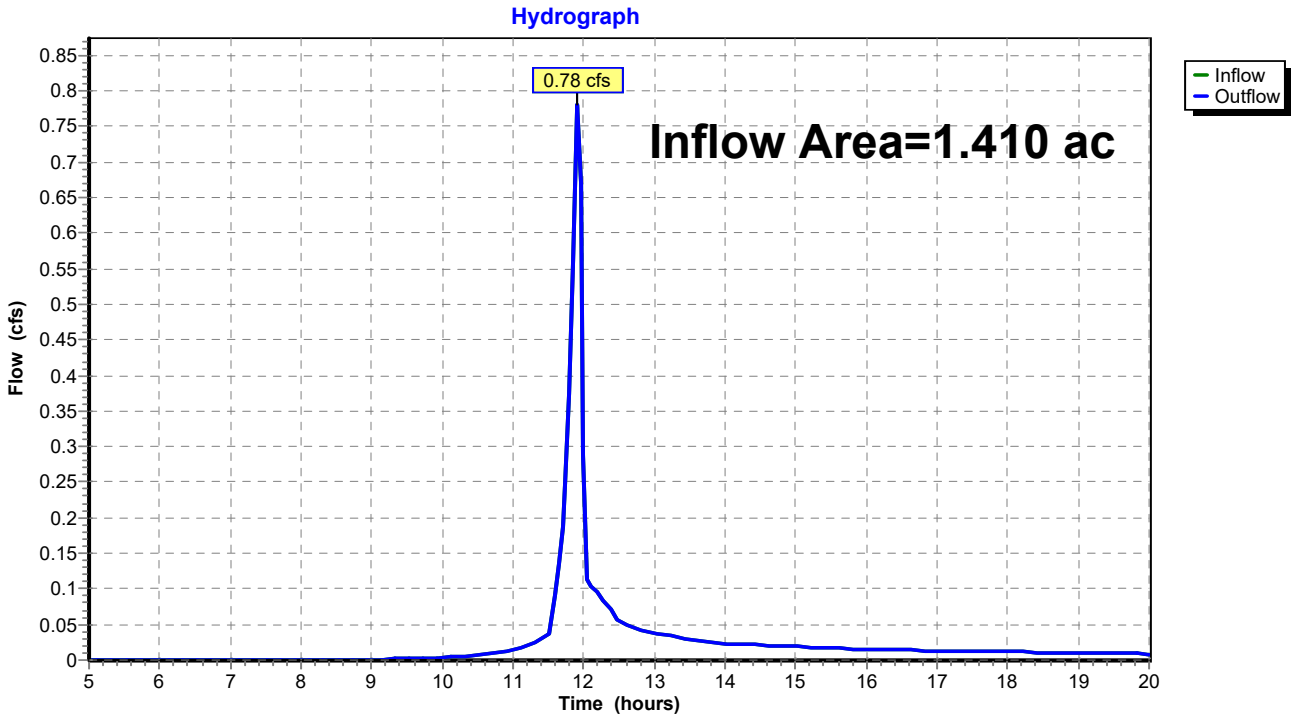
Summary for Reach DPP: Design Point Proposed

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.410 ac, 60.34% Impervious, Inflow Depth > 0.26"
Inflow = 0.78 cfs @ 11.91 hrs, Volume= 0.030 af
Outflow = 0.78 cfs @ 11.91 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DPP: Design Point Proposed



Summary for Pond IB-1: Infilltration Basin 1

Inflow Area = 1.002 ac, 60.53% Impervious, Inflow Depth > 0.45"
Inflow = 0.66 cfs @ 11.93 hrs, Volume= 0.038 af
Outflow = 0.03 cfs @ 11.85 hrs, Volume= 0.022 af, Atten= 95%, Lag= 0.0 min
Discarded = 0.03 cfs @ 11.85 hrs, Volume= 0.022 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,051.78' @ 14.90 hrs Surf.Area= 2,772 sf Storage= 869 cf

Plug-Flow detention time= 223.2 min calculated for 0.022 af (58% of inflow)
Center-of-Mass det. time= 132.6 min (953.1 - 820.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,051.00'	10,098 cf	**Custom Stage Data (Prismatic)**Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,051.00	2,772	0.0	0	0
1,052.50	2,772	40.0	1,663	1,663
1,052.51	2,772	20.0	6	1,669
1,054.00	2,772	20.0	826	2,495
1,054.10	2,772	100.0	277	2,772
1,055.00	3,802	100.0	2,958	5,730
1,056.00	4,934	100.0	4,368	10,098
1,056.50	0	0.0	0	10,098

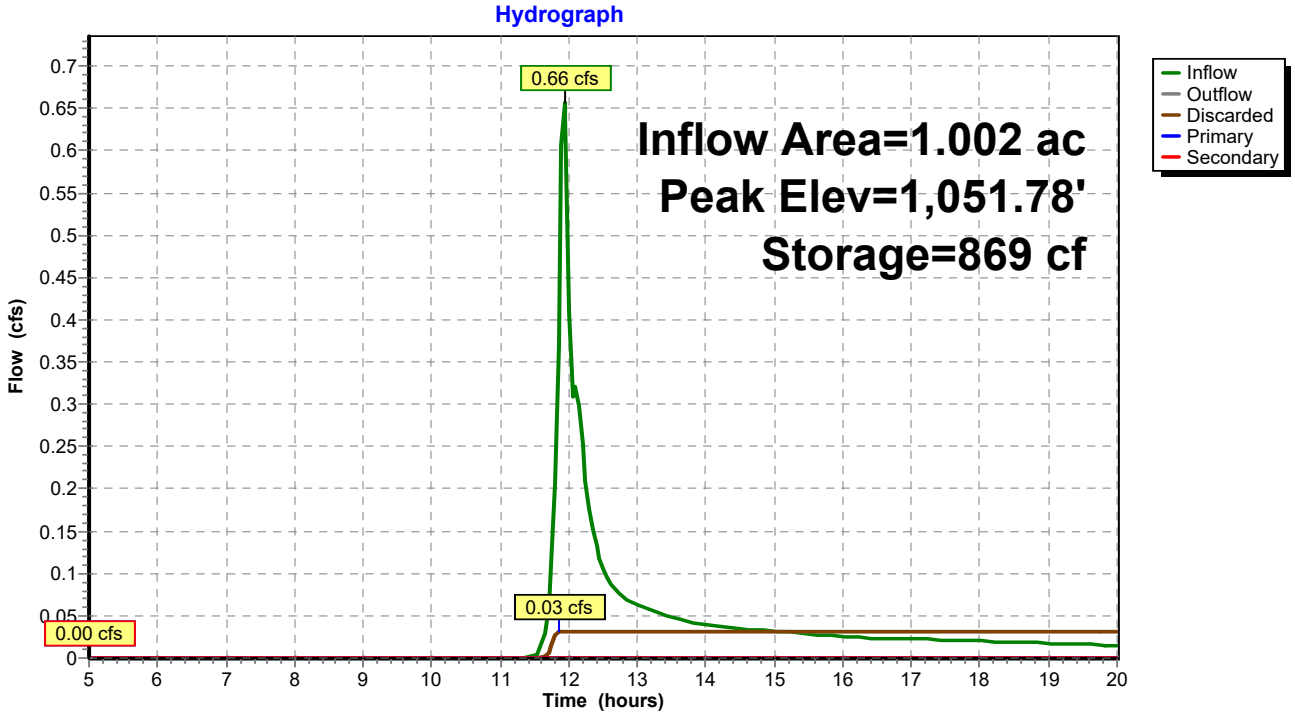
Device	Routing	Invert	Outlet Devices
#1	Discarded	1,051.00'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	1,054.50'	**6.0" Round Culvert** L= 19.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,054.50' / 1,053.00' S= 0.0789 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#3	Secondary	1,055.00'	**10.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.03 cfs @ 11.85 hrs HW=1,051.09' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,051.00' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,051.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond IB-1: Infilltration Basin 1



Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.323	39	>75% Grass cover, Good, HSG A (PSC 1, PSC 2, PSC 3)
0.236	80	>75% Grass cover, Good, HSG D (PSC 1, PSC 2)
0.790	73	Brush, Good, HSG D (ESC)
0.043	98	Existing Driveway, HSG A (ESC)
0.076	98	Gravel Drive & Roof, HSG A (PSC 3)
0.335	98	Gravel Drive & Roof, HSG D (PSC 3)
0.244	98	Gravel Drive and Roof, Good, HSG D (PSC 1)
0.244	98	Gravel Drive and Roof, HSG D (ESC)
0.195	98	Roof, HSG D (PSC 2)
0.331	30	Woods, Good, HSG A (ESC)
2.818	**75**	**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
0.323	0.000	0.000	0.236	0.000	0.559	>75% Grass cover, Good	PSC 1, PSC 2, PSC 3
0.000	0.000	0.000	0.790	0.000	0.790	Brush, Good	ESC
0.043	0.000	0.000	0.000	0.000	0.043	Existing Driveway	ESC
0.076	0.000	0.000	0.335	0.000	0.411	Gravel Drive & Roof	PSC 3
0.000	0.000	0.000	0.244	0.000	0.244	Gravel Drive and Roof	ESC
0.000	0.000	0.000	0.244	0.000	0.244	Gravel Drive and Roof, Good	PSC 1
0.000	0.000	0.000	0.195	0.000	0.195	Roof	PSC 2
0.331	0.000	0.000	0.000	0.000	0.331	Woods, Good	ESC
0.773	**0.000**	**0.000**	**2.045**	**0.000**	**2.818**	**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	IB-1	1,054.50	1,053.00	19.0	0.0789	0.013	6.0	0.0	0.0

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 ESC: Existing Runoff Area=61,335 sf 20.42% Impervious Runoff Depth>0.77"
Flow Length=288' Tc=1.5 min CN=68 Runoff=2.28 cfs 0.090 af

Subcatchment PSC 1: Proposed Runoff Area=17,773 sf 59.88% Impervious Runoff Depth>2.06"
Flow Length=534' Tc=1.3 min CN=88 Runoff=1.72 cfs 0.070 af

Subcatchment PSC 2: Proposed Runoff Area=16,671 sf 51.04% Impervious Runoff Depth>1.38"
Flow Length=350' Tc=16.0 min CN=79 Runoff=0.72 cfs 0.044 af

Subcatchment PSC 3: Proposed Runoff Area=26,972 sf 66.39% Impervious Runoff Depth>1.32"
Flow Length=330' Tc=1.4 min CN=78 Runoff=1.75 cfs 0.068 af

