Stormwater Pollution Prevention Plan
and
Stormwater Management Report

Applicant:

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Appendices

I. Executive Summary

This report defines existing and proposed site conditions, the impact of stormwater runoff on neighboring lands due to the proposed conditions, how stormwater will be managed during and after the construction period, mitigation of any additional stormwater runoff generated from development of this project, the duration of soil disturbance and stabilization practices, and appoints who will be responsible for implementing and maintaining the practices.

The practices specified herein will follow the NYS Standards and Specifications for Erosion and Sediment Control in conjunction with the NYS Stormwater Management Design Manual.

A. Purpose of SWPPP Report

This Stormwater Pollution Prevention Plan (SWPPP) was created to ensure compliance with the New York State Department of Environmental Conservation Service State Pollution Discharge Elimination System General Permit for Stormwater Discharge from Construction Activity (GP-0-15-002) included as Exhibit 1. The Notice of Intent (NOI) application for stormwater discharges is included as Exhibit 2.

B. Duty to Comply and Penalties for Violation

It shall be a violation of the State Pollutant Discharge Elimination System (SPDES) General Permit and the Environmental Conservation Law (ECL) for discharge authorized by the SPDES General Permit to either cause or contribute to a violation of the water quality standards as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York. (SPDES General Permit, Part I.A.)

For the purposes of the SPDES General Permit, the term “owner or operator” means the person, persons, or legal entity, which owns or leases the property on which the construction activity is occurring.

The owner or operator must comply with all conditions of the SPDES General Permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any permit noncompliance constitutes a violation of the Clean Water Act and the ECL and is grounds for enforcement action against the owner or operator, or the contractor/subcontractor; permit revocation or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with the SPDES General Permit or the SWPPP, the NYSDEC may order an immediate stop to all construction activity at the site until the non-compliance is remedied.

The operator and all contractors working on this project shall take all reasonable steps to minimize or prevent any discharge in violation of the SPDES General Permit which has a reasonable likelihood of adversely affecting human health or the environment.

There is substantial criminal, civil, and administrative penalties associated with violating the provisions of the SPDES General Permit. Fines of up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending on the nature and degree of the violation. The operator has acknowledged this by signing a "Pollution Prevention Plan Certification", included as Exhibit 3. Prior to commencement of any construction activities on site, the operator will obtain certifications from all involved contractors to ensure compliance with the terms and conditions herein. Exhibit 4 contains the form that shall be used for obtaining the contractors' certifications.

II. Project Information

A. Project Description

The proposed project will consist of the non-compulsory creation of infiltrating bioretention areas adjacent to two existing parking lots on the campus of SUNY Purchase College. The systems will redirect stormwater to infiltrate, evapotranspire, detain, and remediate runoff generated from impervious asphalt parking surfaces. They help slow, absorb, and filter to remediate polluted water.

B. Stormwater Management Objectives

The objectives of the proposed Stormwater Management methods and procedures for this project shall be:

- Reduce the quantity of stormwater entering the system by promoting the infiltration of stormwater through soil media, thereby increasing the retention and detention capacity of the watershed;
- Reduce the first flush surface runoff entering the wetlands through direct drainage;
- Directly remove pollutants through phytoremediation.

C. Pre-development Conditions

The parcel consists of two asphalt parking lots totaling 13.76 acres of existing impervious area and two grass islands totaling 2.24 acres of pervious area resulting in a 16.00 acre total parcel. It is noted here that, while this report covers the construction of green infrastructure in both the North and South lots of the subject area, construction of the proposed is being deferred in the South lot due to funding constraints.

1. Existing Drainage

The project site is located within the Atlantic Ocean/Long Island Sound watershed. The site drains via sheet flow and concentrated flow to the west side of each parking lot. This water eventually flows via storm drains, which flow into an existing tributary located at the east portion of the site. This tributary eventually flows into Blind Brook,

which ultimately outflows into Long Island Sound, approximately 6.25 miles from the site.

The existing project site drainage is split into eight basic drainage areas. The drainage areas include:

North Parking Lot Area

- N1
- N2
- N3
- N4

South Parking Lot Area – Construction deferred

- S1
- S2
- S3
- S4

Exhibit 9 provides a map outlining the existing sub-areas and outlets.

2. Existing On-site water bodies /wetland and drainage structures

An unnamed tributary of Blind Brook crosses the eastern border of the site from north to south. Federal and New York State mapped wetlands are not present within the project site.

Delineated wetlands exist within the drainage areas. These wetlands have been designated as federal jurisdictional wetlands, as a connection to permanent waterways, as a connection to a closed storm drainage system via overland flow has been determined by the U.S. Army Corps of Engineers (USACE). New York State Wetland G-9 is located to the east of the project parcel, but outside the limits of work. The regulated wetland adjacent area will not be impacted by the project.

Potential impacts to these wetlands will not occur as a result of the proposed development.

3. Environmentally Sensitive Areas

Exhibit 14 documents archeological sensitive areas within the project vicinity. As shown, according to the New York State Historic Preservation Office (SHPO) the project is located in an archaeologically sensitive area.

A review of federal and state data bases revealed no other environmental sensitive areas on or adjacent to the project site. The review included threatened/endangered species designated by the U.S. Fish and Wildlife Service, New York State Critical Environmental areas, Rare Plants and Rare Animals, and Significant Natural Communities.

Flood Insurance Rate Maps were reviewed for the project area. No mapped 100-year flood plains are located on the site. The flood plain map for the project area is shown in Exhibit 15.

4. Existing Utilities

Due to the existence of lighting in the parking lot and adjacent road, underground utilities are assumed to exist within the project area. The locations of the utilities are unknown and will be determined prior to construction.

5. Soil Types

Soil Conservation Service Soil Survey Maps identifying soil types and hydrologic soil groups (HSG) are included as Exhibit 7.

6. Roughness Coefficients for Sheet & Channel Flows

The predominant existing land cover of the project is an asphalt parking lot. Manning's n values were assigned based on the suggested values (Chow, 1959) to determine the Velocity (V) and Time of Concentration (Tc), as required for analysis of the conditions.

D. Post-Development Conditions

1. Proposed Development

The property has been divided into two areas based on the two existing parking lots at the site. Each of these lots consists of three drainage sub-sheds.

The majority of the site will remain undisturbed. No new impervious areas will be added to the site. Upon completion the disturbed area will be reseeded and landscaped as described on the site drawings.

E. Disturbed Area of Site

The overall disturbed portion of the site includes an area of greater than 2.7 acres. See the SWPPP Construction Drawings for overview of the disturbed area.

F. Proposed Project Activity Duration

The project is anticipated to take approximately 3 months to complete. The duration of activity is anticipated from September 2018 to November 2018.

G. Proposed Impervious Areas

The proposed project will not add any impervious area.

H. Future Utilities

This project does not propose any utility work.

I. Post Developed Environmentally Sensitive Areas

Silt fencing will be installed to protect undeveloped areas including the wetlands at the western portion of the site. Upon completion of the project, all disturbed areas with exception of parking and roadway areas will be vegetated. Refer to the Erosion and Sediment Control Plan for erosion and sediment control measures.

J. Proposed Drainage Area Divide Lines

The developed portion of the site has been divided into eight contributing areas (Exhibit 10). Drainage areas N1, N2, N3, S1, S2, and S3 will experience sheet flow and shallow concentrated flow from the existing development to proposed drainage structures. Drainage Areas N4 and S4 consist of proposed infiltrating bioretention areas .

K. Section 303 (d) Listed Impaired Waters

The stormwater runoff from the project site discharges to an unnamed tributary of Blind Brook. Blind Brook is not listed in Appendix E of GP-0-15-002 as a Section 303 (d) Impaired Waterway. Post-construction stormwater management practices designed in conformance with the Stormwater Management Design Manual will be installed at the site.

L. SWPPP Responsibility

1. SWPPP Implementation

The project Contractor shall be responsible for the implementation of all the SWPPP requirements and procedures. Any hired subcontractors shall be responsible to follow the requirements of the SWPPP, but the Prime Contractor shall have the responsibility of notifying all subcontractors of the applicable requirements and to obtain a signed contractor certification statement for their work.

2. SWPPP Inspection

The inspections shall be performed by a Qualified Inspector or a Qualified Professional such as a qualified licensed Professional Engineer or person under his direct supervision, Certified Professional in Erosion and Sediment Control (CPESC), qualified licensed landscape architect, or other NYSDEC endorsed individual. The Qualified Inspector shall be knowledgeable in the principles and practices of erosion and sediment control, has received four (4) hours of training endorsed by the NYSDEC and work for and under the supervision of a Qualified Professional. The inspections shall take place weekly or twice a week if greater than 5 acres is disturbed at any one time.

The Owner shall be responsible for hiring and/or obtaining the services of certified personnel to conduct the SWPPP inspections as per the above requirements and time frame.

III. Stormwater Runoff Quantity Volumes

A. Existing

A computer worksheet using the Soil Conservation Service's Technical Release #55 (TR55) was used to estimate the existing runoff generated from the 1, 2, 5, 10, and 100-year storm events for the Subject Area. Printouts from the worksheet used to estimate the Composite Curve Number (CN), Travel Time (Tt), and Peak Discharge Rate (Qp) from each specified storm event, for the Subject Area, are attached as Exhibit 12. Below is a summary of the results:

Existing Peak Runoff Quantities						
Outlet	Peak Discharge per Storm Event, Q (cfs)					
	1-year	2-year	5-year	10-year	50-year	100-year
N1	6.94	8.15	10.84	13.53	17.58	19.60
N2	5.63	6.61	8.80	10.98	14.27	15.91
N3	5.27	6.19	8.24	10.29	13.37	14.90
S1	5.82	6.83	9.09	11.35	14.74	16.44
S2	5.38	6.31	8.40	10.49	13.62	15.19
S3	7.44	8.74	11.63	14.52	18.87	21.04
Pre-Dev Site Total	36.48	42.83	57.00	71.16	92.45	103.08

B. Proposed

The proposed runoff from the site will be the same as the existing. A computer worksheet using the Soil Conservation Service's Technical Release #55 (TR55) was used to estimate the existing runoff generated from the 1, 2, 5, 10, and 100-year storm events for the Subject Area. Printouts from the worksheet used to estimate the Composite Curve Number (CN), Travel Time (Tt), and Peak Discharge Rate (Qp) from each specified storm event, for the Subject Area, are attached as Exhibit 13. Below is a summary of the results:

Proposed Peak Runoff Quantities						
Outlet	Peak Discharge per Storm Event, Q (cfs)					
	1-year	2-year	5-year	10-year	50-year	100-year
N1	6.94	8.15	10.84	13.53	17.58	19.60
N2	5.63	6.61	8.80	10.98	14.27	15.91
N3	5.27	6.19	8.24	10.29	13.37	14.90
S1	5.82	6.83	9.09	11.35	14.74	16.44
S2	5.38	6.31	8.40	10.49	13.62	15.19
S3	7.44	8.74	11.63	14.52	18.87	21.04
Post-Dev Site Total	36.48	42.83	57.00	71.16	92.45	103.08

C. Net

The following table summarizes the estimated Peak Discharge Rates (Qp) for the existing and proposed conditions, as well as the estimated net change that will occur for the project if storm water management facilities are not constructed:

Net Peak Runoff Quantities						
Condition/ Net Change	Peak Discharge per Storm Event					
	1-year	2-year	5-year	10-year	50-year	100-year
Proposed Peak Runoff	36.48	42.83	57.00	71.16	92.45	103.08
Existing Peak Runoff	36.48	42.83	57.00	71.16	92.45	103.08
Net Change	0.00	0.00	0.00	0.00	0.00	0.00

IV. Stormwater Quality/Quantity Control

The non-compulsory creation of the infiltrating bioretention areas is a green infrastructure retrofit project, which will exceed the required treatment level of the water quality volume. No other measures are necessary.

V. Stormwater Management Practice Volume Sizing

A. Water Quality Volume (WQ_v)

The non-compulsory creation of the infiltrating bioretention areas is a green infrastructure retrofit project, which will exceed the required treatment level of the water quality volume. No other measures are necessary. The calculated WQv for the North site is 0.81 acre ft. (35,123 cu ft). It is anticipated that the proposed North site infiltrating bioretention area is capable of treating and infiltrating 75% (26,500 cu ft) of this volume of water. The calculated WQv for the South site is 0.84 acre ft. (36,661 cu ft). It is anticipated that the proposed South site infiltrating bioretention area is capable of treating and infiltrating 58% (21,342 cu ft) of this volume of water.

B. Overbank Flood Protection (Q_p)

The non-compulsory creation of the infiltrating bioretention areas is a green infrastructure retrofit project, which will exceed the required treatment level of the water quality volume. No other measures are necessary.

C. Extreme Storm Protection (Q_f)

The non-compulsory creation of the infiltrating bioretention areas is a green infrastructure retrofit project, which will exceed the required treatment level of the water quality volume. No other measures are necessary.

D. Stormwater Practices Design

Infiltrating bioretention areas are the proposed practices that will be installed at this site. The details for the design are included in the SWPPP Construction Drawings.

VI. Erosion & Sediment Control

Construction operations will be carried out in such a manner that erosion will be controlled and water and air pollution minimized. Federal, State and local laws concerning pollution abatement will be followed.

A. Temporary Erosion Control Measures

1. Dust Control

   Dust control shall be accomplished on-site through watering only. Calcium chloride or other chemicals used for dust control will not be allowed. The contractor shall provide a positive means to prevent air-borne dust from being generated. At a minimum, sprinkling, sweeping on paved areas and sprinkling and mulching on unpaved areas shall be provided.

2. Silt Fence

   Silt Fence shall be used as a temporary erosion control measure during construction, as shown on the Erosion & Sediment Control Plan.