Reach DPE: Design Point Existing Inflow=2.28 cfs 0.090 af
Outflow=2.28 cfs 0.090 af

Reach DPP: Design Point Proposed Inflow=1.72 cfs 0.070 af
Outflow=1.72 cfs 0.070 af

Pond IB-1: Infilltration Basin 1 Peak Elev=1,054.40' Storage=3,743 cf Inflow=2.06 cfs 0.112 af
Discarded=0.04 cfs 0.026 af Primary=0.00 cfs 0.000 af Secondary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.026 af

Total Runoff Area = 2.818 ac Runoff Volume = 0.272 af Average Runoff Depth = 1.16"
59.60% Pervious = 1.680 ac 40.40% Impervious = 1.138 ac

Summary for Subcatchment ESC: Existing Subcatchment

[49] Hint: Tc<2dt may require smaller dt

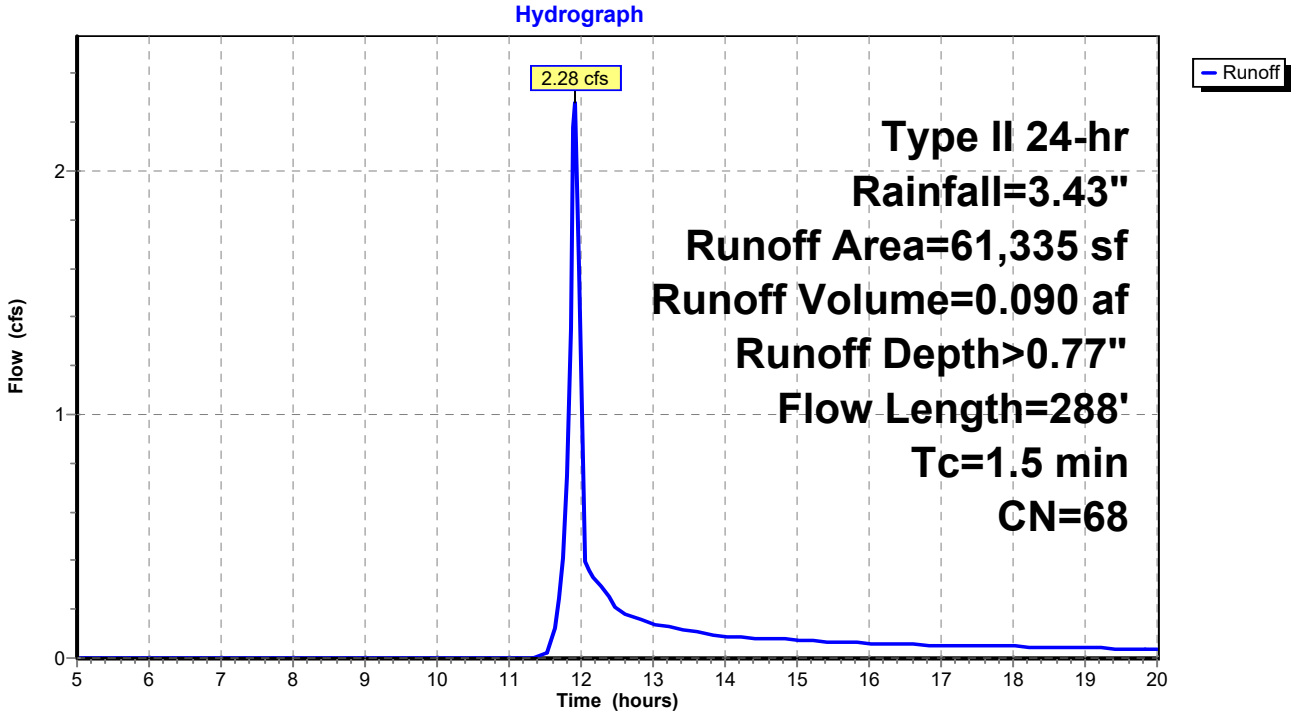
Runoff = 2.28 cfs @ 11.92 hrs, Volume= 0.090 af, Depth> 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.43"

	Area (sf)	CN	Description
*	10,643	98	Gravel Drive and Roof, HSG D
*	1,884	98	Existing Driveway, HSG A
	14,400	30	Woods, Good, HSG A
	34,408	73	Brush, Good, HSG D
	61,335	68	Weighted Average
	48,808		79.58% Pervious Area
	12,527		20.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	31	0.3000	2.95		**Sheet Flow, First 100' Flowpath** Smooth surfaces n= 0.011 P2= 2.70"
0.0	20	0.2500	7.50		**Shallow Concentrated Flow, Balance of Flow to fill** Grassed Waterway Kv= 15.0 fps
0.2	20	0.0100	1.61		**Shallow Concentrated Flow, Gravel Drive** Unpaved Kv= 16.1 fps
1.1	217	0.0500	3.35		**Shallow Concentrated Flow, Balance of Longest Flowpath** Grassed Waterway Kv= 15.0 fps
1.5	288	Total			

Subcatchment ESC: Existing Subcatchment



Summary for Subcatchment PSC 1: Proposed Subcatchment 1

[49] Hint: Tc<2dt may require smaller dt

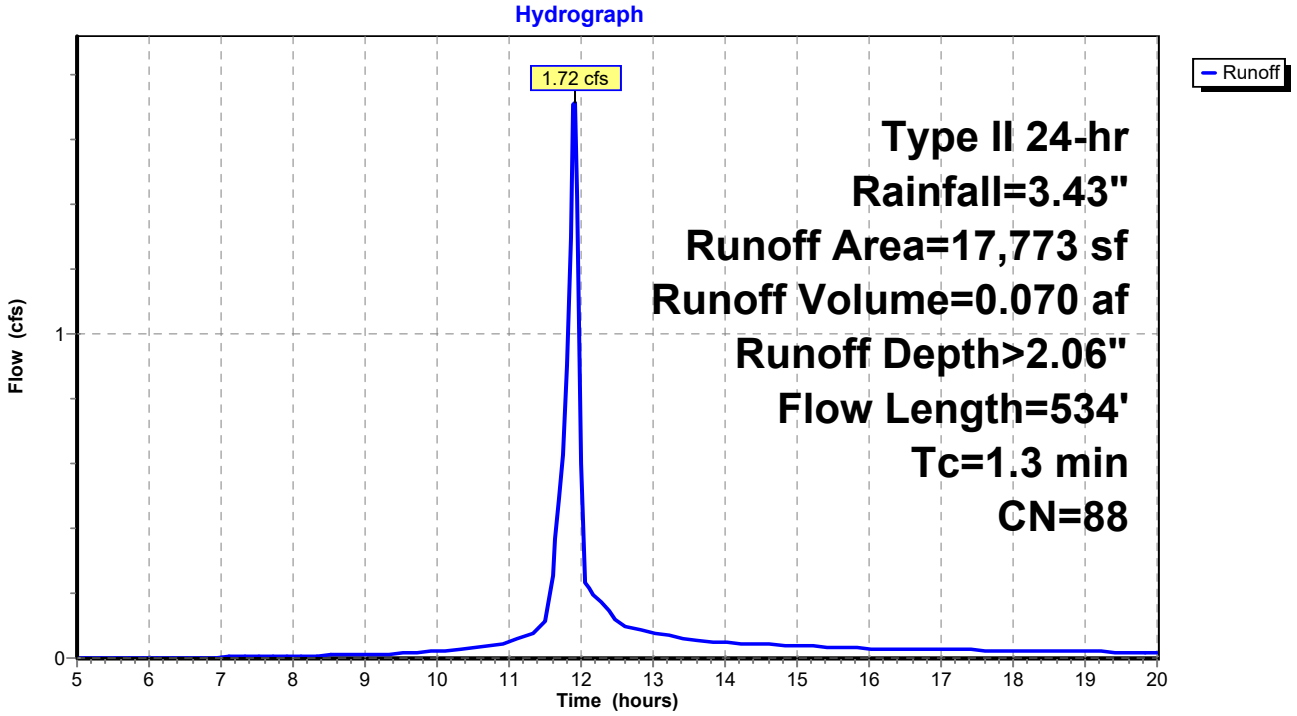
Runoff = 1.72 cfs @ 11.90 hrs, Volume= 0.070 af, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.43"

	Area (sf)	CN	Description
	1,007	39	>75% Grass cover, Good, HSG A
*	10,643	98	Gravel Drive and Roof, Good, HSG D
	6,123	80	>75% Grass cover, Good, HSG D
	17,773	88	Weighted Average
	7,130		40.12% Pervious Area
	10,643		59.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	31	0.3000	2.95		**Sheet Flow, First 100' Flowpath** Smooth surfaces n= 0.011 P2= 2.70"
0.2	21	0.0100	1.61		**Shallow Concentrated Flow, Gravel Drive** Unpaved Kv= 16.1 fps
0.0	21	0.2500	7.50		**Shallow Concentrated Flow, Grassed Waterway to Channel** Grassed Waterway Kv= 15.0 fps
0.9	461	0.0280	8.79	140.65	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.030
1.3	534	Total			