3. Storm Drain Inlet Protection

   Upon installation all proposed inlets within the project limits shall be protected from construction generated sediment by inlet protection devices. Drop inlets shall be protected with filter fabric and stone, as detailed in the New York Standards and Specifications for Erosion & Sediment Control.

4. Temporary and/or Permanent Stabilization

   Stabilization measures shall begin within 14-days of construction activity that has temporarily or permanently ceased within a portion of the project. Stabilization will not be required if construction will begin within 14-days of last disturbance.

5. Temporary Site Seeding and Mulching of disturbed areas:

   - Refer to NY Standards and Specifications for Erosion and Sediment Control - Standard and Specifications for Temporary Construction Area Seeding (Page 4.58).

   - Refer to NY Standards and Specifications for Erosion and Sediment Control - Standard and Specifications for mulching (Page 4.39).

a. Site Preparation

The seedbed shall be scarified. This shall be accomplished by disking or tracking equipment across the work area to be seeded.

b. Temporary Seeding

1) All disturbed cover within each work area (including soil stockpiles) shall be seeded with Ryegrass seed (annual or perennial). The application rate shall be 30 pounds per acre.

2) The seed shall be spread by broadcasting, drilling with cultipack type seeder, or hydroseeding. Hand spreading of temporary seed is acceptable, provide the appropriate coverage and non-clumping of seed is maintained.

c. Mulching and Mulch anchoring

1) All disturbed cover within each work area (including soil stockpiles) shall be mulched, after seed application. The mulch shall be straw mulch and must be applied by mechanical means (straw bale mulcher). The application rate shall be 100 - 120 bales of straw per acre.)

2) The mulch shall be anchored by one of the following methods:

a) Wood Cellulose - Apply with a hydroseeder immediately after mulching. Use 500 pounds of wood fiber per acre. Provide a product with an adhesive material.

b) Mulch Anchoring tool or disk - Apply mulch and pull a mulch anchoring tool (blunt, straight disk) over the mulch as near to the contour as possible. Mulch material should be tucked into soil surface about 3".

B. Permanent Erosion Control Structures

1. Seeding and Planting

It shall be the responsibility of the contractor to establish grass cover on all disturbed areas, as quickly as possible. Seeding shall be in accordance with the guidelines set forth in the New York Standards and Specifications for Erosion and Sediment Control and as specified as follows:

· Refer to NY Standards and Specifications for Erosion and Sediment Control - Standard and Specifications for Permanent Construction Area Plantings (Page 4.42).

- Refer to NY Standards and Specifications for Erosion and Sediment Control - Standard and Specifications for mulching (Page 4.39).

a. Site Preparation

The seedbed shall be scarified to a depth of 4"-6". This shall be accomplished by disking or tracking equipment across the work area to be seeded. Remove all stones over 1" in diameter, sticks and foreign matter from the surface. Apply lime as needed to obtain a pH of 6.5. Fertilize with Commercial fertilizer, (10-6-4), inorganic, or organic, containing not less than 10 percent nitrogen, 6 percent available phosphoric acid and 4 percent water soluble potash.

b. Permanent Seeding

All disturbed areas on site shall be covered with a permanent seed mixture, prior to completion of the project. The seed mix shall be as described in the site drawings.

c. Mulching and Mulch anchoring

1) All disturbed cover within each work area shall be mulched, after seed application. The application rate shall be 100 - 120 bales of straw per acre.)

2) The mulch shall be anchored by one of the following methods:

a) Wood Cellulose - Apply with a hydroseeder immediately after mulching. Use 500 pounds of wood fiber per acre. Provide a product with an adhesive material.

b) Mulch Anchoring tool or disk - Apply mulch and pull a mulch anchoring tool (blunt, straight disk) over the mulch as near to the contour as possible. Mulch material should be tucked into soil surface about 3".

C. Operation

To ensure the stability and effectiveness of all protective measures and practice during and after construction, all erosion control measures implemented shall be in accordance with the construction sequence schedule. Refer to Exhibit 8.

VII. Construction Sequence Schedule

The Project Contractor shall follow the construction sequence schedule to create the least amount of site disturbance, sediment loading, soil erosion, and to control the impact of stormwater runoff on the waters of New York. The Project Contractor shall limit the area of disturbance to the minimum required to properly construct the infiltrating bioretention areas, drainage structures, and associated appurtenances.

The overall construction sequence shall be in accordance with that described on the Site Construction Drawings. The following provides a description of the construction activities as they pertain to erosion and sediment control.

STEP 1: PRE-CONSTRUCTION ACTIONS

Resource Protection

The contractor shall contact Dig Safely prior to initiating work. Private utilities that may be impacted by the project shall be marked prior to initiating work.

Surface Water Protection

Identify bodies of water and locate existing culverts and drainage channels located either on site or in the vicinity of the site. Plan appropriate practices to protect on-site or downstream surface water with the use of silt fence, check dams and sediment traps. Wetlands on site will be protected by silt fence, installed up-gradient of the wetland areas.

Stabilized Construction Entrance

A stabilized construction entrance will be constructed at the entry point of each of the islands to be modified for the infiltrating bioretention areas and removed as soon as practicable to facilitate final grading and planting of the rain garden beds.

Perimeter Sediment Controls

Silt fence material and installation comply with the standard drawing and specifications. Install silt fences down grade of all proposed grading and disturbance activities. Silt fence should be placed on or parallel to contours where there is no concentration of water flowing to the silt fence and where erosion occurs in the form of sheet erosion. The area below the silt fence should be undisturbed ground. Refer to the Erosion and Sediment Control Plan for proposed silt fence locations.

Install additional sediment traps and gravel check dams as needed.

STEP 2: RUNOFF AND DRAINAGE CONTROL

Runoff Control

If necessary install gravel check dams in areas of concentrated flows, or at entrances to culverts at site stormwater discharge points.

Final site drainage should be designed to prevent erosion, concentrated flows to adjacent properties, uncontrolled overflow, and ponding.

Runoff Conveyance System (add specific practice chosen for site here)

Stabilize conveyance system. All infiltrating bioretention areas need to be planted as shown on the detail. Protect existing natural drainage systems and streams by maintaining vegetative buffers and by implementing other appropriate practices.

Groundwater Recharge (add specific practice chosen for site here)

Groundwater recharge will occur at the infiltrating bioretention areas as shown on site drawings. The facility has been designed as a stormwater treatment system as documented in the site drainage calculations.

Outlet stabilization

Install practices (silt fence, rip-rap, and sediment traps) to prevent erosion at discharge points.

STEP 3: GRADING

Excavation for clearing and earth disturbance may only take place after the sediment and erosion controls are installed.

Stockpile the topsoil removed from the site or apply removed topsoil and subsoil in proposed fill/grading areas. The topsoil should be protected, stabilized, and sited in a location away from the storm drains and waterbodies.

Changes in grade or removal of vegetation should not disturb established buffers and should not be allowed within any regulated distance from wetlands, the high water line of a body of water affected by tidal action, or other such protected zones.

Proposed grading should not impair existing surface drainage resulting in a potential erosion hazard impacting adjacent land or waterbodies.

STEP 4: EROSION CONTROL (STABILIZATION)

Implement erosion control practices to keep the soil in place. Stabilization should be completed immediately for the surface of all perimeter controls and perimeter slopes.

When activities temporarily cease during construction, soil stockpiles and exposed soil should be stabilized by seed, mulch, or other appropriate measures as soon as possible. All disturbances shall be stabilized within 14 days of initial disturbance with temporary seeding and mulching. Apply temporary or permanent stabilization measures immediately on all disturbed areas where work is delayed or completed.

Consult the local Soil and Water Conservation District for proper timing and application rate of seed, fertilizer, and mulch.

STEP 5: SEDIMENT CONTROL

At any location where surface runoff from disturbed or graded areas may flow off the construction area, sediment control measures must be installed to prevent sediment from being transported off site.

Swales or other areas that transport concentrated flow should be appropriately stabilized.

STEP 6: MAINTENANCE AND INSPECTION

The Owner will be responsible for hiring and/or obtaining the services of certified personnel to conduct the SWPPP inspections. The inspections of the erosion and sediment control practices will meet the following requirements:

- Inspection forms will be prepared to identify the type, number, and frequency of maintenance actions required for stormwater management and erosion control during construction.
- Inspection and maintenance reports will be generated once a week if less than 5 acres are disturbed. If greater than 5 acres are disturbed a report shall be prepared twice per week, separated by a minimum of two (2) full calendar days.
- All inspections will verify that all practices are adequately operational, maintained properly, and that sediment is removed from all control structures.
- All inspections will look for evidence of the soil erosion on the site, potential of pollutants entering drainage systems, problems at discharge points (such as turbidity in receiving water), and signs of soil and mud transport from the site to the public road at the entrance.
- All maintenance issues will be brought to the attention of the Project Contractor and satisfactorily addressed in a timely manner. Routine maintenance will be performed as per the recommendations of the New York Standards and Specifications for Erosion and Sediment Control.
- Prior to the start of construction, the Owner must obtain the services of a qualified SWPPP inspector. The Inspector shall be responsible for conducting the maintenance inspections and reports during construction and post-construction.
- The Project Contractor (and sub-Contractors) shall be responsible for implementing and maintaining all erosion and sediment control during construction and post-construction.
- A copy of the weekly inspections and the SWPPP shall be maintained on-site.

STEP 7: FINALIZE GRADING & LANDSCAPING

- Final grading of the site shall be stabilized once the construction is completed.
- All open areas, including borrow, and spoil areas must be stabilized.
- Permanent topsoil, seeding, sod, mulching, riprap, or other stabilization practices shall be installed in the remaining disturbed areas as appropriate.
- Stabilization must be undertaken no later than 14 days after construction activity has ceased except as noted in the GP-0-15-002.
- Remove the temporary control measures upon complete stabilization of the disturbed areas.

STEP 8: POST CONSTRUCTION CONTROLS:

- Identify the permanent structural or non-structural practices that will remain on the site.
- Ensure that the permanent structural or non-structural practices utilized during construction are properly designed to suit the post-construction site conditions.
- In finalizing the plan, evaluate the post-construction runoff condition on the site.
- Minimize the risk of concentrated flow and erosion.
- On-site runoff controls help reduce the risk of increased runoff velocity, erosion, and point source discharge. In addition to the standard runoff and erosion control practices identified in NY Standards and Specifications for Erosion and Sediment Control, some of the techniques discussed under on-site runoff control discussion may be applied.

Exhibit 5 contains a form for changes required to the SWPPP. If the above list requires modification due to unforeseen circumstances, this form shall be used.

VIII. Pollution Prevention Measures

A. Spill Prevention Inventory

The materials or substances below are expected to be present onsite during construction:

- Concrete
- Detergents
- Paints (enamel and latex)
- Fertilizers
- Petroleum-based products (Fuel for Equipment)
- Wood
- Asphalt

To Report a Petroleum or Chemical Spill, please call the DEC 24 Hour Spill Hotline: 1-800-457-7362.

B. Material Management Practices

The following are the material management practices that may be required to reduce the risk of spills or other accidental exposure of hazardous materials and substances to stormwater runoff:

1. Products shall be kept in original containers unless they are not resealable.
2. Original labels and material safety data sheets shall be retained, as they contain important product information.
3. Store only product quantities necessary to complete the job.
4. Chemicals, fuel, and oil shall be stored in common area at a location the designated by the site superintendent. All materials stored onsite shall be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
5. Products shall be kept in their original containers with the original manufacturer's label.
6. Substances shall not be mixed with one another unless recommended by the manufacturer.
7. Whenever possible, products shall be used in their entirety before disposing of the container.
8. Whenever possible, manufacturer's recommendations for proper use and disposal of containers and any remaining contents shall be followed.
9. The site superintendent shall perform daily inspections to ensure proper use and disposal of materials onsite.

C. Spill Control Practices

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices shall be followed for spill prevention and cleanup:

- Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include but not be limited to oil/coolant/chemical spill sorbant (Remediact, Spillaway, etc.), absorbent pads/pillows, brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for spill control.
- All spills shall be cleaned up immediately after discovery.
- The spill shall be kept well ventilated and personnel shall wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- Spills, of any size, of toxic or hazardous material shall be reported to the appropriate State or local government agency.
- The spill prevention plan shall be adjusted to include measures to prevent this type of spill from recurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.

The site superintendent, responsible for the day-to-day site operations, will be the spill prevention and cleanup coordinator.

D. Product Specific Practices

The following product specific practices shall be followed onsite:

1. Petroleum Products - All onsite vehicles shall be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products shall be stored in tightly sealed containers that are clearly labeled. Any asphalt substances used onsite shall be applied according to the manufacturer's recommendations.
2. Fertilizers - Fertilizers used shall be applied only in the minimum amounts recommended by the manufacture. Once applied, fertilizer shall be worked into the soil to limit exposure to stormwater. Storage shall be in a covered shed. The contents of any partially used bags of fertilizer shall be transferred to a sealable plastic bin to avoid spills.
3. Paints - All containers shall be sealed and stored when not being used. Excess paint shall not be discharged to the storm sewer system but shall be properly disposed of according to manufacturers' instructions or state and local regulations.
4. Concrete Trucks - Concrete trucks shall not be allowed to wash out or discharge surplus concrete or drum wash water on the site.

5. Waste Disposal - All litter and construction debris shall be picked up from the work areas daily. Construction debris shall be stockpiled until its removal from the project site. Construction debris stockpiles shall be surrounded by silt fence. All personnel shall be instructed regarding the correct procedure for waste disposal. Notices stating these practices shall be posted in the office trailer. The Site Superintendent, the individual who manages the day-to-day site operations, shall be responsible for seeing that these procedures are followed.
6. Hazardous Waste - All hazardous waste materials shall be disposed of in the manner specified by local or State regulation or by the manufacturer. Site personnel will be instructed in these practices. The Site Superintendent, the individual who manages day-to-day site operations, shall be responsible for seeing that these practices are followed.
7. Recyclable Waste – All recyclable waste (cardboard, wood etc.) shall be collected and recycled.

E. Non-Stormwater Discharges

Non-stormwater discharges containing sediment and other contaminants shall be treated. It is expected that the following non-stormwater discharges items that are checked will occur from the site during the construction period:

- Water from pipeline flushing.
- Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred).

F. Protection of Stormwater Outfalls

All stormwater outfalls will be protected with silt fence, straw bales, check dams, and appropriate erosion and control devices, installed in accordance with the New York Standards and Specifications for Erosion and Sediment Control. Specific consideration shall be taken to outfalls located downstream of construction material and chemical storage areas.

G. Post Construction Clean Up

The site will be cleaned of construction debris. Silt fence and other temporary erosion control practices shall be removed when soils are stabilized.

IX. Maintenance & Inspection Procedures

These are the inspection and maintenance practices that will be used to maintain the proposed erosion and sediment controls:

1. All control measures will be inspected at least once each week.

2. All measures shall be maintained in good working order. If a repair is necessary, it shall be initiated within 24 hours of report and completed within 48-hours thereafter.

3. Built-up sediment shall be removed from silt fence when it has reached one-third the height of the fence.

4. Silt fence will be inspected for depth of sediment, tears, attachment of fabric to the fence posts, and to ensure that the fence posts are secure in the ground.

5. Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and healthy growth.

X. Maintenance Plan

This section describes the required procedures and maintenance that allow the design elements of this project to function properly. The stormwater management practices have been chosen and designed to reduce the impacts of stormwater runoff, protect the waters of New York State and meet the requirements of the NYSDEC SPDES General Permit for Stormwater Discharge Associated with Construction Activities (GP-0-15-002) permit regulations. Maintenance of these stormwater management practices (SMPs) is an integral part of the permit requirements and shall follow the maintenance schedule as outlined in this manual.

A. SMPs Inspection

Swales and embankments shall be inspected annually for adequate vegetative cover, embankment erosion, animal burrows, unauthorized plantings, cracking/bulging/sliding of the berm and emergency spillway, clear and functioning drains, seeps/leaks, slope protection or rip rap failure, and outfall is clear of debris and obstructions.

B. SMPs Maintenance

All the necessary repairs and maintenance shall be taken care of immediately after the inspection. It is of the utmost importance that all repairs be handled in a timely manner to reduce the impact of the damage and reduce/prevent future damage.

C. Responsibility

Inspection and maintenance of the stormwater management practices are the responsibility of the PROPERTY OWNER. The inspection and maintenance of the permanent stormwater management practices are considered a part of the NYSDEC SPDES General Permit for Stormwater Discharge Associated with Construction Activities (GP-0-15-002) permit and are subject to the regulations, requirements, and fines of the General Permit. When property is transferred, a clause should be contained in the deed that acknowledges the inspection and maintenance requirement and notifies the new Owner of the transfer of responsibility. The requirement for inspection and maintenance does not expire and should continue indefinitely.

D. Construction Sequence Scheduling

The contractor shall prepare a schedule for activities during and after construction. The sequence of implementing the erosion and sediment controls and water quality/quantity control practices identified in the SWPPP shall be defined. The schedule must identify activities during the period prior to soil disturbance through site stabilization.

The schedule shall also identify the inspection and maintenance measures during and after construction. The quantity of practices may be identified by the number of units or any other type of measures identified in the SWPPP. All planned activities should be marked on corresponding maps. A copy of the schedule along with the maps should be available at the construction site. Exhibit 8 contains the form that shall be used for by the contractor for the Construction Sequence Schedule.

XI. Conclusions

Based on the preceding information and calculations, the following conclusions can be drawn with regard to the proposed site development:

A. Erosion & Sediment Control

The proposed permanent and temporary devices, if properly installed, will mitigate the effects of erosion to the lands and sedimentation of the surrounding waterways.

B. Stormwater Quality Control

The proposed devices, if installed to the minimum dimensions specified and maintained in accordance with the "NYS Stormwater Management Design Manual", will mitigate the increase of pollutants generated from the addition of impervious areas.

C. Stormwater Quantity Control

The Stormwater Quantity Control section of this report demonstrates that the *Project* will produce reduced post-developed peak runoff rates after the implementation of the proposed devices.

Any questions or comments regarding this report should be directed to Kirk Wilson, P.E. at (716) 849-0982 extension 105.

APPENDIX

Exhibit **1**: SPDES General Permit (GP-0-15-002)

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

From

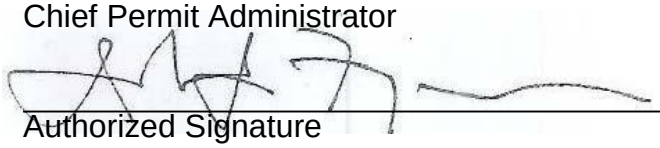
CONSTRUCTION ACTIVITY

Permit No. GP-0-15-002

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

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

John J. Ferguson
Chief Permit Administrator



1 / 12 / 15

Authorized Signature Date

Address: NYS DEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

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

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

http://www.dec.ny.gov/

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

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

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

Part I. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application

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

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

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

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

B. Effluent Limitations Applicable to Discharges from Construction Activities

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(i) Wastewater from washout of concrete;

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

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

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

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

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

at or below the outlet does not occur.

C. Post-construction Stormwater Management Practice Requirements

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

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

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

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

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

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

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

(iii) Channel Protection Volume ("Cpv"): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:

(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

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

(iv) Overbank Flood Control Criteria ("Qp"): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or

(2) A downstream analysis reveals that overbank control is not required.

(v) Extreme Flood Control Criteria ("Qf"): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or

(2) A downstream analysis reveals that overbank control is not required.

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

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

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

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

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

(iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:

(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or

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

(iv) Overbank Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

(v) Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:

(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that overbank control is not required.

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

(Part I.C.2.c.i)

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

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

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

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

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

(Part I.C.2.c.iv)

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

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

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

D. Maintaining Water Quality

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

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

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

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

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

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

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

E. Eligibility Under This General Permit

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

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

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

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

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

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

(Part I.F)

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

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

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

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

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

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

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

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

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

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

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

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

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

(Part I.F.8)

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

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

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

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

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

(Part I.F.8.c.iii)

(iii) Executed Memorandum of Agreement, or

d. Documentation that:

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

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

II. Part II. OBTAINING PERMIT COVERAGE

A. Notice of Intent (NOI) Submittal

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

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

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

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

(Part II.A.2)

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

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

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

B. Permit Authorization

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

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

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

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

   c. the final SWPPP has been prepared, and

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

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

(Part II.B.3)

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

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

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

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

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

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

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

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

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

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

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

C. General Requirements For Owners or Operators With Permit Coverage

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

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

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

   a. The *owner or operator* shall

(Part II.C.3.a)

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

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

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

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

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

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

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

(Part II.D)

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

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

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

E. Change of *Owner or Operator*

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

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

(Part III)

III. Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

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

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

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

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

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

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

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

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

(Part III.A.5)

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

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

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

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

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

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

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

B. Required SWPPP Contents

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

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

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

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

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

activity at the site that results in soil disturbance;

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

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

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

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

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

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

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

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

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

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

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

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

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

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

   c. A Stormwater Modeling and Analysis Report that includes:

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

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

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

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

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

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

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

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

e. Infiltration test results, when required; and

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

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

C. Required SWPPP Components by Project Type

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

(Part IV)

IV. Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

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

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

B. Contractor Maintenance Inspection Requirements

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

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

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

C. Qualified Inspector Inspection Requirements

(Part IV.C)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

a. Date and time of inspection;

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

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

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

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

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

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

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

(Part IV.C.4.i)

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

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

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

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

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

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

V. Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

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

(Part V.A.2)

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

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

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

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

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

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

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

(Part V.A.5)

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

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

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

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

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

VI. Part VI. REPORTING AND RETENTION OF RECORDS

A. Record Retention

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

B. Addresses

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

(Part VII)

VII. Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply

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

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

B. Continuation of the Expired General Permit

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

C. Enforcement

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

D. Need to Halt or Reduce Activity Not a Defense

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

E. Duty to Mitigate

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

F. Duty to Provide Information

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

G. Other Information

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

H. Signatory Requirements

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

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

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

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

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

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

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

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

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

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

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

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

(Part VII.H.2.b)

individual or any individual occupying a named position) and,

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

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

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

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

I. Property Rights

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

J. Severability

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

K. Requirement to Obtain Coverage Under an Alternative Permit

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

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

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

L. Proper Operation and Maintenance

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

M. Inspection and Entry

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

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

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

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

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

(Part VII.N)

N. Permit Actions

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

O. Definitions

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

P. Re-Opener Clause

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

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

Q. Penalties for Falsification of Forms and Reports

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

R. Other Permits

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

VIII. **APPENDIX A**

Definitions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

IX. APPENDIX B

Required SWPPP Components by Project Type

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

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:

- Single family home not located in one of the watersheds listed in Appendix C or not *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E
- Construction of a barn or other agricultural building, silo, stock yard or pen.

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

- Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains
- Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects
- Bike paths and trails
- Sidewalk construction projects that are not part of a road/ highway construction or reconstruction project
- Slope stabilization projects
- Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics
- Spoil areas that will be covered with vegetation
- Land clearing and grading for the purposes of creating vegetated open space (i.e. recreational parks, lawns, meadows, fields), excluding projects that *alter hydrology from pre to post development* conditions
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions
- Demolition project where vegetation will be established and no redevelopment is planned
- Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*
- Structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State", excluding projects that involve soil disturbances of less than five acres and construction activities that include the construction or reconstruction of impervious area

The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:

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

Table 2

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

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

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

X. APPENDIX C

Watersheds Where Enhanced Phosphorus Removal Standards Are Required

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

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

Figure 1 - New York City Watershed East of the Hudson

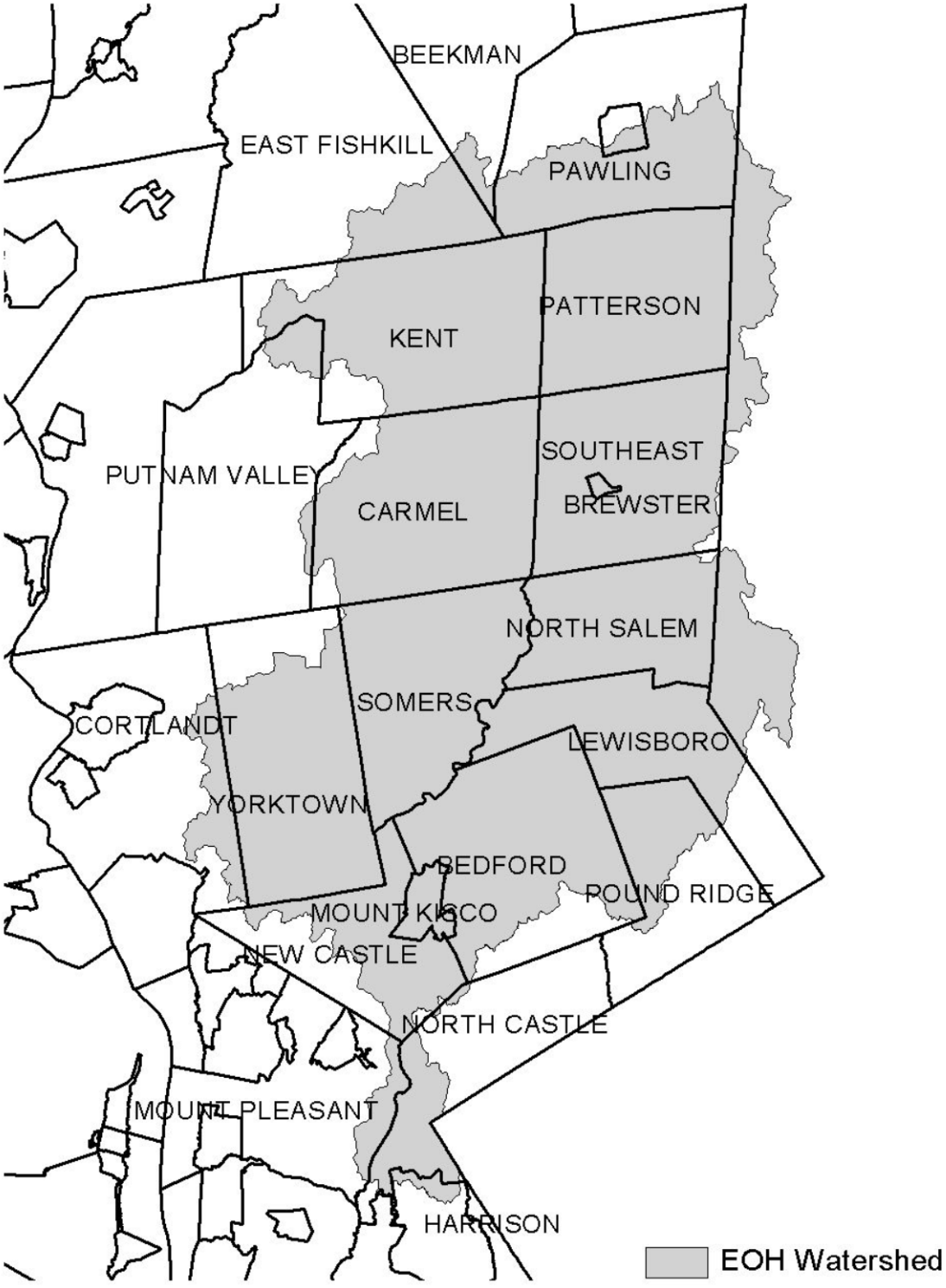


Figure 2 - Onondaga Lake Watershed

Figure 3 - Greenwood Lake Watershed

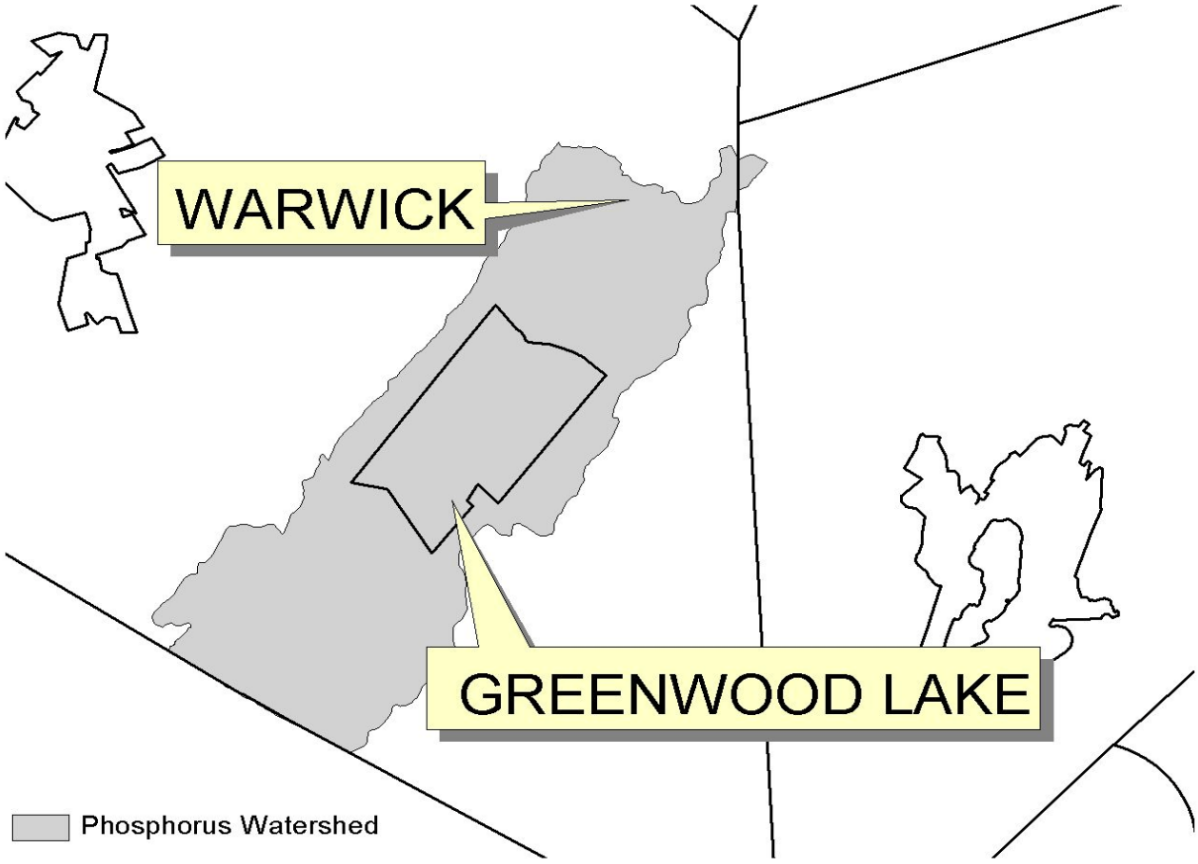


Figure 4 - Oscawana Lake Watershed

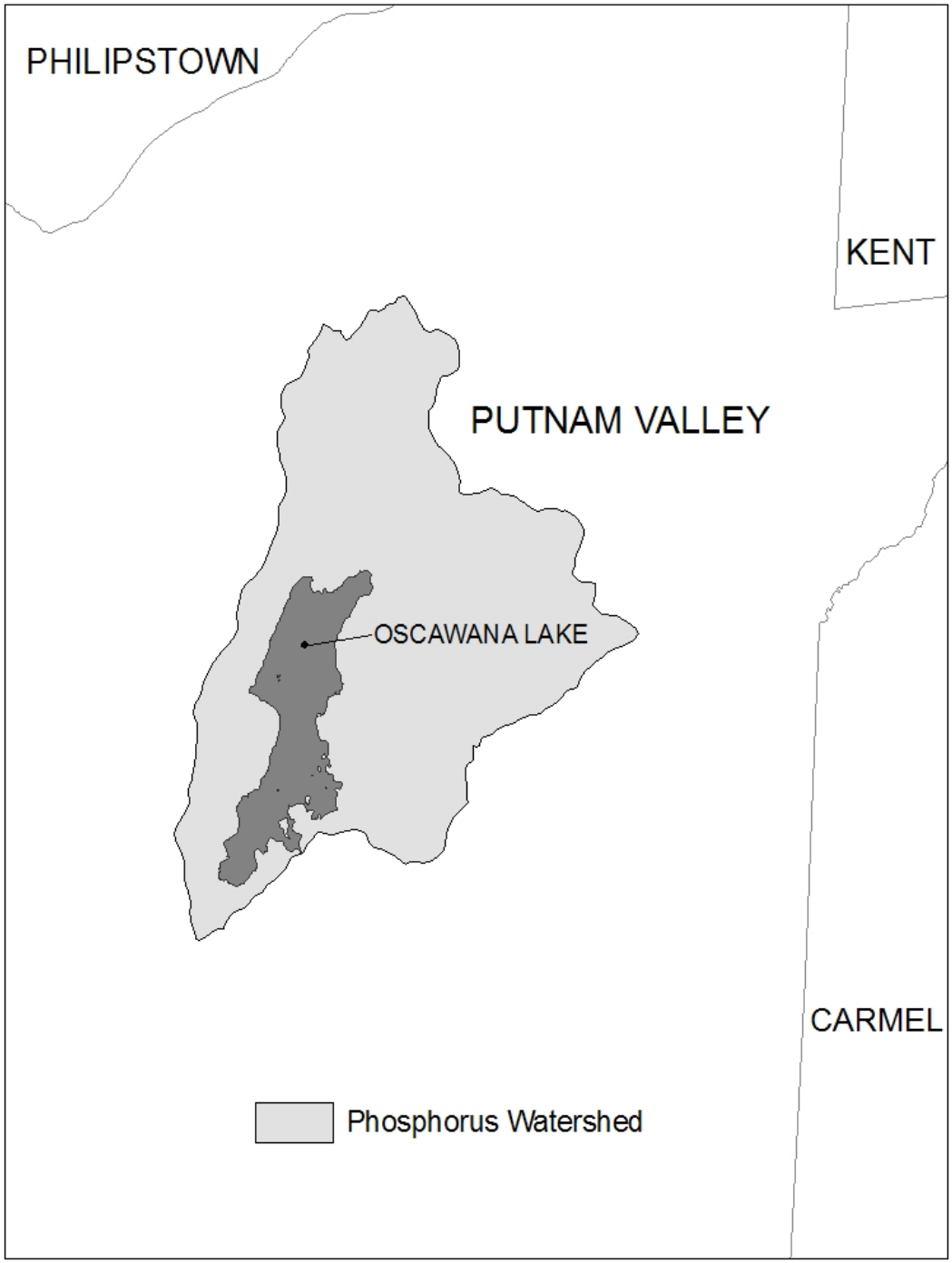
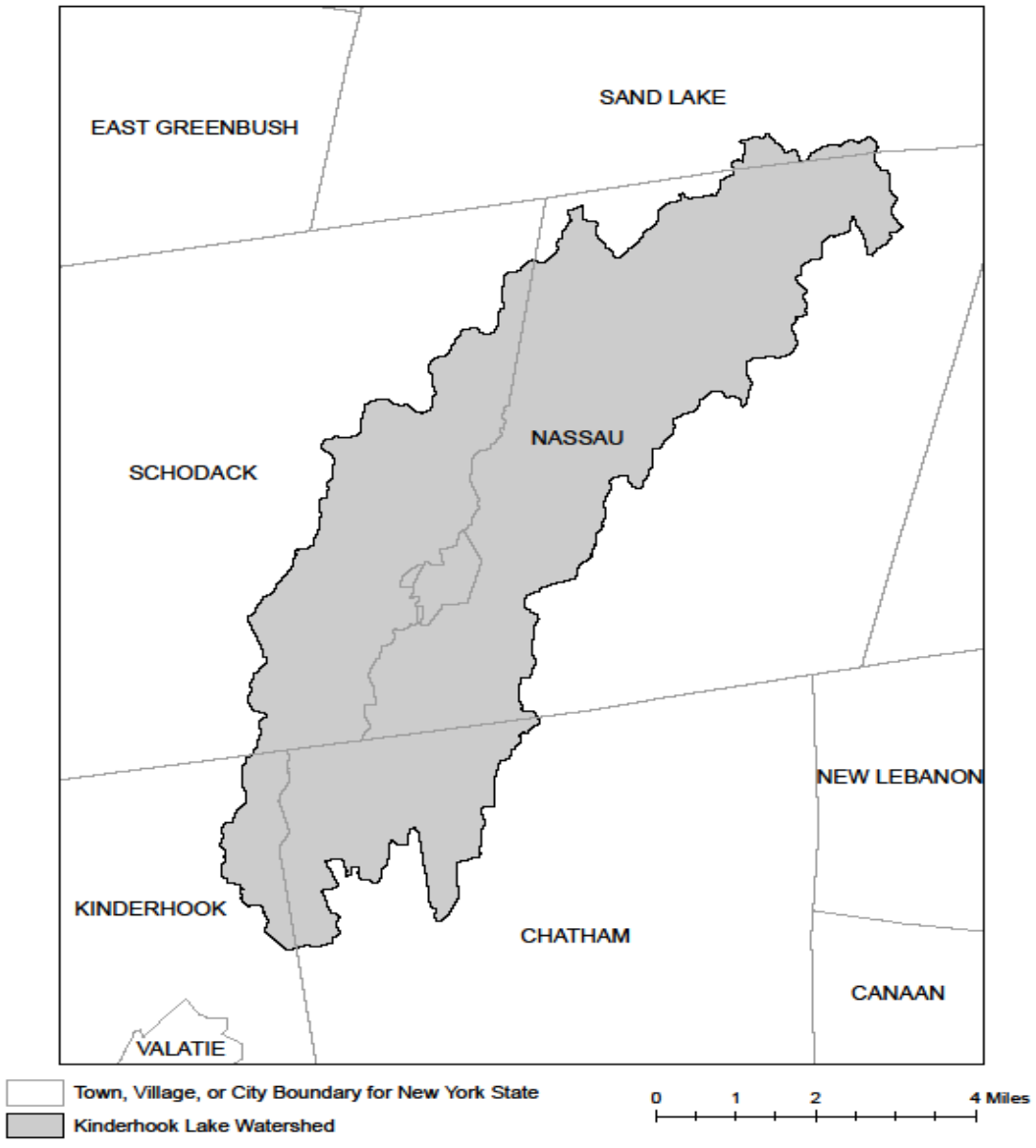


Figure 5: Kinderhook Lake Watershed



XI. APPENDIX D

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

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

XII. APPENDIX E

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

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

APPENDIX E

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

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

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

XIII. APPENDIX F

LIST OF NYS DEC REGIONAL OFFICES

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

Exhibit 2: Notice of Intent (NOI)

0644089821

NOTICE OF INTENT

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

NYR _____ (for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-15-002

All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

-IMPORTANT-
RETURN THIS FORM TO THE ADDRESS ABOVE
OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)
SUNY - Purchase College

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

Owner/Operator Contact Person First Name
Tom

Owner/Operator Mailing Address
735 Anderson Hill Road

City
Purchase

State
NY

Zip
10577 -

Phone (Owner/Operator)
914 - 251 - 6944

Fax (Owner/Operator)
914 - 251 - 6935

Email (Owner/Operator)
Tom.Kelly@purchase.edu

FED TAX ID
__ - _____ (not required for individuals)

Project Site Information

Project/Site Name
SUNY Purchase Green Infrastructure

Street Address (NOT P.O. BOX)
West Loop Road

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

City/Town/Village (THAT ISSUES BUILDING PERMIT)
Purchase

State NY | Zip 10577 - | County Westchester | DEC Region 3

Name of Nearest Cross Street
Cottage Avenue

Distance to Nearest Cross Street (Feet)
750

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

Tax Map Numbers
Section-Block-Parcel

Tax Map Numbers

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

www.dec.ny.gov/imsmaps/stormwater/viewer.htm

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site, go to the tool boxes on the top and choose "i"(identify). Then click on the center of your site and a new window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting) 608705

Y Coordinates (Northing) 4545068

2. What is the nature of this construction project?

○ **New Construction**

○ **Redevelopment with increase in impervious area**

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

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

Pre-Development Existing Land Use

- ○ FOREST
- ○ PASTURE/OPEN LAND
- ○ CULTIVATED LAND
- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY
- ● PARKING LOT
- ○ OTHER

Post-Development Future Land Use

- ○ SINGLE FAMILY HOME
- ○ SINGLE FAMILY SUBDIVISION — Number of Lots
- ○ TOWN HOME RESIDENTIAL
- ○ MULTIFAMILY RESIDENTIAL
- ○ INSTITUTIONAL/SCHOOL
- ○ INDUSTRIAL
- ○ COMMERCIAL
- ○ MUNICIPAL
- ○ ROAD/HIGHWAY
- ○ RECREATIONAL/SPORTS FIELD
- ○ BIKE PATH/TRAIL
- ○ LINEAR UTILITY (water, sewer, gas, etc.)
- ● PARKING LOT
- ○ CLEARING/GRADING ONLY
- ○ DEMOLITION, NO REDEVELOPMENT
- ○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
- ○ OTHER

***Note**: for gas well drilling, non-high volume hydraulic fractured wells only

4. In accordance with the larger common plan of development or sale, enter the total project site area; the total area to be disturbed; existing impervious area to be disturbed (for redevelopment activities); and the future impervious area constructed within the disturbed area. (Round to the nearest tenth of an acre.)