Subcatchment PSC 1: Proposed Subcatchment 1



Summary for Subcatchment PSC 2: Proposed Subcatchment 2

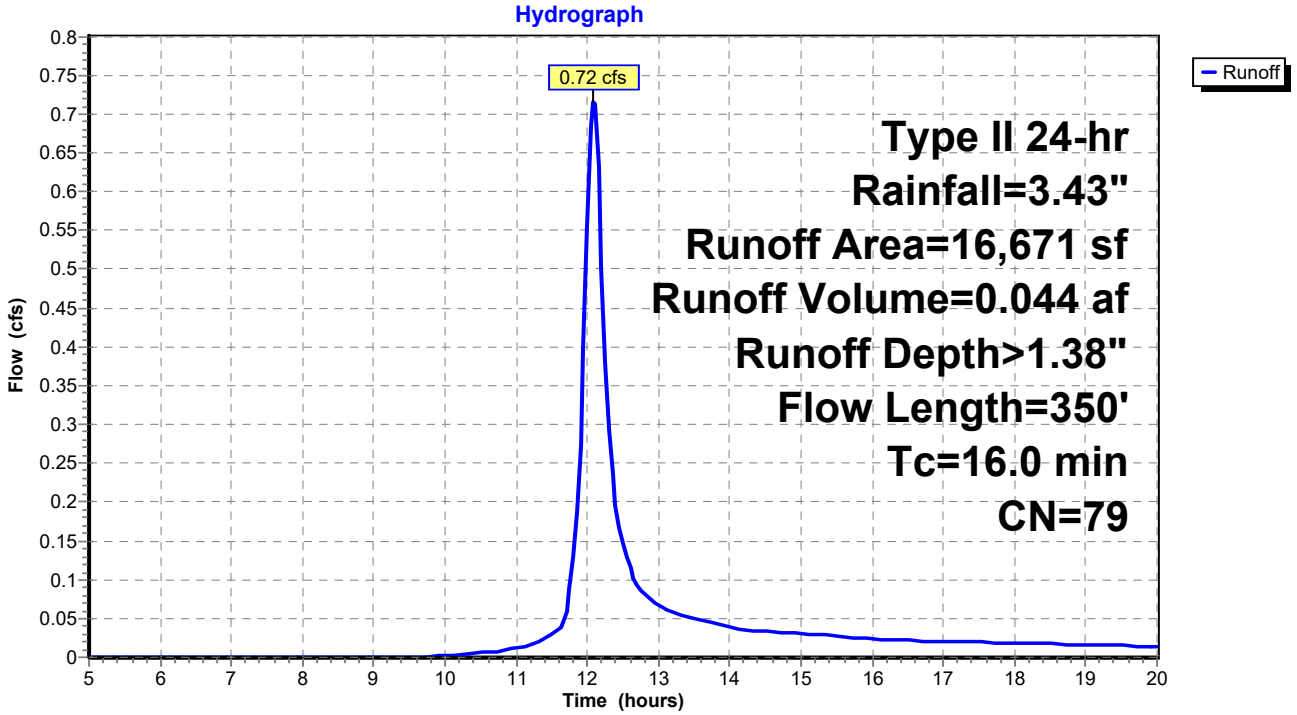
Runoff = 0.72 cfs @ 12.09 hrs, Volume= 0.044 af, Depth> 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.43"

	Area (sf)	CN	Description
*	8,509	98	Roof, HSG D
	4,001	39	>75% Grass cover, Good, HSG A
	4,161	80	>75% Grass cover, Good, HSG D
	16,671	79	Weighted Average
	8,162		48.96% Pervious Area
	8,509		51.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	100	0.0200	0.11		**Sheet Flow, First 100' Flowpath** Grass: Dense n= 0.240 P2= 2.70"
0.1	9	0.0200	2.12		**Shallow Concentrated Flow, Balance of Longest Flowpath** Grassed Waterway Kv= 15.0 fps
0.4	241	0.0330	9.54	152.69	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.030
16.0	350	Total			

Subcatchment PSC 2: Proposed Subcatchment 2



Summary for Subcatchment PSC 3: Proposed Subcatchment 3

[49] Hint: Tc<2dt may require smaller dt

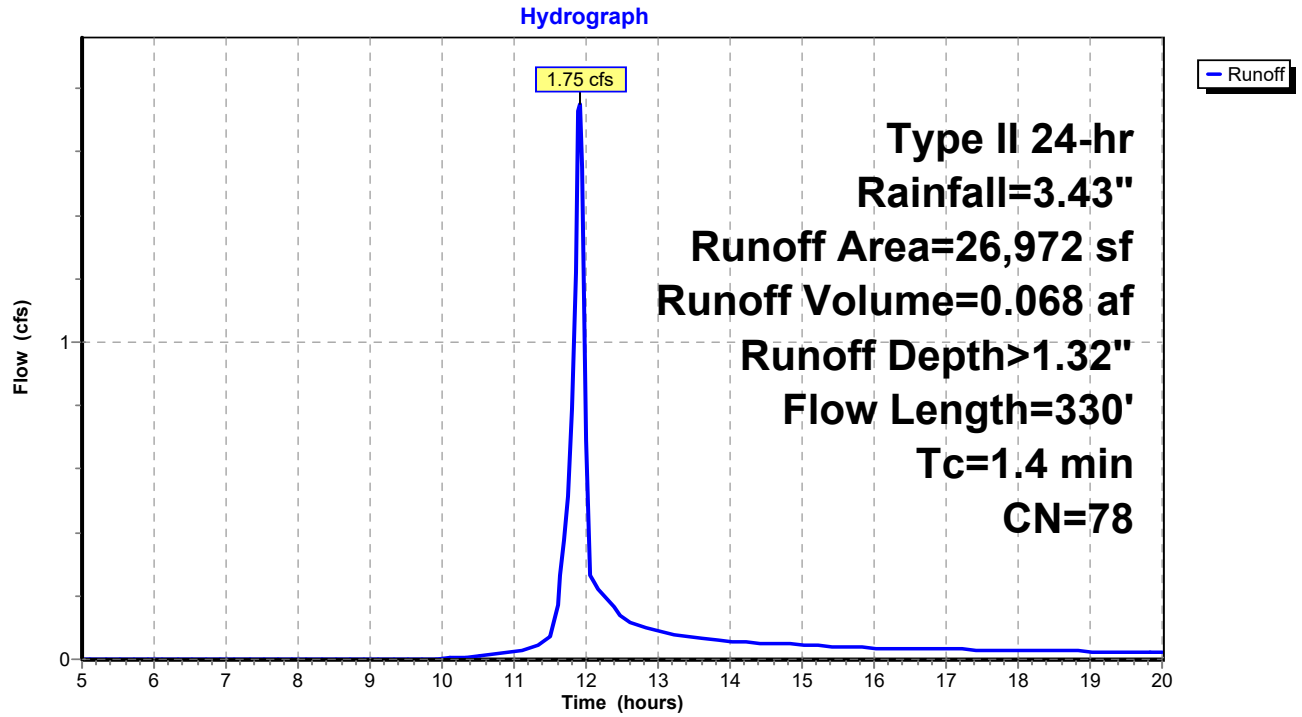
Runoff = 1.75 cfs @ 11.91 hrs, Volume= 0.068 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=3.43"

	Area (sf)	CN	Description
*	14,594	98	Gravel Drive & Roof, HSG D
*	3,314	98	Gravel Drive & Roof, HSG A
	9,064	39	>75% Grass cover, Good, HSG A
	26,972	78	Weighted Average
	9,064		33.61% Pervious Area
	17,908		66.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	87	0.0340	1.52		**Sheet Flow, First 100' Flowpath** Smooth surfaces n= 0.011 P2= 2.70"
0.4	243	0.0410	10.64	170.20	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.030
1.4	330	Total			

Subcatchment PSC 3: Proposed Subcatchment 3



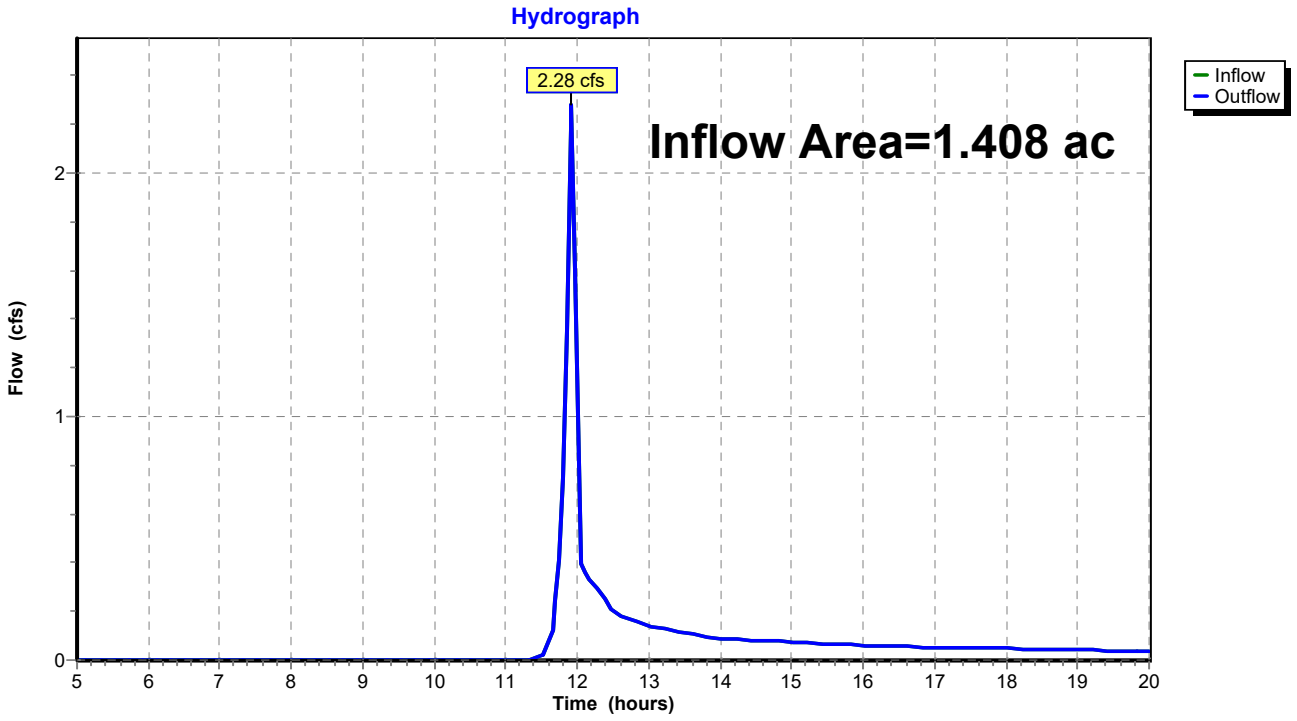
Summary for Reach DPE: Design Point Existing

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.408 ac, 20.42% Impervious, Inflow Depth > 0.77"
Inflow = 2.28 cfs @ 11.92 hrs, Volume= 0.090 af
Outflow = 2.28 cfs @ 11.92 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DPE: Design Point Existing