Total Site Area	Total Area To Be Disturbed	Existing Impervious Area To Be Disturbed	Future Impervious Area Within Disturbed Area
16.0	2.7	0.5	0.0

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

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

A	B	C	D
%	%	%	%

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

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

Start Date	End Date
9/1/18	11/15/18

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

Name

Blind Brook

9a. Type of waterbody identified in Question 9?

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

9b. How was the wetland identified?

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

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-15-002? ○ **Yes** ● **No**

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-15-002? ○ **Yes** ● **No**

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? ○ **Yes** ● **No**
If no, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey? ○ **Yes** ○ **No**
If Yes, what is the acreage to be disturbed?

.

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

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

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

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

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

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

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

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

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

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

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

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

SWPPP Preparer

Lu Engineers, P.C.

Contact Name (Last, Space, First)

Wilson Kirk

Mailing Address

50 Lakefront Boulevard, Suite 212

City

Buffalo

State NY Zip 14202-

Phone 716-849-0982 Fax 716-849-0969

Email

kwilson@luengineers.com

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-15-002. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First Name Kirk **MI**

Last Name Wilson

Signature

Date / /

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

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

Temporary Structural

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

Biotechnical

- ○ Brush Matting
- ○ Wattling

Vegetative Measures

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

Permanent Structural

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

Other

Post-construction Stormwater Management Practice (SMP) Requirements

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

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

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

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

- ○ All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).
- ○ Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

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

Total WQv Required

		0	.	4	1	2

acre-feet

29. Identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity in Table 1 (See Page 9) that were used to reduce the Total WQv Required(#28).

Also, provide in Table 1 the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use Tables 1 and 2 to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

Table 1 - Runoff Reduction (RR) Techniques and Standard Stormwater Management Practices (SMPs)

	Total Contributing Area (acres)		Total Contributing Impervious Area(acres)
RR Techniques (Area Reduction)			
○ Conservation of Natural Areas (RR-1)		and/or	
○ Sheetflow to Riparian Buffers/Filters Strips (RR-2)		and/or	
○ Tree Planting/Tree Pit (RR-3)		and/or	
○ Disconnection of Rooftop Runoff (RR-4)		and/or	
RR Techniques (Volume Reduction)			
○ Vegetated Swale (RR-5)			
○ Rain Garden (RR-6)			
○ Stormwater Planter (RR-7)			
○ Rain Barrel/Cistern (RR-8)			
○ Porous Pavement (RR-9)			
○ Green Roof (RR-10)			
Standard SMPs with RRv Capacity			
○ Infiltration Trench (I-1)			
○ Infiltration Basin (I-2)			
○ Dry Well (I-3)			
○ Underground Infiltration System (I-4)			
● Bioretention (F-5)			13.761
○ Dry Swale (O-1)			
Standard SMPs			
○ Micropool Extended Detention (P-1)			
○ Wet Pond (P-2)			
○ Wet Extended Detention (P-3)			
○ Multiple Pond System (P-4)			
○ Pocket Pond (P-5)			
○ Surface Sand Filter (F-1)			
○ Underground Sand Filter (F-2)			
○ Perimeter Sand Filter (F-3)			
○ Organic Filter (F-4)			
○ Shallow Wetland (W-1)			
○ Extended Detention Wetland (W-2)			
○ Pond/Wetland System (W-3)			
○ Pocket Wetland (W-4)			
○ Wet Swale (O-2)			

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

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

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

Name

Manufacturer

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

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

Total RRv provided

1.098 **acre-feet**

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

● **Yes** ○ **No**

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

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

Minimum RRv Required

. **acre-feet**

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

● **Yes** ○ **No**

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

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

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

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

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

WQv Provided

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

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

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

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

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

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

CPv Required

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

CPv Provided

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

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

○ Site discharges directly to tidal waters or a fifth order or larger stream.

○ Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

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

Total Overbank Flood Control Criteria (Qp)

Pre-Development

[ ][ ][ ].[ ][ ][ ] **CFS**

Post-development

[ ][ ][ ].[ ][ ][ ] **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development

[ ][ ][ ].[ ][ ][ ] **CFS**

Post-development

[ ][ ][ ].[ ][ ][ ] **CFS**

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

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

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

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

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

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

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

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

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

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

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

Owner/Operator Certification

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

Print First Name **MI**

Print Last Name

Owner/Operator Signature

Date / /

Exhibit 3: Operator’s Pollution Prevention Plan Certification

OPERATOR'S POLLUTION PREVENTION PLAN CERTIFICATION

I have read this document. I understand and agree to comply with the provisions stated herein. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Applicant(s)
Signature:_____

Print name and title:

_____

Date:_____

Exhibit 4: Contractor's Certifications

CONTRACTORS' CERTIFICATIONS

"I certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP for the construction site identified in such SWPPP as a condition of authorization to discharge stormwater. I also understand that the operator (Owner) must comply with the terms and conditions fo the New York State Pollution 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."

Name (please print) _____**Signature:** _____
Title:_____
Date:_____

Signature	**For (Company Name and Address)**	**Responsible For**
_____	_____	_____
General contractor, President **Date:** _____		
_____	_____	_____
Landscape Company **Date:** _____		
_____	_____	_____
Underground Utilities **Date**:_____		

Exhibit 5: Required SWPPP Modifications

CHANGES REQUIRED TO THE POLLUTION PREVENTION PLAN

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

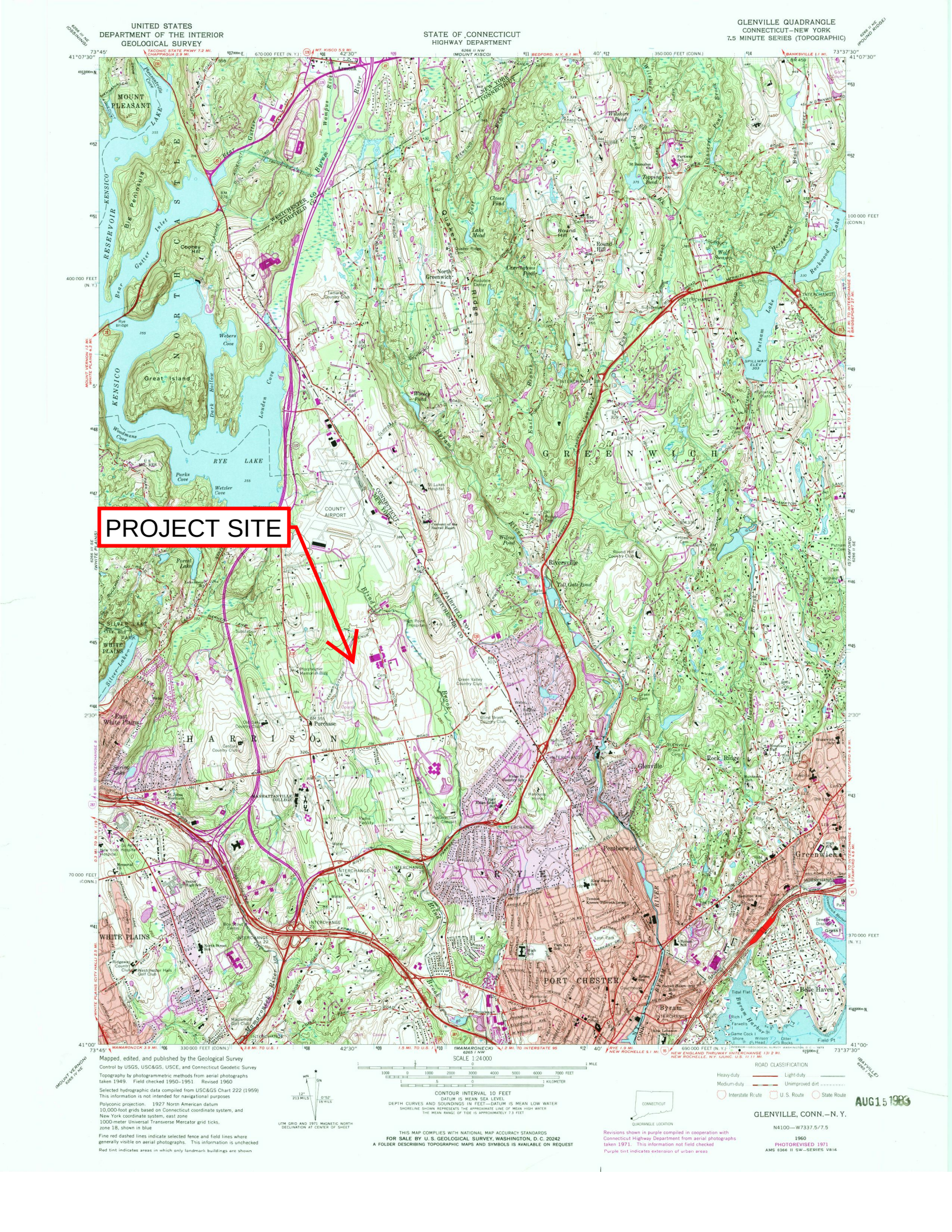
Name (please print)

_____

Signature:_____Date:_____

Reasons for changes:

Exhibit 6: USGS Quadrangle



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF CONNECTICUT
HIGHWAY DEPARTMENT

GLENVILLE QUADRANGLE
CONNECTICUT–NEW YORK
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, USCE, and Connecticut Geodetic Survey

Topography by photogrammetric methods from aerial photographs taken 1949. Field checked 1950–1951 Revised 1960

Selected hydrographic data compiled from USC&GS Chart 222 (1959) This information is not intended for navigational purposes

Polyconic projection. 1927 North American datum
10,000-foot grids based on Connecticut coordinate system, and New York coordinate system, east zone
1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Red tint indicates areas in which only landmark buildings are shown

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS APPROXIMATELY 7.3 FEET

UTM GRID AND 1971 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Revisions shown in purple compiled in cooperation with Connecticut Highway Department from aerial photographs taken 1971. This information not field checked
Purple tint indicates extension of urban areas

ROAD CLASSIFICATION
Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
Interstate Route — U. S. Route — State Route

AUG 15 1983

GLENVILLE, CONN.–N. Y.

N4100—W7337.5/7.5

1960
PHOTOREVISED 1971
AMS 6266 II SW—SERIES V816

Exhibit 7: Soil Conservation Service Soil Survey Map

Custom Soil Resource Report
Soil Map

Map Scale: 1:6,050 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

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 1:12,000.

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: Westchester County, New York
Survey Area Data: Version 13, Oct 8, 2017

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

Date(s) aerial images were photographed: Jul 21, 2014—Aug 27, 2014

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ChB	Charlton fine sandy loam, 3 to 8 percent slopes	22.4	15.3%
LcA	Leicester loam, 0 to 3 percent slopes, stony	13.8	9.5%
PnB	Paxton fine sandy loam, 3 to 8 percent slopes	5.9	4.0%
PnC	Paxton fine sandy loam, 8 to 15 percent slopes	0.4	0.2%
RdA	Ridgebury loam, 0 to 3 percent slopes	14.1	9.6%
RdB	Ridgebury loam, 3 to 8 percent slopes	2.0	1.4%
Sh	Sun loam	5.8	4.0%
Ub	Udorthents, smoothed	29.0	19.8%
Uf	Urban land	51.0	34.9%
WdB	Woodbridge loam, 3 to 8 percent slopes	1.7	1.2%
Totals for Area of Interest		**146.1**	**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.

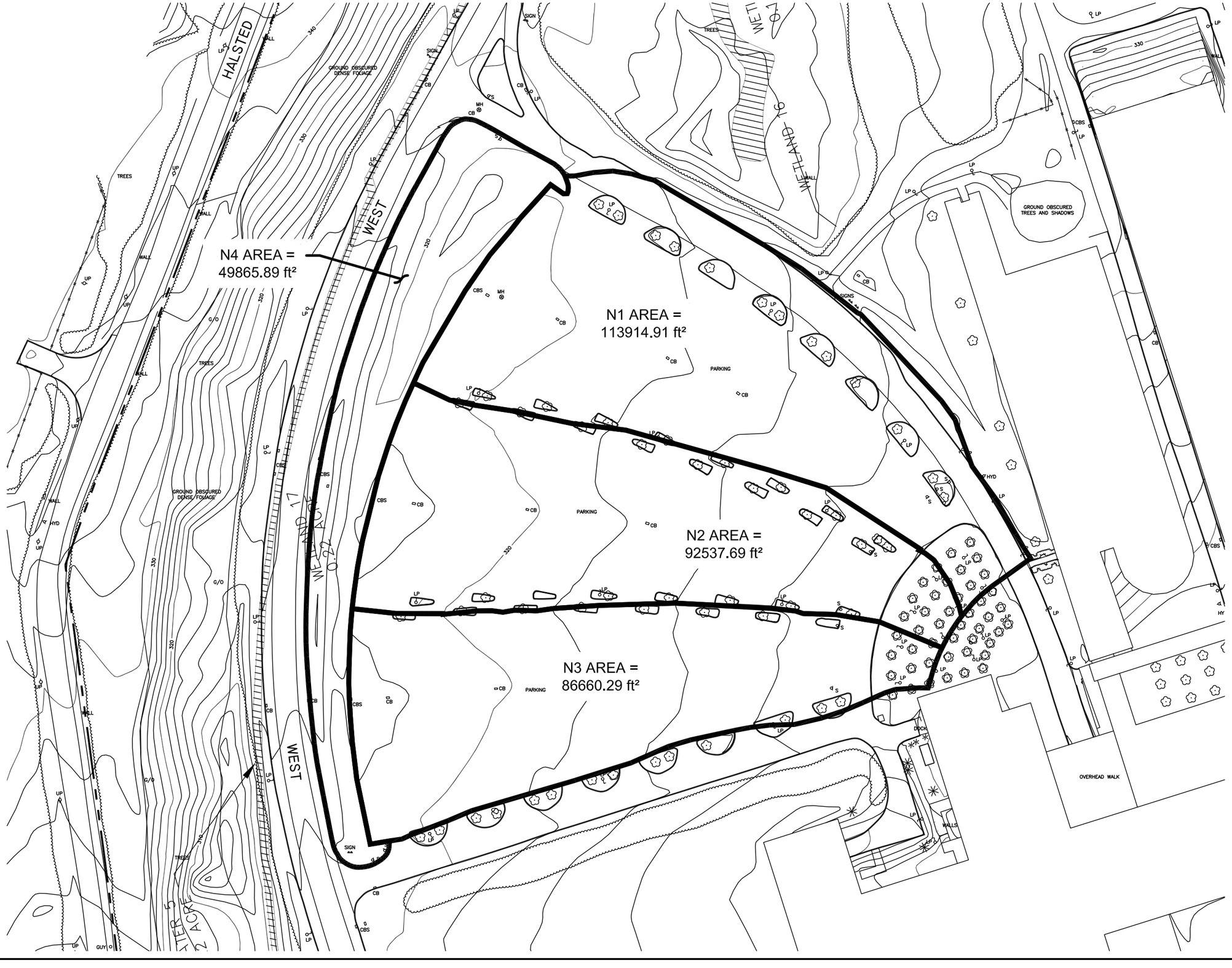
Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, 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