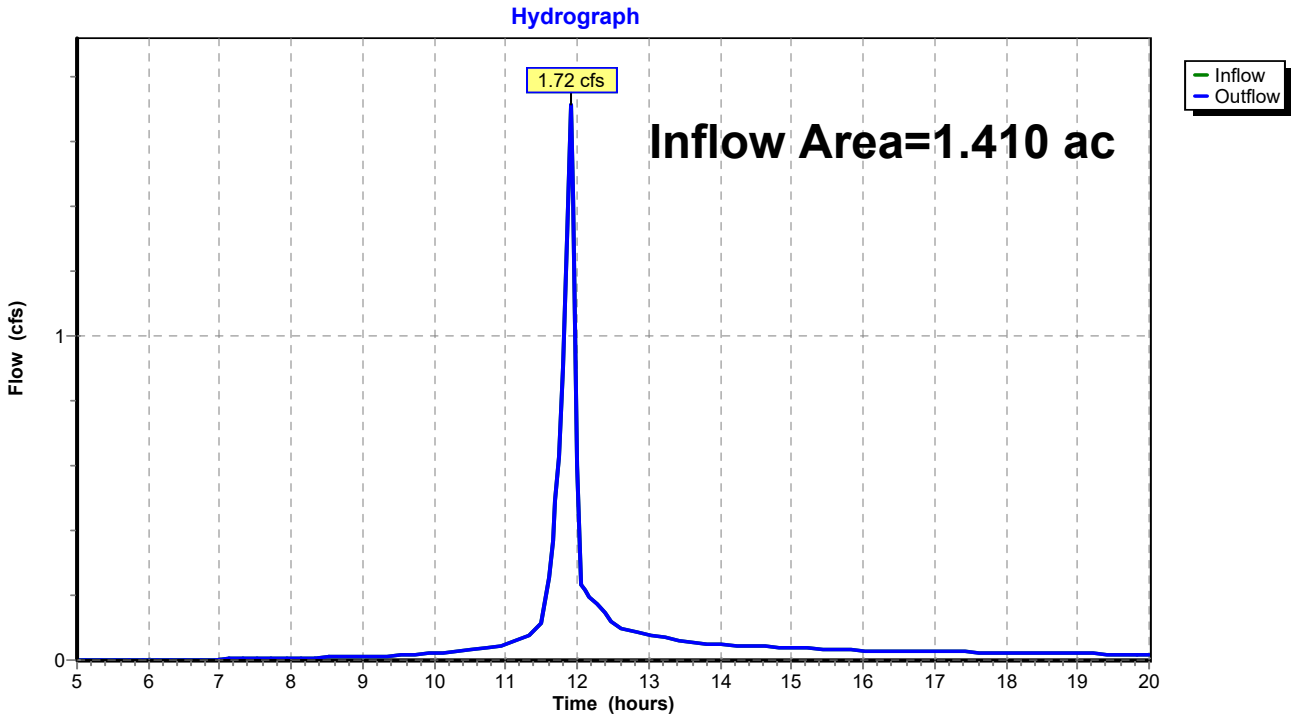
Summary for Reach DPP: Design Point Proposed

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.410 ac, 60.34% Impervious, Inflow Depth > 0.59"
Inflow = 1.72 cfs @ 11.90 hrs, Volume= 0.070 af
Outflow = 1.72 cfs @ 11.90 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DPP: Design Point Proposed



Summary for Pond IB-1: Infilltration Basin 1

Inflow Area = 1.002 ac, 60.53% Impervious, Inflow Depth > 1.34"
Inflow = 2.06 cfs @ 11.92 hrs, Volume= 0.112 af
Outflow = 0.04 cfs @ 19.73 hrs, Volume= 0.026 af, Atten= 98%, Lag= 468.3 min
Discarded = 0.04 cfs @ 19.73 hrs, Volume= 0.026 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,054.40' @ 19.73 hrs Surf.Area= 3,110 sf Storage= 3,743 cf

Plug-Flow detention time= 230.2 min calculated for 0.026 af (23% of inflow)
Center-of-Mass det. time= 134.6 min (931.3 - 796.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,051.00'	10,098 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,051.00	2,772	0.0	0	0
1,052.50	2,772	40.0	1,663	1,663
1,052.51	2,772	20.0	6	1,669
1,054.00	2,772	20.0	826	2,495
1,054.10	2,772	100.0	277	2,772
1,055.00	3,802	100.0	2,958	5,730
1,056.00	4,934	100.0	4,368	10,098
1,056.50	0	0.0	0	10,098

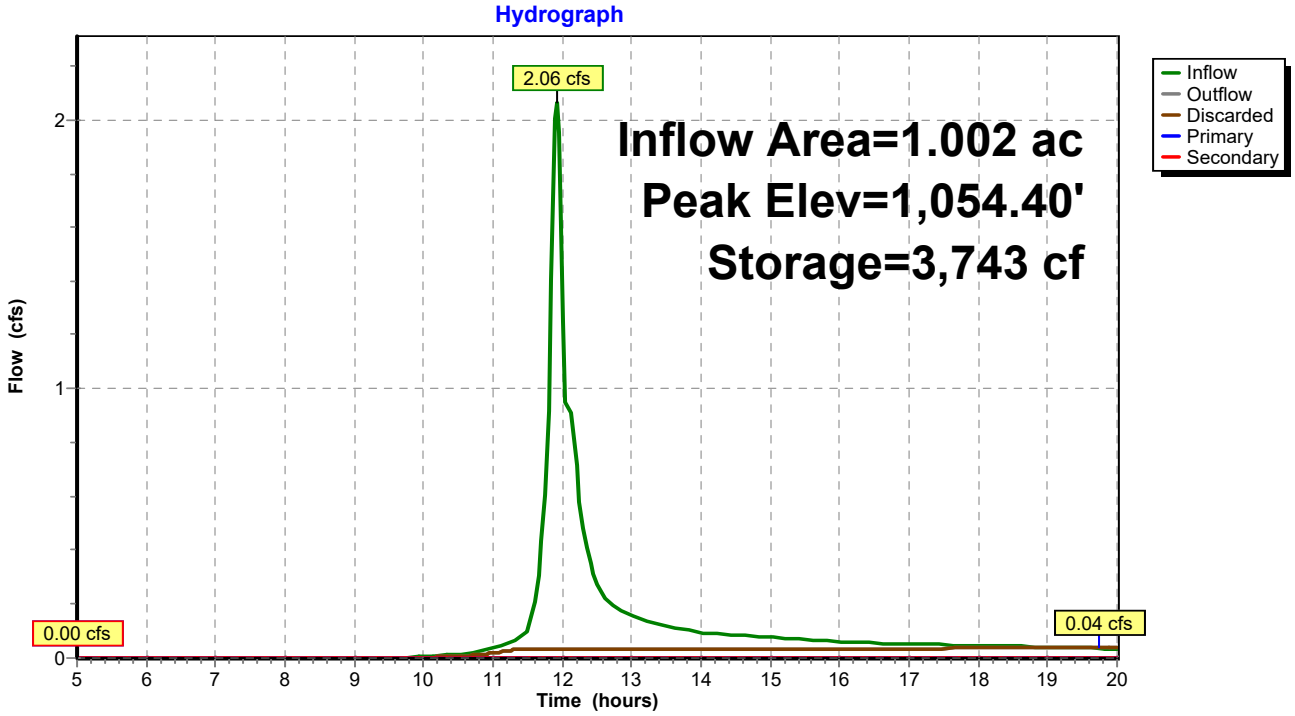
Device	Routing	Invert	Outlet Devices
#1	Discarded	1,051.00'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	1,054.50'	**6.0" Round Culvert** L= 19.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,054.50' / 1,053.00' S= 0.0789 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#3	Secondary	1,055.00'	**10.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.04 cfs @ 19.73 hrs HW=1,054.40' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,051.00' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,051.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond IB-1: Infilltration Basin 1



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Printed 5/14/2020

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.323	39	>75% Grass cover, Good, HSG A (PSC 1, PSC 2, PSC 3)
0.236	80	>75% Grass cover, Good, HSG D (PSC 1, PSC 2)
0.790	73	Brush, Good, HSG D (ESC)
0.043	98	Existing Driveway, HSG A (ESC)
0.076	98	Gravel Drive & Roof, HSG A (PSC 3)
0.335	98	Gravel Drive & Roof, HSG D (PSC 3)
0.244	98	Gravel Drive and Roof, Good, HSG D (PSC 1)
0.244	98	Gravel Drive and Roof, HSG D (ESC)
0.195	98	Roof, HSG D (PSC 2)
0.331	30	Woods, Good, HSG A (ESC)
2.818	**75**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.773	HSG A	ESC, PSC 1, PSC 2, PSC 3
0.000	HSG B	
0.000	HSG C	
2.045	HSG D	ESC, PSC 1, PSC 2, PSC 3
0.000	Other	
2.818		**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
0.323	0.000	0.000	0.236	0.000	0.559	>75% Grass cover, Good	PSC 1, PSC 2, PSC 3
0.000	0.000	0.000	0.790	0.000	0.790	Brush, Good	ESC
0.043	0.000	0.000	0.000	0.000	0.043	Existing Driveway	ESC
0.076	0.000	0.000	0.335	0.000	0.411	Gravel Drive & Roof	PSC 3
0.000	0.000	0.000	0.244	0.000	0.244	Gravel Drive and Roof	ESC
0.000	0.000	0.000	0.244	0.000	0.244	Gravel Drive and Roof, Good	PSC 1
0.000	0.000	0.000	0.195	0.000	0.195	Roof	PSC 2
0.331	0.000	0.000	0.000	0.000	0.331	Woods, Good	ESC
0.773	**0.000**	**0.000**	**2.045**	**0.000**	**2.818**	**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	IB-1	1,054.50	1,053.00	19.0	0.0789	0.013	6.0	0.0	0.0

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 ESC: Existing Runoff Area=61,335 sf 20.42% Impervious Runoff Depth>2.36"
Flow Length=288' Tc=1.5 min CN=68 Runoff=7.07 cfs 0.277 af

Subcatchment PSC 1: Proposed Runoff Area=17,773 sf 59.88% Impervious Runoff Depth>4.29"
Flow Length=534' Tc=1.3 min CN=88 Runoff=3.41 cfs 0.146 af

Subcatchment PSC 2: Proposed Runoff Area=16,671 sf 51.04% Impervious Runoff Depth>3.36"
Flow Length=350' Tc=16.0 min CN=79 Runoff=1.72 cfs 0.107 af

Subcatchment PSC 3: Proposed Runoff Area=26,972 sf 66.39% Impervious Runoff Depth>3.28"
Flow Length=330' Tc=1.4 min CN=78 Runoff=4.20 cfs 0.169 af

Reach DPE: Design Point Existing Inflow=7.07 cfs 0.277 af
Outflow=7.07 cfs 0.277 af

Reach DPP: Design Point Proposed Inflow=3.41 cfs 0.281 af
Outflow=3.41 cfs 0.281 af

Pond IB-1: Infilltration Basin 1 Peak Elev=1,055.09' Storage=6,126 cf Inflow=5.02 cfs 0.276 af
Discarded=0.05 cfs 0.037 af Primary=0.44 cfs 0.115 af Secondary=0.67 cfs 0.020 af Outflow=1.15 cfs 0.172 af

Total Runoff Area = 2.818 ac Runoff Volume = 0.699 af Average Runoff Depth = 2.98"
59.60% Pervious = 1.680 ac 40.40% Impervious = 1.138 ac

Summary for Subcatchment ESC: Existing Subcatchment

[49] Hint: Tc<2dt may require smaller dt

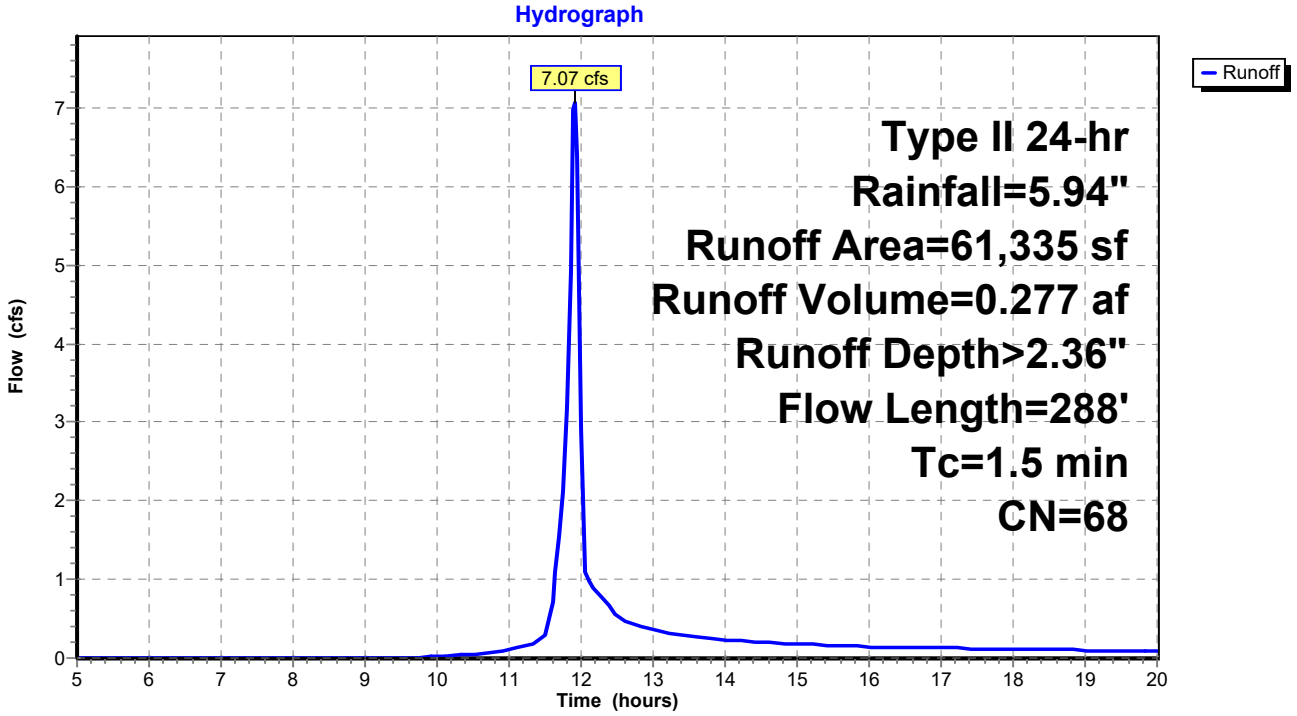
Runoff = 7.07 cfs @ 11.91 hrs, Volume= 0.277 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.94"

	Area (sf)	CN	Description
*	10,643	98	Gravel Drive and Roof, HSG D
*	1,884	98	Existing Driveway, HSG A
	14,400	30	Woods, Good, HSG A
	34,408	73	Brush, Good, HSG D
	61,335	68	Weighted Average
	48,808		79.58% Pervious Area
	12,527		20.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	31	0.3000	2.95		**Sheet Flow, First 100' Flowpath** Smooth surfaces n= 0.011 P2= 2.70"
0.0	20	0.2500	7.50		**Shallow Concentrated Flow, Balance of Flow to fill** Grassed Waterway Kv= 15.0 fps
0.2	20	0.0100	1.61		**Shallow Concentrated Flow, Gravel Drive** Unpaved Kv= 16.1 fps
1.1	217	0.0500	3.35		**Shallow Concentrated Flow, Balance of Longest Flowpath** Grassed Waterway Kv= 15.0 fps
1.5	288	Total			

Subcatchment ESC: Existing Subcatchment



Summary for Subcatchment PSC 1: Proposed Subcatchment 1

[49] Hint: Tc<2dt may require smaller dt

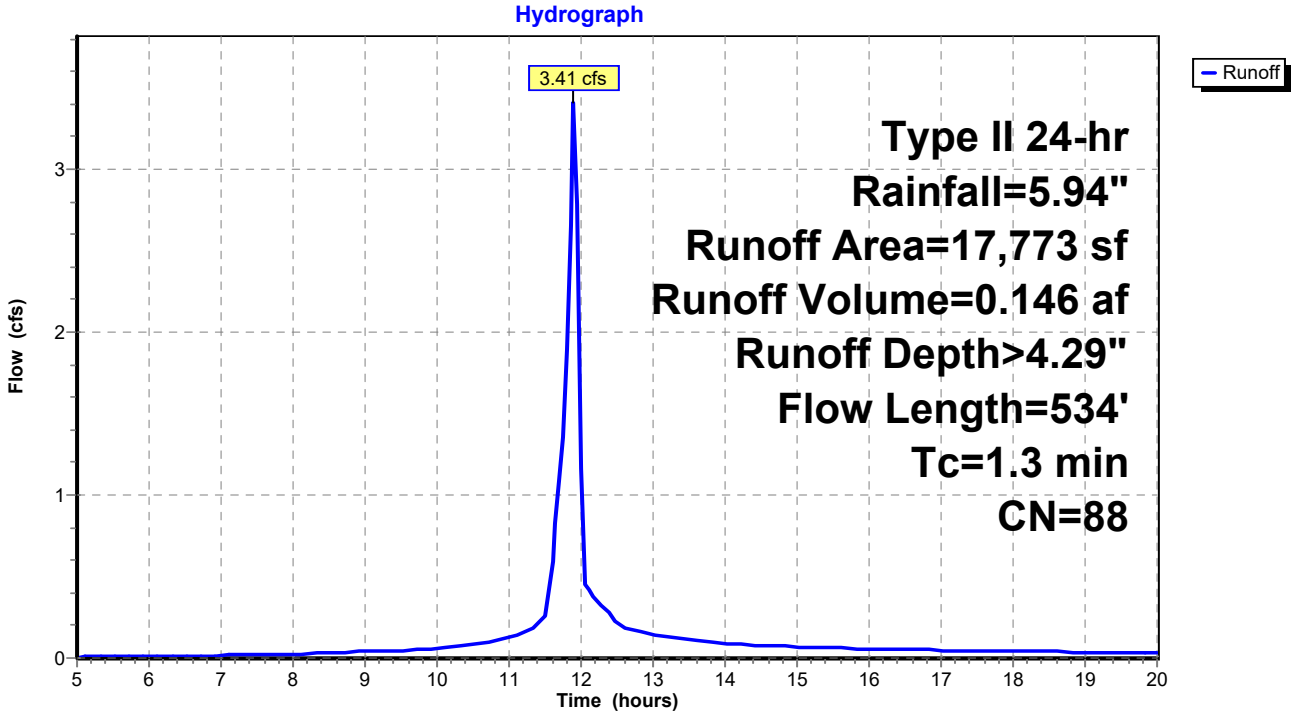
Runoff = 3.41 cfs @ 11.90 hrs, Volume= 0.146 af, Depth> 4.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.94"

	Area (sf)	CN	Description
	1,007	39	>75% Grass cover, Good, HSG A
*	10,643	98	Gravel Drive and Roof, Good, HSG D
	6,123	80	>75% Grass cover, Good, HSG D
	17,773	88	Weighted Average
	7,130		40.12% Pervious Area
	10,643		59.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	31	0.3000	2.95		**Sheet Flow, First 100' Flowpath** Smooth surfaces n= 0.011 P2= 2.70"
0.2	21	0.0100	1.61		**Shallow Concentrated Flow, Gravel Drive** Unpaved Kv= 16.1 fps
0.0	21	0.2500	7.50		**Shallow Concentrated Flow, Grassed Waterway to Channel** Grassed Waterway Kv= 15.0 fps
0.9	461	0.0280	8.79	140.65	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.030
1.3	534	Total			