Exhibit **8**: Construction Sequence Scheduling

CONSTRUCTION SEQUENCE SCHEDULING

Type	Activities *(Identify name of planned practices)*	Number (Quantity)	Map Symbols	Start(Date) ---- End(Date) Pre During Post	Maintenance Actions
1- Pre-Construction Actions					
2- Runoff & Drainage Control					
3-Grading					
4-Erosion Control					
5-Sediment Control					
6-Maintenance, Inspection & Plan Update					
7-Finalize Grading & Landscaping					
8- Post construction SW Mgmt.					

Exhibit 9: Existing Drainage Condition Map



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REV.	DATE	DESCRIPTION

[STATE LICENSE INFO]
NOT FOR CONSTRUCTION OR PRICING
[or fill in other important info for issue]

SCALE:	1:30
DATE:	12.4.2015
DRAWN BY:	MB
CHECKED BY:	CM
APPROVED BY:	MT

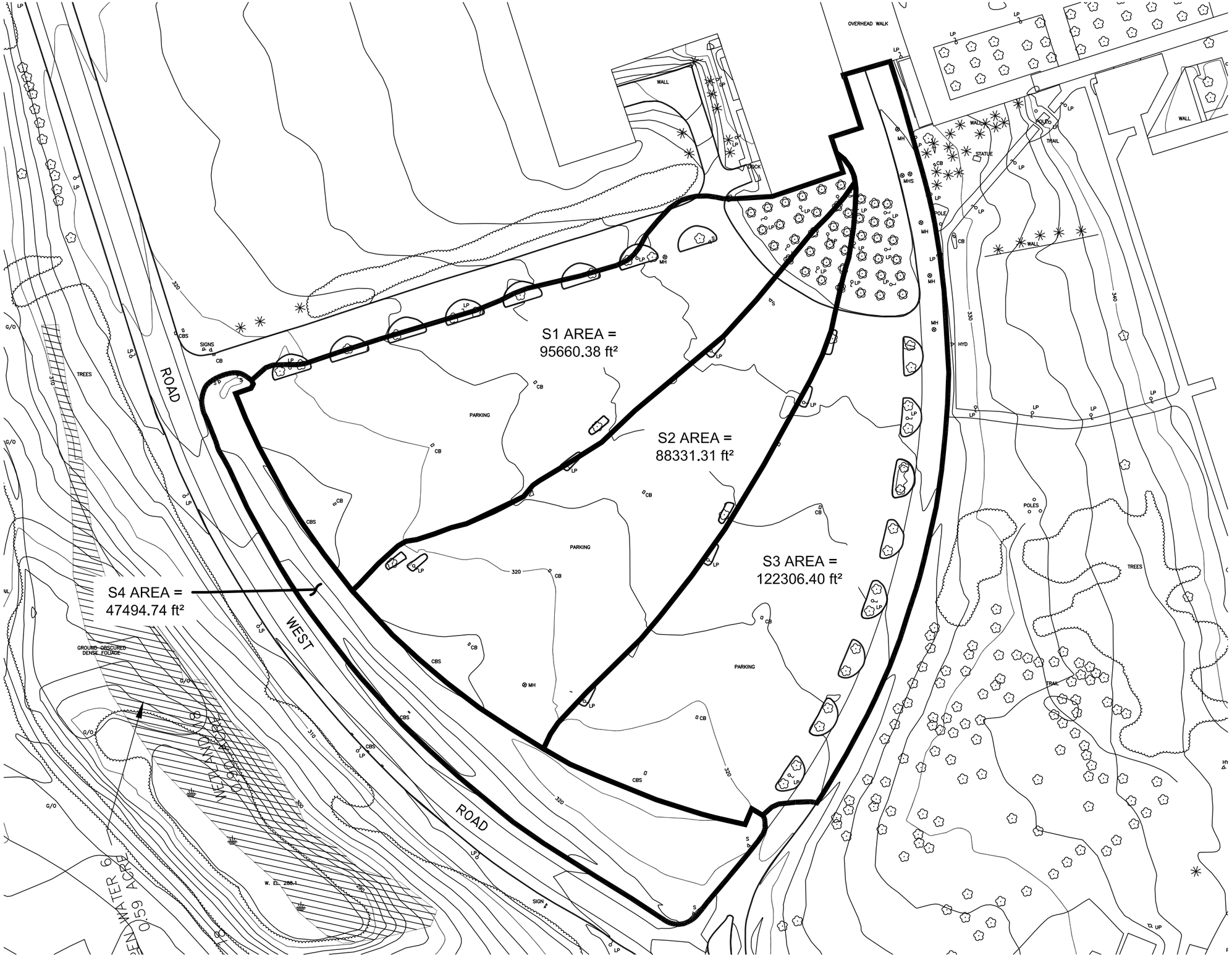
AA PROJECT #:	150024
PROJECT PHASE:	SITE INVESTIGATION

DRAWING TITLE:

EXISTING DRAINAGE PLAN - NORTH

SHEET:

PL-1



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DATE:	12.4.2015
DRAWN BY:	MB
CHECKED BY:	CM
APPROVED BY:	MT

AA PROJECT #:	150024
PROJECT PHASE:	SITE INVESTIGATION

DRAWING TITLE:

EXISTING DRAINAGE PLAN - SOUTH

SHEET:

PL-2

Z:\Projects\50384 Andropogon Associates, Ltd\50384-01 Green Infrastructure-SUNY Purchase\Cadd\CD Design\50384-01_ N&S PLAN.dwg, 6/21/2018 2:48:34 PM, pborkowski

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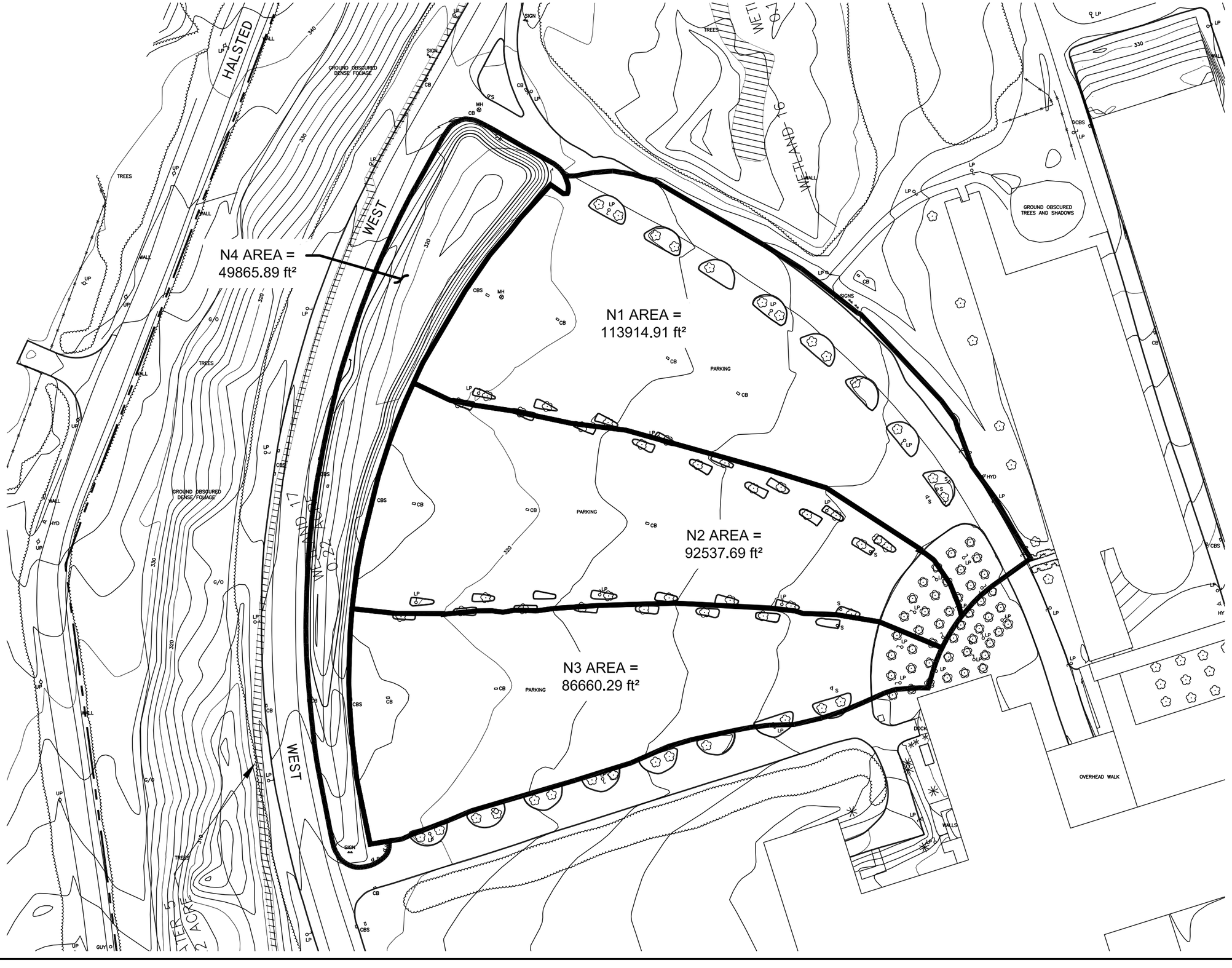
DATE MODIFIED: 6/21/2018

Exhibit 10: Proposed Drainage Condition Map



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[or fill in other important info for issue]

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DATE:	12.4.2015
DRAWN BY:	MB
CHECKED BY:	CM
APPROVED BY:	MT

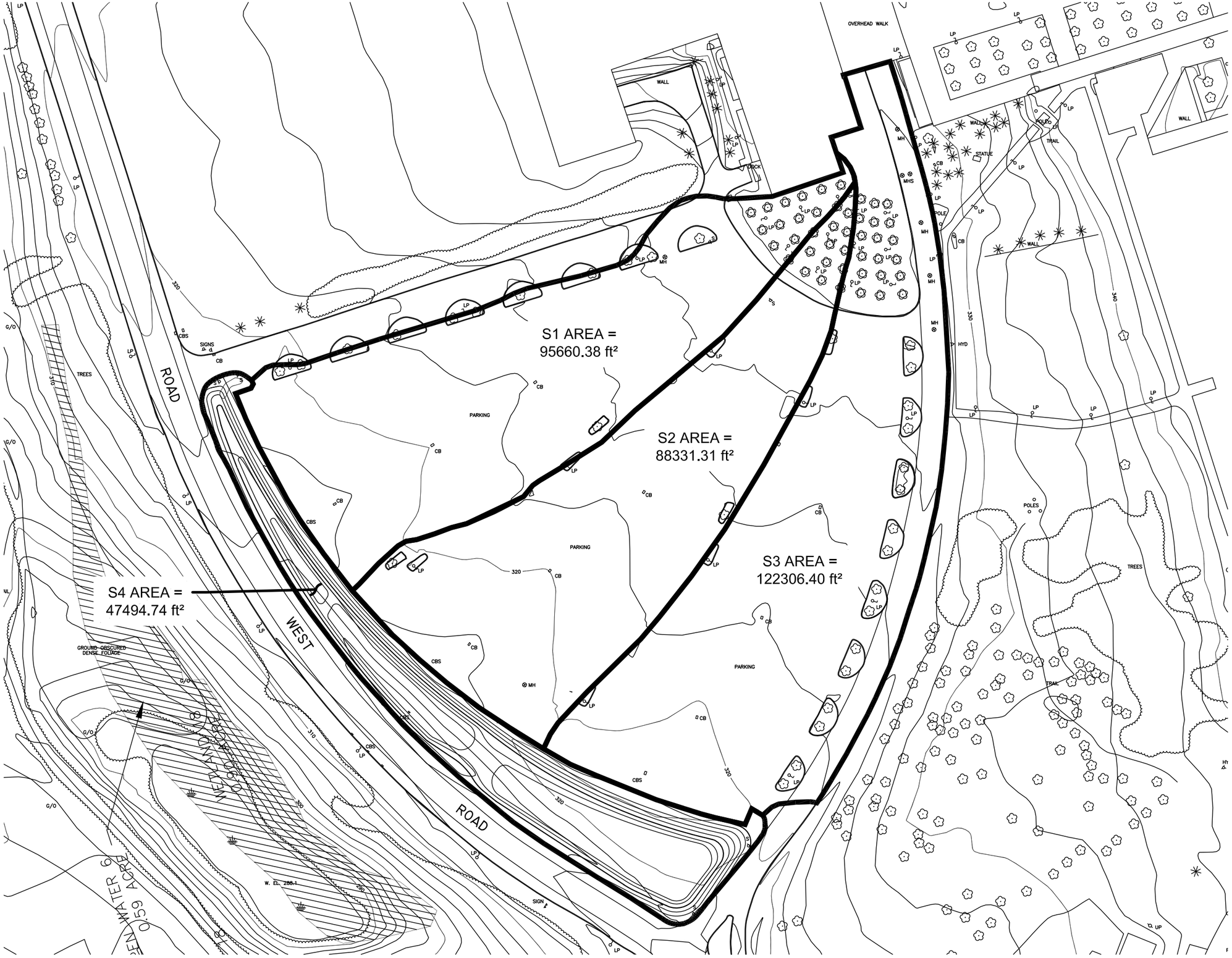
AA PROJECT #:	150024
PROJECT PHASE:	SITE INVESTIGATION

DRAWING TITLE:

PROP. DRAINAGE PLAN - NORTH

SHEET:

PL-3



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REV.	DATE	DESCRIPTION

[STATE LICENSE INFO]
NOT FOR CONSTRUCTION OR PRICING
[or fill in other important info for issue]

SCALE:	1:30
DATE:	12.4.2015
DRAWN BY:	MB
CHECKED BY:	CM
APPROVED BY:	MT

AA PROJECT #:	150024
PROJECT PHASE:	SITE INVESTIGATION

DRAWING TITLE:

PROP. DRAINAGE PLAN - SOUTH

SHEET:

PL-4

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DATE MODIFIED: 6/21/2018

Exhibit 11: Water Quality Volume

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=	1.50 *inch*

Breakdown of Subcatchments

Catchment Number	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Rv	WQv *(ft^3)*	Description
1	7.87	6.73	86%	0.82	35,123	Infiltration Bioretention
2						
3						
4						
5						
6						
7						
8						
9						
10						
Subtotal (1-30)	7.87	6.73	86%	0.82	35,123	Subtotal 1
Total	7.87	6.73	86%	0.82	35,123	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*
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"	7.87	6.73	86%	0.82	35,123
Subtract Area	0.00	0.00			
WQv adjusted after Area Reductions	7.87	6.73	86%	0.82	35,123
Disconnection of Rooftops		0.00			
Adjusted WQv after Area Reduction and Rooftop Disconnect	7.87	6.73	86%	0.82	35,123
WQv reduced by Area Reduction techniques					0

Infiltrating Bioretention Worksheet

(For use on HSG A or B Soils without underdrains)

WQv ≤ VSM + VDL + (DP x ARG)

VSM = ARG x DSM x nSM

VDL (optional) = ARG x DDL x nDL

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	7.87	6.73	0.86	0.82	35122.97	1.50	Infiltration Bioretention
Enter Impervious Area Reduced by Disconnection of Rooftops			86%	0.82	35,123	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.					-26,342	*ft^3*	

Infiltrating Bioretention Parameters				
Treatment Volume	WQv	8,781	*ft^3*	
Enter depth of soil Media	DSM	2.50	*ft*	*2.5 - 4 ft*
Enter depth of drainage	DDL	0.00	*ft*	*≥ 0.5 ft*
Enter ponding depth above surface	DP	1	*ft*	*≤ 0.5*
Enter porosity of Soil Media	nSM	0.20		*≥20%*
Enter porosity of Drainage	nDL	0.40		*≥ 40%*
Required Bioretention Area	ARG	5854	*sf*	
Bioretention Area Provided		22084	*ft2*	
Native Soil Infiltration Rate		2.00	*in/hr*	*Okay*
Are you using underdrains?		No		
Total Volume Provided		33,126	*ft^3*	*Sum of storage Volume Provided in each layer*

Determine Runoff Reduction			
Runoff Reduction	8,781	*ft^3*	*This is 80% of storage volume provided or WQv whichever is less*
Volume Treated	0	*ft^3*	*This is the portion of the WQv that is not reduced in the practice*
Sizing √	*OK*		*Check to be sure Area provided ≥ Af*

Infiltrating Bioretention Worksheet

Total Applied RRV	8,780.74
Total Area	7.87
Total Impervious Area	6.73
Total Volume Treated	0.00
Rooftop Disconnect Impervious Area Total	0.00

Infiltrating Bioretention Worksheet

(For use on HSG A or B Soils without underdrains)

WQv ≤ VSM + VDL + (DP x ARG)

VSM = ARG x DSM x nSM

VDL (optional) = ARG x DDL x nDL

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	7.87	6.73	0.86	0.82	35122.97	1.50	Infiltration Bioretention
Enter Impervious Area Reduced by Disconnection of Rooftops			86%	0.82	35,123	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.					0	*ft^3*	

Infiltrating Bioretention Parameters				
Treatment Volume	WQv	35,123	*ft^3*	
Enter depth of soil Media	DSM	2.50	*ft*	*2.5 - 4 ft*
Enter depth of drainage	DDL	0.00	*ft*	*≥ 0.5 ft*
Enter ponding depth above surface	DP	1	*ft*	*≤ 0.5*
Enter porosity of Soil Media	nSM	0.20		*≥20%*
Enter porosity of Drainage	nDL	0.40		*≥ 40%*
Required Bioretention Area	ARG	23415	*sf*	
Bioretention Area Provided		22084	*ft2*	*Error, practice too small*
Native Soil Infiltration Rate		2.00	*in/hr*	*Okay*
Are you using underdrains?		No		
Total Volume Provided		33,126	*ft^3*	*Sum of storage Volume Provided in each layer*

Determine Runoff Reduction			
Runoff Reduction	26,501	*ft^3*	*This is 80% of storage volume provided or WQv whichever is less*
Volume Treated	8,622	*ft^3*	*This is the portion of the WQv that is not reduced in the practice*
Sizing √	*Error*		*Check to be sure Area provided ≥ Af*

Infiltrating Bioretention Worksheet

Total Applied RRV	26,500.80
Total Area	7.87
Total Impervious Area	6.73
Total Volume Treated	8,622.17
Rooftop Disconnect Impervious Area Total	0.00

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=	1.50	*inch*

Breakdown of Subcatchments

Catchment Number	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Rv	WQv *(ft^3)*	Description
1	2.62	2.62	100%	0.95	13,527	Infiltration Bioretention
2	2.12	2.12	100%	0.95	10,989	Infiltration Bioretention
3	1.99	1.99	100%	0.95	10,291	Infiltration Bioretention
4	1.14	0.00	0%	0.05	312	Infiltration Bioretention
5						
6						
7						
8						
9						
10						
Subtotal (1-30)	7.87	6.73	85%	0.82	35,119	Subtotal 1
Total	7.87	6.73	85%	0.82	35,119	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"	7.87	6.73	85%	0.82	35,119
Subtract Area	0.00	0.00			
WQv adjusted after Area Reductions	7.87	6.73	85%	0.82	35,119
Disconnection of Rooftops		0.00			
Adjusted WQv after Area Reduction and Rooftop Disconnect	7.87	6.73	85%	0.82	35,119
WQv reduced by Area Reduction techniques					0

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=	1.50	*inch*

Breakdown of Subcatchments

Catchment Number	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Rv	WQv *(ft^3)*	Description
1	8.12	7.03	87%	0.83	36,661	Infiltration Bioretention
2						
3						
4						
5						
6						
7						
8						
9						
10						
Subtotal (1-30)	8.12	7.03	87%	0.83	36,661	Subtotal 1
Total	8.12	7.03	87%	0.83	36,661	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*
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"	8.12	7.03	87%	0.83	36,661
Subtract Area	0.00	0.00			
WQv adjusted after Area Reductions	8.12	7.03	87%	0.83	36,661
Disconnection of Rooftops		0.00			
Adjusted WQv after Area Reduction and Rooftop Disconnect	8.12	7.03	87%	0.83	36,661
WQv reduced by Area Reduction techniques					0

Infiltrating Bioretention Worksheet

(For use on HSG A or B Soils without underdrains)

WQv ≤ VSM + VDL + (DP x ARG)

VSM = ARG x DSM x nSM

VDL (optional) = ARG x DDL x nDL

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	8.12	7.03	0.87	0.83	36661.19	1.50	Infiltration Bioretention
Enter Impervious Area Reduced by Disconnection of Rooftops			87%	0.83	36,661	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.					-27,496	*ft^3*	

Infiltrating Bioretention Parameters				
Treatment Volume	WQv	9,165	*ft^3*	
Enter depth of soil Media	DSM	2.50	*ft*	*2.5 - 4 ft*
Enter depth of drainage	DDL	0.00	*ft*	*≥ 0.5 ft*
Enter ponding depth above surface	DP	1	*ft*	*≤ 0.5*
Enter porosity of Soil Media	nSM	0.20		*≥20%*
Enter porosity of Drainage	nDL	0.40		*≥ 40%*
Required Bioretention Area	ARG	6110	*sf*	
Bioretention Area Provided		17785	*ft2*	
Native Soil Infiltration Rate		2.00	*in/hr*	*Okay*
Are you using underdrains?		No		
Total Volume Provided		26,678	*ft^3*	*Sum of storage Volume Provided in each layer*

Determine Runoff Reduction			
Runoff Reduction	9,165	*ft^3*	*This is 80% of storage volume provided or WQv whichever is less*
Volume Treated	0	*ft^3*	*This is the portion of the WQv that is not reduced in the practice*
Sizing √	*OK*		*Check to be sure Area provided ≥ Af*

Infiltrating Bioretention Worksheet

Total Applied RRV	9,165.30
Total Area	8.12
Total Impervious Area	7.03
Total Volume Treated	0.00
Rooftop Disconnect Impervious Area Total	0.00

Infiltrating Bioretention Worksheet

(For use on HSG A or B Soils without underdrains)

WQv ≤ VSM + VDL + (DP x ARG)

VSM = ARG x DSM x nSM

VDL (optional) = ARG x DDL x nDL

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	8.12	7.03	0.87	0.83	36661.19	1.50	Infiltration Bioretention
Enter Impervious Area Reduced by Disconnection of Rooftops			87%	0.83	36,661	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.					0	*ft^3*	

Infiltrating Bioretention Parameters				
Treatment Volume	WQv	36,661	*ft^3*	
Enter depth of soil Media	DSM	2.50	*ft*	*2.5 - 4 ft*
Enter depth of drainage	DDL	0.00	*ft*	*≥ 0.5 ft*
Enter ponding depth above surface	DP	1	*ft*	*≤ 0.5*
Enter porosity of Soil Media	nSM	0.20		*≥20%*
Enter porosity of Drainage	nDL	0.40		*≥ 40%*
Required Bioretention Area	ARG	24441	*sf*	
Bioretention Area Provided		17785	*ft2*	*Error, practice too small*
Native Soil Infiltration Rate		2.00	*in/hr*	*Okay*
Are you using underdrains?		No		
Total Volume Provided		26,678	*ft^3*	*Sum of storage Volume Provided in each layer*

Determine Runoff Reduction			
Runoff Reduction	21,342	*ft^3*	*This is 80% of storage volume provided or WQv whichever is less*
Volume Treated	15,319	*ft^3*	*This is the portion of the WQv that is not reduced in the practice*
Sizing √	*Error*		*Check to be sure Area provided ≥ Af*

Infiltrating Bioretention Worksheet

Total Applied RRV	21,342.00
Total Area	8.12
Total Impervious Area	7.03
Total Volume Treated	15,319.19
Rooftop Disconnect Impervious Area Total	0.00

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=	1.50	*inch*

Breakdown of Subcatchments

Catchment Number	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Rv	WQv *(ft^3)*	Description
1	2.20	2.20	100%	0.95	11,360	Infiltration Basin
2	2.03	2.03	100%	0.95	10,489	Infiltration Basin
3	2.81	2.81	100%	0.95	14,524	Infiltration Basin
4	1.09	0.00	0%	0.05	297	Infiltration Basin
5						
6						
7						
8						
9						
10						
Subtotal (1-30)	8.12	7.03	87%	0.83	36,670	Subtotal 1
Total	8.12	7.03	87%	0.83	36,670	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"	8.12	7.03	87%	0.83	36,670
Subtract Area	0.00	0.00			
WQv adjusted after Area Reductions	8.12	7.03	87%	0.83	36,670
Disconnection of Rooftops		0.00			
Adjusted WQv after Area Reduction and Rooftop Disconnect	8.12	7.03	87%	0.83	36,670
WQv reduced by Area Reduction techniques					0

Exhibit 12: Existing Runoff Calculations

SUNY-Purchase Green Infrastructure Installation project

Lot N1 Lot N1 Peak Runoff Quantity Volume, q, Calculation

1-Year 24-Hour rain event, SUNY-Purchase $P := 2.80\ \text{in}$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{\text{ft}}{\text{ft}}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00441\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ \text{in}}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ \text{in}}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 2.569\ \text{in}}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ \text{ft}$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.031\ \text{hr}}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ \text{ft}$

Average velocity, V $V := 2.78\ \frac{\text{ft}}{\text{sec}}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ \text{hr}}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ \text{hr}$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.015$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 7.478\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N1 Peak Runoff Quantity Volume, q, Calculation

2-Year 24-Hour rain event, SUNY-Purchase $P := 3.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00441\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 3.017\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.029\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.013$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 8.782\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N1 Peak Runoff Quantity Volume, q, Calculation