Subcatchment PSC 1: Proposed Subcatchment 1



Summary for Subcatchment PSC 2: Proposed Subcatchment 2

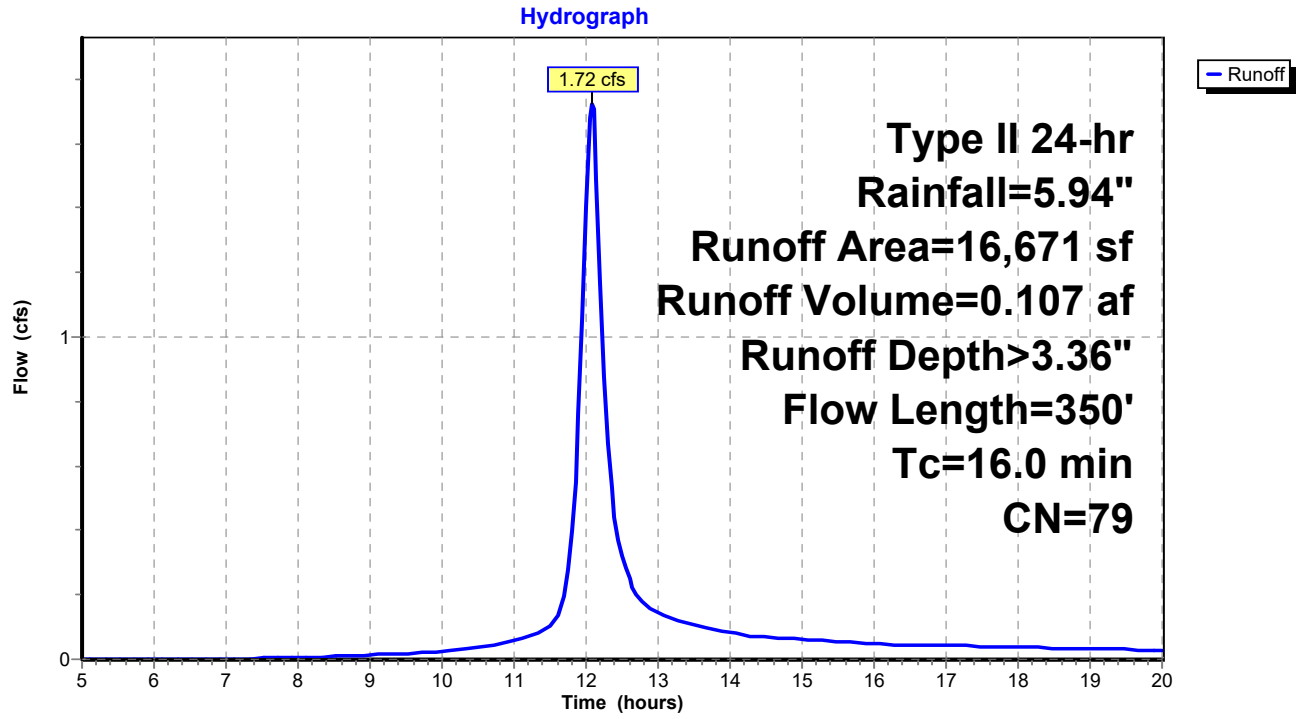
Runoff = 1.72 cfs @ 12.08 hrs, Volume= 0.107 af, Depth> 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.94"

	Area (sf)	CN	Description
*	8,509	98	Roof, HSG D
	4,001	39	>75% Grass cover, Good, HSG A
	4,161	80	>75% Grass cover, Good, HSG D
	16,671	79	Weighted Average
	8,162		48.96% Pervious Area
	8,509		51.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.5	100	0.0200	0.11		**Sheet Flow, First 100' Flowpath** Grass: Dense n= 0.240 P2= 2.70"
0.1	9	0.0200	2.12		**Shallow Concentrated Flow, Balance of Longest Flowpath** Grassed Waterway Kv= 15.0 fps
0.4	241	0.0330	9.54	152.69	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.030
16.0	350	Total			

Subcatchment PSC 2: Proposed Subcatchment 2



Summary for Subcatchment PSC 3: Proposed Subcatchment 3

[49] Hint: Tc<2dt may require smaller dt

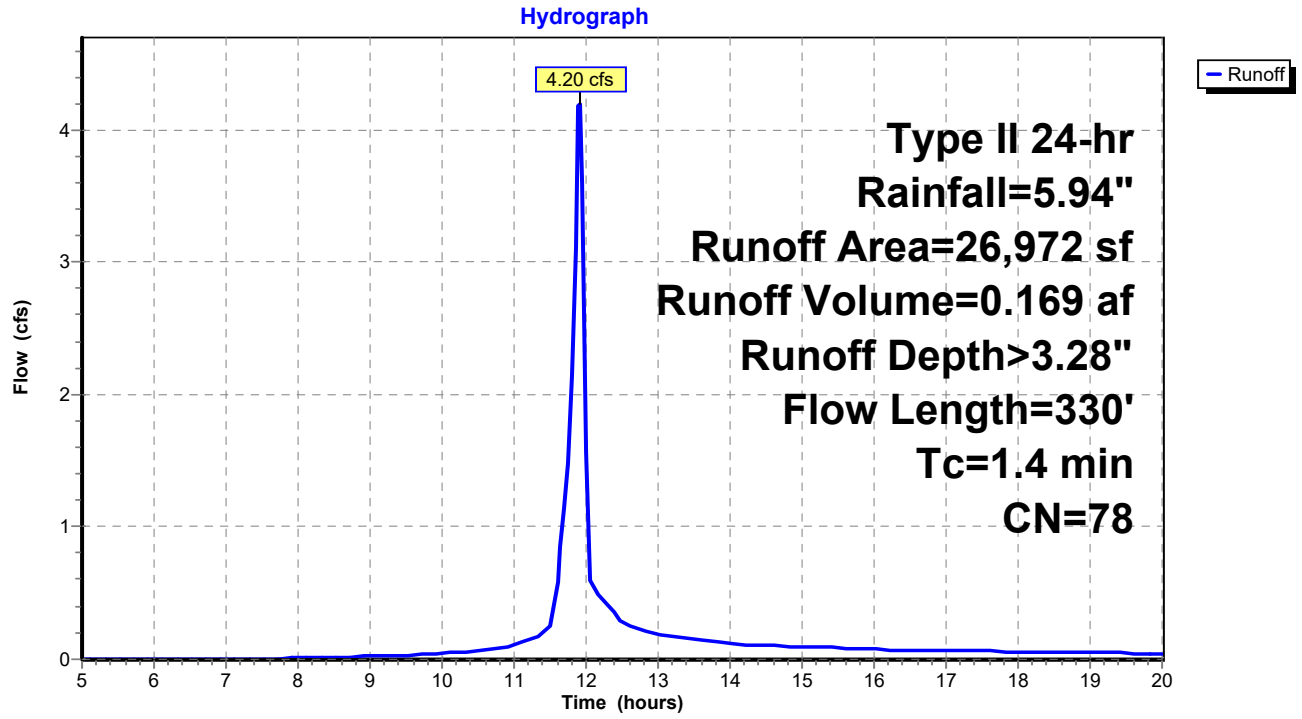
Runoff = 4.20 cfs @ 11.91 hrs, Volume= 0.169 af, Depth> 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=5.94"

	Area (sf)	CN	Description
*	14,594	98	Gravel Drive & Roof, HSG D
*	3,314	98	Gravel Drive & Roof, HSG A
	9,064	39	>75% Grass cover, Good, HSG A
	26,972	78	Weighted Average
	9,064		33.61% Pervious Area
	17,908		66.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	87	0.0340	1.52		**Sheet Flow, First 100' Flowpath** Smooth surfaces n= 0.011 P2= 2.70"
0.4	243	0.0410	10.64	170.20	**Trap/Vee/Rect Channel Flow, Balance of Longest Flowpath** Bot.W=2.00' D=2.00' Z= 3.0 '/' Top.W=14.00' n= 0.030
1.4	330	Total			

Subcatchment PSC 3: Proposed Subcatchment 3



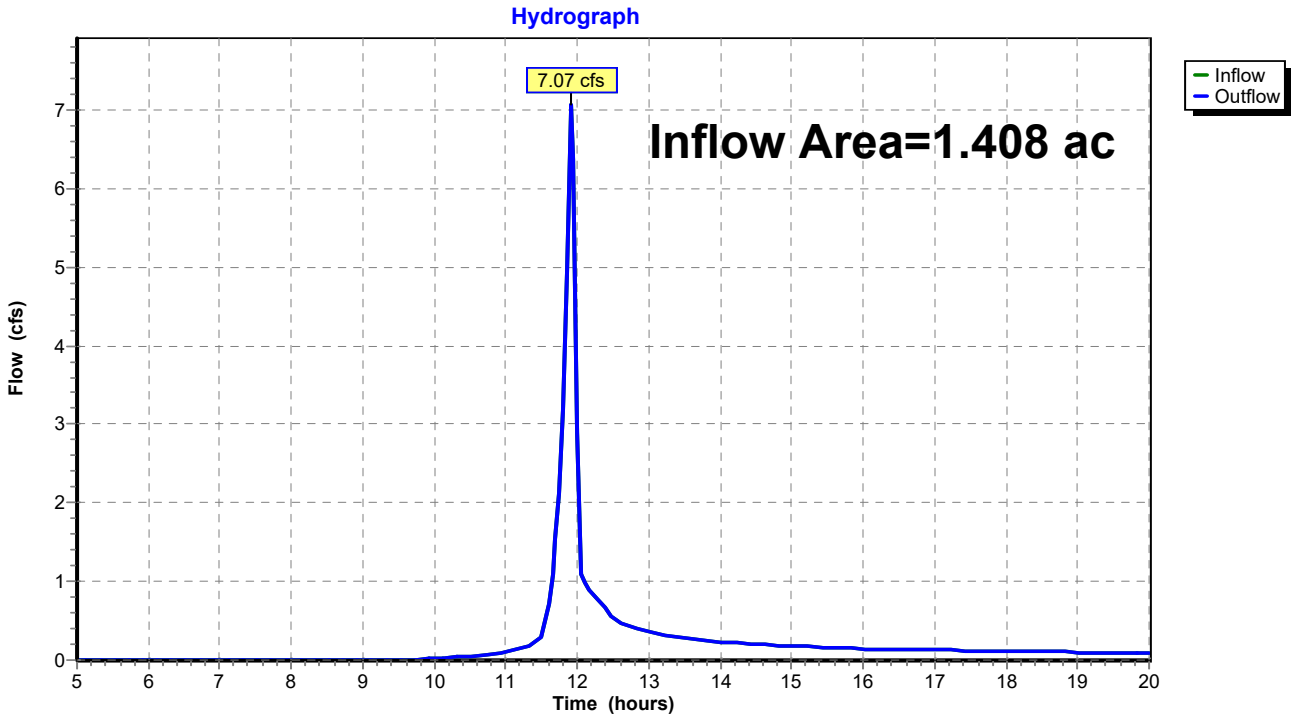
Summary for Reach DPE: Design Point Existing

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.408 ac, 20.42% Impervious, Inflow Depth > 2.36"
Inflow = 7.07 cfs @ 11.91 hrs, Volume= 0.277 af
Outflow = 7.07 cfs @ 11.91 hrs, Volume= 0.277 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DPE: Design Point Existing



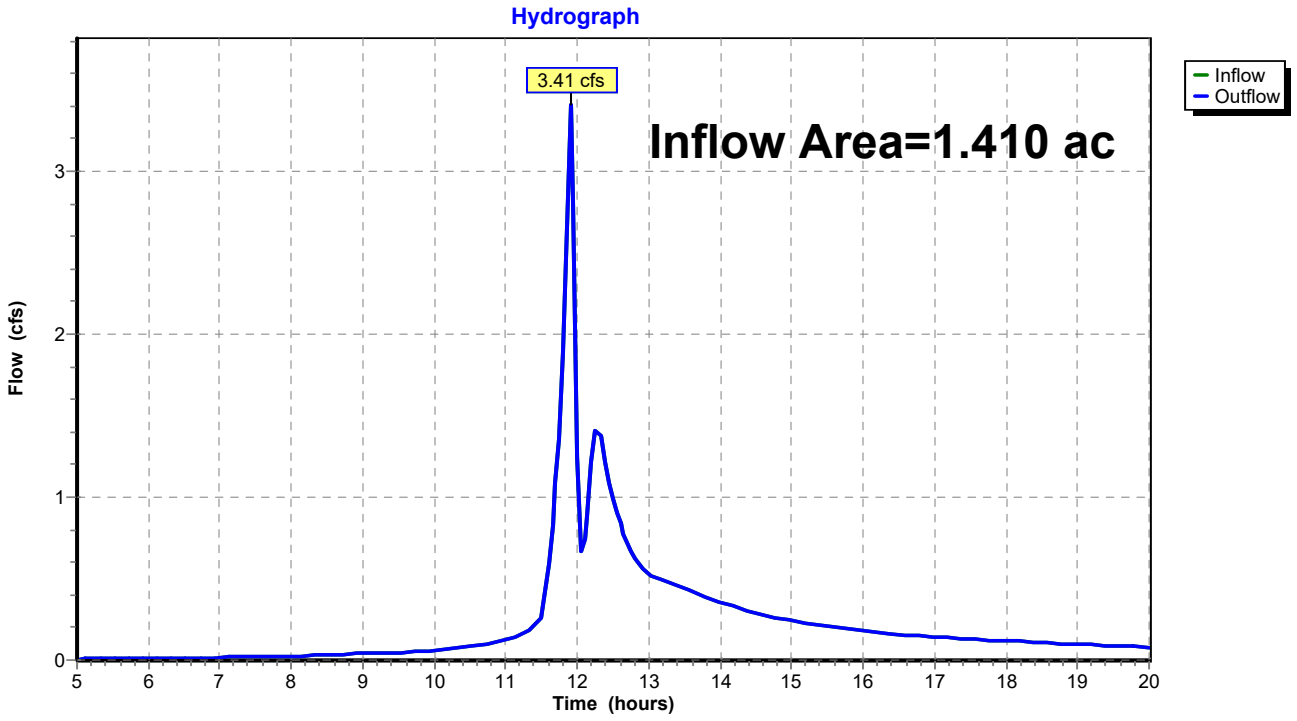
Summary for Reach DPP: Design Point Proposed

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.410 ac, 60.34% Impervious, Inflow Depth > 2.39"
Inflow = 3.41 cfs @ 11.90 hrs, Volume= 0.281 af
Outflow = 3.41 cfs @ 11.90 hrs, Volume= 0.281 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach DPP: Design Point Proposed



Summary for Pond IB-1: Infilltration Basin 1

Inflow Area = 1.002 ac, 60.53% Impervious, Inflow Depth > 3.31"
Inflow = 5.02 cfs @ 11.92 hrs, Volume= 0.276 af
Outflow = 1.15 cfs @ 12.29 hrs, Volume= 0.172 af, Atten= 77%, Lag= 22.6 min
Discarded = 0.05 cfs @ 12.29 hrs, Volume= 0.037 af
Primary = 0.44 cfs @ 12.29 hrs, Volume= 0.115 af
Secondary = 0.67 cfs @ 12.29 hrs, Volume= 0.020 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1,055.09' @ 12.29 hrs Surf.Area= 3,905 sf Storage= 6,126 cf

Plug-Flow detention time= 150.4 min calculated for 0.171 af (62% of inflow)
Center-of-Mass det. time= 78.5 min (855.8 - 777.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,051.00'	10,098 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,051.00	2,772	0.0	0	0
1,052.50	2,772	40.0	1,663	1,663
1,052.51	2,772	20.0	6	1,669
1,054.00	2,772	20.0	826	2,495
1,054.10	2,772	100.0	277	2,772
1,055.00	3,802	100.0	2,958	5,730
1,056.00	4,934	100.0	4,368	10,098
1,056.50	0	0.0	0	10,098

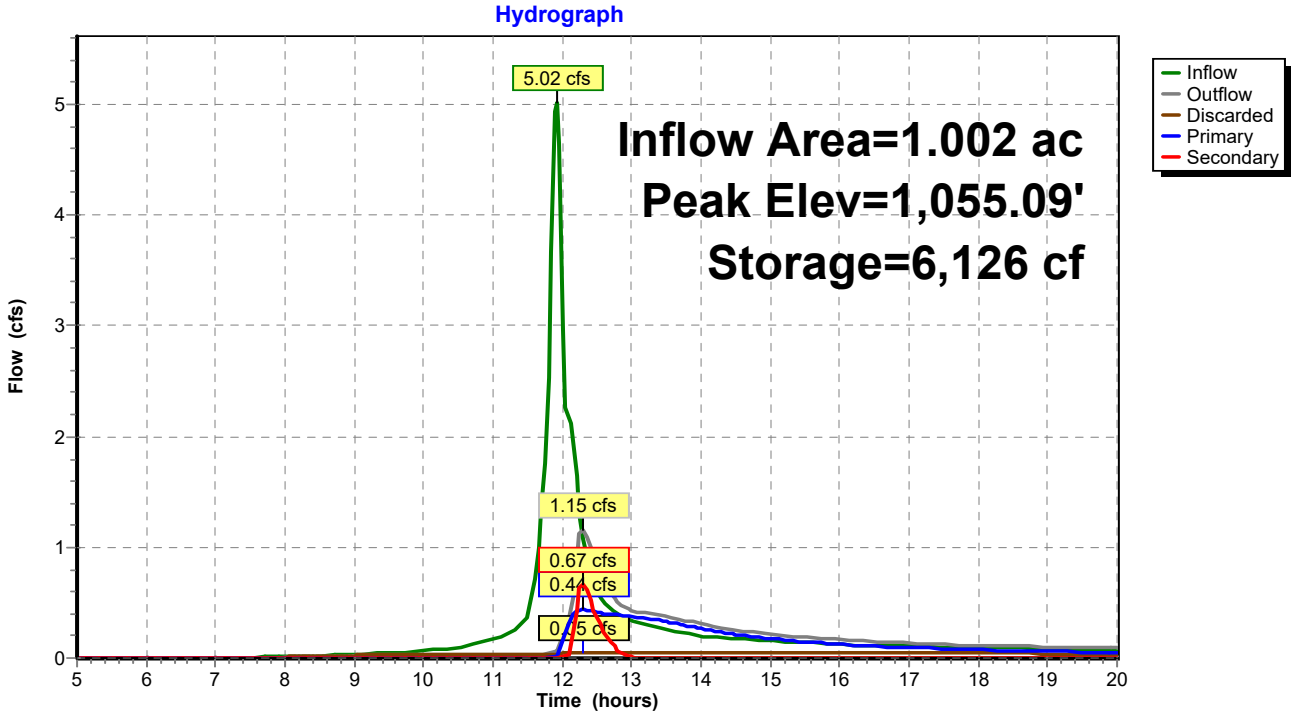
Device	Routing	Invert	Outlet Devices
#1	Discarded	1,051.00'	**0.500 in/hr Exfiltration over Surface area**
#2	Primary	1,054.50'	**6.0" Round Culvert** L= 19.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,054.50' / 1,053.00' S= 0.0789 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#3	Secondary	1,055.00'	**10.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Discarded OutFlow Max=0.05 cfs @ 12.29 hrs HW=1,055.09' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.44 cfs @ 12.29 hrs HW=1,055.09' (Free Discharge)
└**2=Culvert** (Inlet Controls 0.44 cfs @ 2.22 fps)

Secondary OutFlow Max=0.64 cfs @ 12.29 hrs HW=1,055.09' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 0.64 cfs @ 0.71 fps)

Pond IB-1: Infilltration Basin 1



APPENDIX 3

SOILS DATA

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 Tompkins County, New York

Moore Storage

March 28, 2020

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.

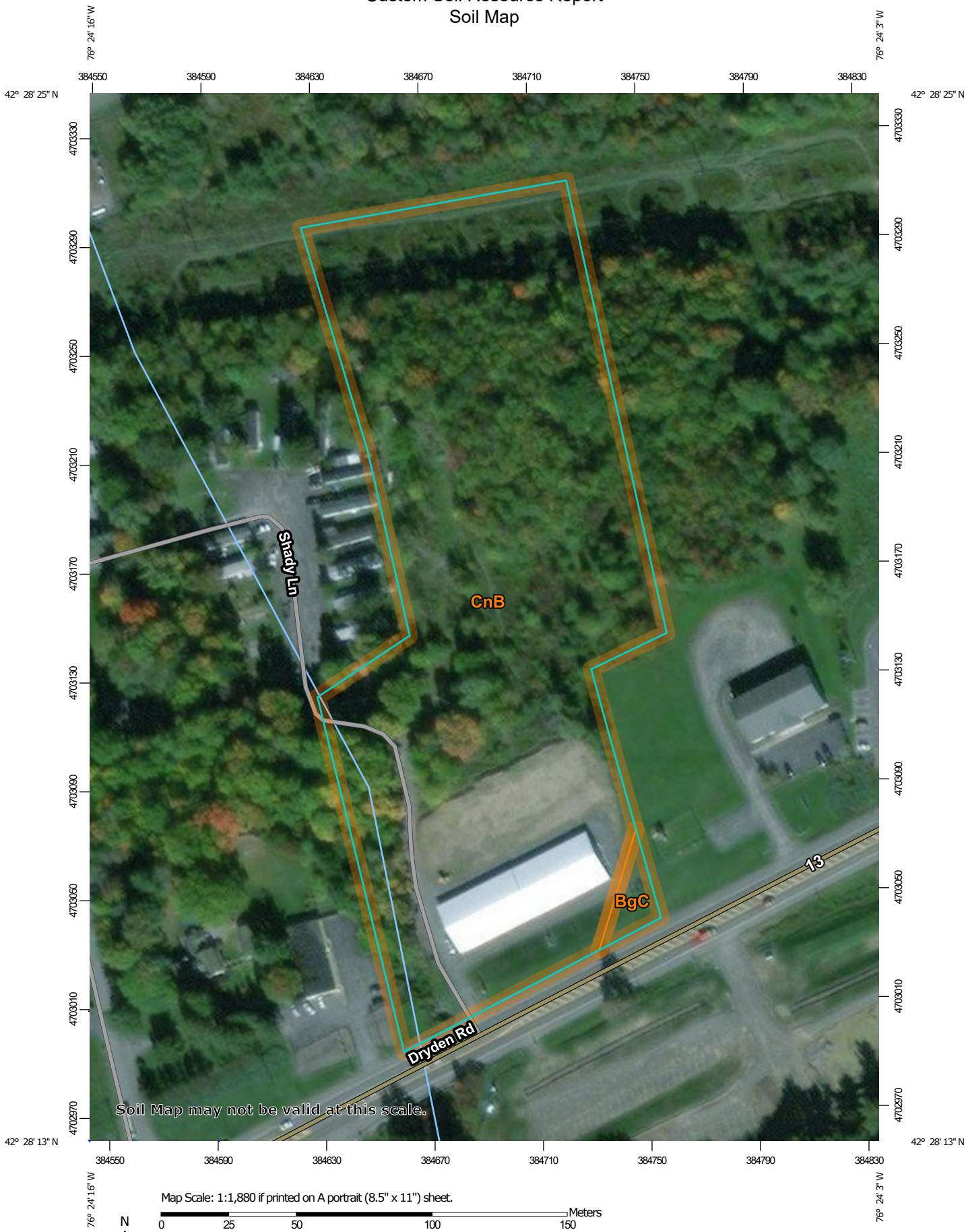
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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.

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,880 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil 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 1:20,000.

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: Tompkins County, New York
Survey Area Data: Version 15, Sep 16, 2019

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

Date(s) aerial images were photographed: Aug 29, 2012—Nov 6, 2016

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
BgC	Bath and Valois soils, 5 to 15 percent slopes	0.1	1.5%
CnB	Chenango gravelly loam, fan, 0 to 8 percent slopes	7.0	98.5%
Totals for Area of Interest		**7.1**	**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.

Tompkins County, New York

BgC—Bath and Valois soils, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2v32c
Elevation: 330 to 2,460 feet
Mean annual precipitation: 31 to 70 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 105 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Bath and similar soils: 40 percent
Valois and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bath

Setting

Landform: Hills, mountains
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Loamy till derived mainly from gray and brown siltstone, sandstone, and shale

Typical profile

Ap - 0 to 9 inches: channery silt loam
Bw1 - 9 to 15 inches: channery silt loam
Bw2 - 15 to 25 inches: channery loam
E - 25 to 29 inches: channery loam
Bx - 29 to 52 inches: very channery silt loam
C - 52 to 72 inches: very channery silt loam

Properties and qualities

Slope: 5 to 15 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: 26 to 38 inches to fragipan
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Valois

Setting

Landform: Lateral moraines, end moraines, valley sides
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy till derived mainly from sandstone, siltstone, and shale

Typical profile

H1 - 0 to 2 inches: gravelly silt loam
H2 - 2 to 32 inches: gravelly silt loam
H3 - 32 to 49 inches: gravelly silt loam
H4 - 49 to 60 inches: gravelly silt loam

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 24 to 36 inches to fragipan
Natural drainage class: 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 24 to 35 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Mardin

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Langford

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Erie

Percent of map unit: 5 percent
Landform: Hills, till plains, drumlinoid ridges
Landform position (two-dimensional): Footslope, summit

Landform position (three-dimensional): Base slope, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Lordstown

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank, side slope, nose slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Volusia

Percent of map unit: 5 percent
Landform: Hills, mountains
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope, interfluve, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

CnB—Chenango gravelly loam, fan, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9xlc
Mean annual precipitation: 32 to 42 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Chenango, fan, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chenango, Fan

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits, derived mainly from sandstone, shale, and siltstone

Typical profile

H1 - 0 to 8 inches: gravelly loam

H2 - 8 to 26 inches: gravelly silt loam
H3 - 26 to 60 inches: very gravelly loamy coarse sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 36 to 60 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Genesee (hamlin)

Percent of map unit: 5 percent
Hydric soil rating: No

Red hook

Percent of map unit: 5 percent
Hydric soil rating: No

Arkport

Percent of map unit: 5 percent
Hydric soil rating: No

Tioga

Percent of map unit: 5 percent
Hydric soil rating: No

Braceville

Percent of map unit: 5 percent
Hydric soil rating: No

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APPENDIX 4

PRECIPITATION DATA

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New York
Location	
Longitude	76.403 degrees West
Latitude	42.471 degrees North
Elevation	0 feet
Date/Time	Sat, 28 Mar 2020 20:06:28 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.70	0.87	1.07	**1yr**	0.75	0.95	1.21	1.45	1.71	2.01	2.27	**1yr**	1.78	2.18	2.58	3.12	3.59	**1yr**
2yr	0.32	0.50	0.62	0.81	1.02	1.26	**2yr**	0.88	1.12	1.43	1.70	2.01	2.34	2.62	**2yr**	2.08	2.52	2.95	3.50	4.01	**2yr**
5yr	0.38	0.59	0.74	0.99	1.26	1.57	**5yr**	1.09	1.39	1.78	2.13	2.50	2.91	3.25	**5yr**	2.58	3.13	3.63	4.22	4.83	**5yr**
10yr	0.42	0.66	0.84	1.14	1.48	1.85	**10yr**	1.28	1.63	2.11	2.52	2.96	3.43	3.83	**10yr**	3.04	3.68	4.26	4.86	5.57	**10yr**
25yr	0.50	0.79	1.00	1.38	1.84	2.31	**25yr**	1.58	2.02	2.64	3.15	3.70	4.27	4.76	**25yr**	3.78	4.58	5.26	5.86	6.73	**25yr**
50yr	0.56	0.90	1.15	1.60	2.16	2.73	**50yr**	1.86	2.38	3.12	3.74	4.37	5.04	5.61	**50yr**	4.46	5.40	6.18	6.75	7.76	**50yr**
100yr	0.63	1.02	1.31	1.86	2.54	3.24	**100yr**	2.19	2.80	3.71	4.43	5.18	5.94	6.62	**100yr**	5.26	6.37	7.26	7.77	8.95	**100yr**
200yr	0.72	1.17	1.51	2.17	2.99	3.82	**200yr**	2.58	3.30	4.39	5.25	6.12	7.02	7.82	**200yr**	6.21	7.52	8.53	8.96	10.33	**200yr**
500yr	0.85	1.39	1.82	2.64	3.71	4.78	**500yr**	3.20	4.11	5.49	6.57	7.65	8.74	9.74	**500yr**	7.74	9.37	10.56	10.81	12.49	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.25	0.39	0.48	0.64	0.79	0.84	**1yr**	0.68	0.82	0.96	1.07	1.51	1.74	2.10	**1yr**	1.54	2.02	2.38	2.95	3.27	**1yr**
2yr	0.32	0.49	0.61	0.82	1.01	1.12	**2yr**	0.87	1.09	1.24	1.53	1.86	2.28	2.55	**2yr**	2.02	2.45	2.87	3.43	3.93	**2yr**
5yr	0.36	0.55	0.69	0.94	1.20	1.32	**5yr**	1.04	1.29	1.44	1.78	2.18	2.72	3.03	**5yr**	2.40	2.92	3.40	4.00	4.58	**5yr**
10yr	0.40	0.61	0.76	1.06	1.37	1.50	**10yr**	1.18	1.47	1.63	1.99	2.46	3.10	3.44	**10yr**	2.75	3.31	3.86	4.47	5.15	**10yr**
25yr	0.46	0.69	0.86	1.23	1.62	1.78	**25yr**	1.40	1.74	1.92	2.29	2.86	3.67	4.07	**25yr**	3.25	3.91	4.53	5.20	5.99	**25yr**
50yr	0.50	0.76	0.95	1.37	1.84	2.03	**50yr**	1.59	1.99	2.17	2.56	3.22	4.18	4.61	**50yr**	3.70	4.43	5.12	5.82	6.72	**50yr**
100yr	0.55	0.84	1.05	1.52	2.08	2.32	**100yr**	1.80	2.27	2.46	2.85	3.61	4.76	5.22	**100yr**	4.21	5.02	5.78	6.52	7.53	**100yr**
200yr	0.62	0.93	1.18	1.70	2.38	2.65	**200yr**	2.05	2.59	2.79	3.17	4.06	5.40	5.90	**200yr**	4.78	5.67	6.51	7.30	8.45	**200yr**
500yr	0.74	1.10	1.42	2.06	2.93	3.17	**500yr**	2.53	3.10	3.30	3.67	4.74	6.40	6.92	**500yr**	5.66	6.66	7.61	8.49	9.84	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.30	0.47	0.57	0.77	0.94	1.03	**1yr**	0.81	1.01	1.16	1.44	1.77	2.20	2.41	**1yr**	1.94	2.31	2.75	3.28	3.78	**1yr**
2yr	0.34	0.52	0.64	0.87	1.07	1.18	**2yr**	0.93	1.16	1.31	1.63	1.99	2.42	2.71	**2yr**	2.14	2.61	3.05	3.60	4.11	**2yr**
5yr	0.40	0.62	0.77	1.05	1.34	1.53	**5yr**	1.15	1.49	1.69	2.06	2.54	3.12	3.47	**5yr**	2.76	3.33	3.87	4.46	5.09	**5yr**
10yr	0.46	0.71	0.88	1.24	1.60	1.86	**10yr**	1.38	1.82	2.04	2.47	3.07	3.79	4.20	**10yr**	3.36	4.04	4.65	5.25	6.01	**10yr**
25yr	0.57	0.86	1.07	1.53	2.01	2.42	**25yr**	1.74	2.37	2.63	3.16	3.96	4.91	5.42	**25yr**	4.35	5.21	5.96	6.53	7.47	**25yr**
50yr	0.66	1.01	1.25	1.80	2.42	2.94	**50yr**	2.09	2.88	3.19	3.81	4.81	5.98	6.56	**50yr**	5.29	6.31	7.19	7.70	8.82	**50yr**
100yr	0.77	1.17	1.46	2.11	2.89	3.58	**100yr**	2.50	3.50	3.87	4.61	5.82	7.29	7.96	**100yr**	6.45	7.65	8.70	9.10	10.41	**100yr**
200yr	0.90	1.35	1.71	2.48	3.46	4.37	**200yr**	2.99	4.27	4.70	5.55	7.06	8.89	9.67	**200yr**	7.87	9.30	10.54	10.73	12.30	**200yr**
500yr	1.10	1.63	2.10	3.05	4.34	5.67	**500yr**	3.74	5.54	6.06	7.10	9.14	11.56	12.52	**500yr**	10.23	12.03	13.60	13.37	15.33	**500yr**

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