5-Year 24-Hour rain event, SUNY-Purchase $P := 4.25\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00441\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 4.015\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.025\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$$\frac{I_a}{P} = 0.01$$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$$q_p := q_u \cdot A_m \cdot Q \cdot F_p$$

$$q_p = 11.685\,cfs$$

SUNY-Purchase Green Infrastructure Installation project

Lot N1 Peak Runoff Quantity Volume, q, Calculation

10-Year 24-Hour rain event, SUNY-Purchase $P := 5.25\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00441\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 5.013\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.023\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$$\frac{I_a}{P} = 0.008$$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$$q_p := q_u \cdot A_m \cdot Q \cdot F_p$$

$$q_p = 14.59\ cfs$$

SUNY-Purchase Green Infrastructure Installation project

Lot N1 Peak Runoff Quantity Volume, q, Calculation

50-Year 24-Hour rain event, SUNY-Purchase $P := 6.75\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00441\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 6.511\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.02\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.006$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 18.951 cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N1 Peak Runoff Quantity Volume, q, Calculation

100-Year 24-Hour rain event, SUNY-Purchase $P := 7.5\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00441\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 7.261\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.019\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.005$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 21.133\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N2 Peak Runoff Quantity Volume, q, Calculation

1-Year 24-Hour rain event, SUNY-Purchase $P := 2.80\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00346\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 2.569\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.031\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.015$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 5.867\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N2 Peak Runoff Quantity Volume, q, Calculation

2-Year 24-Hour rain event, SUNY-Purchase $P := 3.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00346\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 3.017\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.029\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.013$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 6.89\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N2 Peak Runoff Quantity Volume, q, Calculation

5-Year 24-Hour rain event, SUNY-Purchase $P := 4.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00346\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 4.015\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.025\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.01$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 9.168\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N2 Peak Runoff Quantity Volume, q, Calculation

10-Year 24-Hour rain event, SUNY-Purchase $P := 5.25\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00346\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 5.013\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.023\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.008$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 11.447\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N2 Peak Runoff Quantity Volume, q, Calculation

50-Year 24-Hour rain event, SUNY-Purchase $P := 6.75\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00346\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 6.511\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.02\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.006$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 14.869\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N2 Peak Runoff Quantity Volume, q, Calculation

100-Year 24-Hour rain event, SUNY-Purchase $P := 7.5\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00346\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 7.261\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.019\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.005$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 16.58\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N3 Peak Runoff Quantity Volume, q, Calculation

1-Year 24-Hour rain event, SUNY-Purchase $P := 2.80\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00321\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 2.569\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.031\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.015$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 5.443\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N3 Peak Runoff Quantity Volume, q, Calculation

2-Year 24-Hour rain event, SUNY-Purchase $P := 3.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00321\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 3.017\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.029\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.013$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 6.392\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N3 Peak Runoff Quantity Volume, q, Calculation

5-Year 24-Hour rain event, SUNY-Purchase $P := 4.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00321\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 4.015\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.025\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.01$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 8.505\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N3 Peak Runoff Quantity Volume, q, Calculation

10-Year 24-Hour rain event, SUNY-Purchase $P := 5.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00321\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 5.013\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.023\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.008$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 10.62\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N3 Peak Runoff Quantity Volume, q, Calculation

50-Year 24-Hour rain event, SUNY-Purchase $P := 6.75\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00321\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 6.511\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.02\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.006$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 13.794\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N3 Peak Runoff Quantity Volume, q, Calculation

100-Year 24-Hour rain event, SUNY-Purchase $P := 7.5\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00321\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 7.261\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.019\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.005$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 15.382\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S1 Lot N1 Peak Runoff Quantity Volume, q, Calculation

1-Year 24-Hour rain event, SUNY-Purchase $P := 2.80\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00356\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 2.569\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.031\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$$\frac{I_a}{P} = 0.015$$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$$q_p := q_u \cdot A_m \cdot Q \cdot F_p$$

$$q_p = 6.036\,cfs$$

SUNY-Purchase Green Infrastructure Installation project

Lot S1 Peak Runoff Quantity Volume, q, Calculation

2-Year 24-Hour rain event, SUNY-Purchase $P := 3.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00356\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 3.017\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.029\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.013$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 7.089\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S1 Peak Runoff Quantity Volume, q, Calculation

5-Year 24-Hour rain event, SUNY-Purchase $P := 4.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00356\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 4.015\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.025\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.01$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 9.433\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S1 Peak Runoff Quantity Volume, q, Calculation

10-Year 24-Hour rain event, SUNY-Purchase $P := 5.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00356\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 5.013\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.023\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.008$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 11.778\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S1 Peak Runoff Quantity Volume, q, Calculation

50-Year 24-Hour rain event, SUNY-Purchase $P := 6.75\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00356\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 6.511\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.02\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.006$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 15.299\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S1 Peak Runoff Quantity Volume, q, Calculation

100-Year 24-Hour rain event, SUNY-Purchase $P := 7.5\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00356\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 7.261\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.019\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$$\frac{I_a}{P} = 0.005$$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$$q_p := q_u \cdot A_m \cdot Q \cdot F_p$$

$$q_p = 17.059\,cfs$$

SUNY-Purchase Green Infrastructure Installation project

Lot S2 Lot N1 Peak Runoff Quantity Volume, q, Calculation

1-Year 24-Hour rain event, SUNY-Purchase $P := 2.80\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00327\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 2.569\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.031\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.015$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 5.545\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S2 Peak Runoff Quantity Volume, q, Calculation

2-Year 24-Hour rain event, SUNY-Purchase $P := 3.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00327\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 3.017\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.029\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.013$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 6.512\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S2 Peak Runoff Quantity Volume, q, Calculation

5-Year 24-Hour rain event, SUNY-Purchase $P := 4.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00327\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 4.015\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.025\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.01$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 8.664\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S2 Peak Runoff Quantity Volume, q, Calculation

10-Year 24-Hour rain event, SUNY-Purchase $P := 5.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00327\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 5.013\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.023\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.008$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 10.819\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S2 Peak Runoff Quantity Volume, q, Calculation

50-Year 24-Hour rain event, SUNY-Purchase $P := 6.75\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00327\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 6.511\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.02\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.006$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 14.052\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S2 Peak Runoff Quantity Volume, q, Calculation

100-Year 24-Hour rain event, SUNY-Purchase $P := 7.5\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00327\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 7.261\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.019\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.005$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 15.67\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S3 Lot N1 Peak Runoff Quantity Volume, q, Calculation

1-Year 24-Hour rain event, SUNY-Purchase $P := 2.80\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00460\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 2.569\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.031\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.015$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 7.8\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S3 Peak Runoff Quantity Volume, q, Calculation

2-Year 24-Hour rain event, SUNY-Purchase $P := 3.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00460\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 3.017\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.029\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.013$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 9.161\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S3 Peak Runoff Quantity Volume, q, Calculation

5-Year 24-Hour rain event, SUNY-Purchase $P := 4.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00460\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 4.015\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.025\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.01$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 12.188\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S3 Peak Runoff Quantity Volume, q, Calculation

10-Year 24-Hour rain event, SUNY-Purchase $P := 5.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00460\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 5.013\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.023\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.008$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 15.219\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S3 Peak Runoff Quantity Volume, q, Calculation

50-Year 24-Hour rain event, SUNY-Purchase $P := 6.75\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00460\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 6.511\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.02\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.006$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 19.768\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S3 Peak Runoff Quantity Volume, q, Calculation

100-Year 24-Hour rain event, SUNY-Purchase $P := 7.5\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00460\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 7.261\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.019\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.005$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 22.043\,cfs$

Exhibit 13: Proposed Runoff Calculations

SUNY-Purchase Green Infrastructure Installation project

Lot N1 Lot N1 Peak Runoff Quantity Volume, q, Calculation

1-Year 24-Hour rain event, SUNY-Purchase $P := 2.80\ \text{in}$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{\text{ft}}{\text{ft}}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00441\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ \text{in}}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ \text{in}}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 2.569\ \text{in}}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ \text{ft}$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.031\ \text{hr}}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ \text{ft}$

Average velocity, V $V := 2.78\ \frac{\text{ft}}{\text{sec}}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ \text{hr}}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ \text{hr}$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.015$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 7.478\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N1 Peak Runoff Quantity Volume, q, Calculation

2-Year 24-Hour rain event, SUNY-Purchase $P := 3.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00441\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 3.017\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.029\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.013$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 8.782\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N1 Peak Runoff Quantity Volume, q, Calculation

5-Year 24-Hour rain event, SUNY-Purchase $P := 4.25\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00441\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 4.015\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.025\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$$\frac{I_a}{P} = 0.01$$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$$q_p := q_u \cdot A_m \cdot Q \cdot F_p$$

$$q_p = 11.685\,cfs$$

SUNY-Purchase Green Infrastructure Installation project

Lot N1 Peak Runoff Quantity Volume, q, Calculation

10-Year 24-Hour rain event, SUNY-Purchase $P := 5.25\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00441\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 5.013\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.023\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$$\frac{I_a}{P} = 0.008$$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$$q_p := q_u \cdot A_m \cdot Q \cdot F_p$$

$$q_p = 14.59\ cfs$$

SUNY-Purchase Green Infrastructure Installation project

Lot N1 Peak Runoff Quantity Volume, q, Calculation

50-Year 24-Hour rain event, SUNY-Purchase $P := 6.75\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00441\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 6.511\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.02\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.006$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 18.951 cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N1 Peak Runoff Quantity Volume, q, Calculation

100-Year 24-Hour rain event, SUNY-Purchase $P := 7.5\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00441\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 7.261\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.019\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.005$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 21.133\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N2 Peak Runoff Quantity Volume, q, Calculation

1-Year 24-Hour rain event, SUNY-Purchase $P := 2.80\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00346\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 2.569\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.031\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.015$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 5.867\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N2 Peak Runoff Quantity Volume, q, Calculation

2-Year 24-Hour rain event, SUNY-Purchase $P := 3.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00346\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 3.017\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.029\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.013$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 6.89\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N2 Peak Runoff Quantity Volume, q, Calculation

5-Year 24-Hour rain event, SUNY-Purchase $P := 4.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00346\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 4.015\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.025\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.01$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 9.168\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N2 Peak Runoff Quantity Volume, q, Calculation

10-Year 24-Hour rain event, SUNY-Purchase $P := 5.25\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00346\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 5.013\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.023\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.008$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 11.447\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N2 Peak Runoff Quantity Volume, q, Calculation

50-Year 24-Hour rain event, SUNY-Purchase $P := 6.75\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00346\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 6.511\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.02\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.006$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 14.869\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N2 Peak Runoff Quantity Volume, q, Calculation

100-Year 24-Hour rain event, SUNY-Purchase $P := 7.5\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00346\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 7.261\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.019\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.005$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 16.58\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N3 Peak Runoff Quantity Volume, q, Calculation

1-Year 24-Hour rain event, SUNY-Purchase $P := 2.80\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00321\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 2.569\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.031\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.015$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 5.443\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N3 Peak Runoff Quantity Volume, q, Calculation

2-Year 24-Hour rain event, SUNY-Purchase $P := 3.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00321\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 3.017\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.029\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.013$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 6.392\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N3 Peak Runoff Quantity Volume, q, Calculation

5-Year 24-Hour rain event, SUNY-Purchase $P := 4.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00321\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 4.015\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.025\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.01$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 8.505\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N3 Peak Runoff Quantity Volume, q, Calculation

10-Year 24-Hour rain event, SUNY-Purchase $P := 5.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00321\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 5.013\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.023\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.008$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 10.62\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N3 Peak Runoff Quantity Volume, q, Calculation

50-Year 24-Hour rain event, SUNY-Purchase $P := 6.75\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00321\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 6.511\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.02\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.006$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 13.794\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot N3 Peak Runoff Quantity Volume, q, Calculation

100-Year 24-Hour rain event, SUNY-Purchase $P := 7.5\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00321\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 7.261\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.019\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.005$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 15.382\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S1 Lot N1 Peak Runoff Quantity Volume, q, Calculation

1-Year 24-Hour rain event, SUNY-Purchase $P := 2.80\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00356\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 2.569\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.031\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$$\frac{I_a}{P} = 0.015$$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$$q_p := q_u \cdot A_m \cdot Q \cdot F_p$$

$$q_p = 6.036\,cfs$$

SUNY-Purchase Green Infrastructure Installation project

Lot S1 Peak Runoff Quantity Volume, q, Calculation

2-Year 24-Hour rain event, SUNY-Purchase $P := 3.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00356\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 3.017\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.029\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.013$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 7.089\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S1 Peak Runoff Quantity Volume, q, Calculation

5-Year 24-Hour rain event, SUNY-Purchase $P := 4.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00356\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 4.015\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.025\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.01$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 9.433\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S1 Peak Runoff Quantity Volume, q, Calculation

10-Year 24-Hour rain event, SUNY-Purchase $P := 5.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00356\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 5.013\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.023\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.008$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 11.778\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S1 Peak Runoff Quantity Volume, q, Calculation

50-Year 24-Hour rain event, SUNY-Purchase $P := 6.75\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00356\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 6.511\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.02\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.006$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 15.299\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S1 Peak Runoff Quantity Volume, q, Calculation

100-Year 24-Hour rain event, SUNY-Purchase $P := 7.5\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00356\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 7.261\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.019\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$$\frac{I_a}{P} = 0.005$$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$$q_p := q_u \cdot A_m \cdot Q \cdot F_p$$

$$q_p = 17.059\,cfs$$

SUNY-Purchase Green Infrastructure Installation project

Lot S2 Lot N1 Peak Runoff Quantity Volume, q, Calculation

1-Year 24-Hour rain event, SUNY-Purchase $P := 2.80\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00327\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 2.569\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.031\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.015$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 5.545\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S2 Peak Runoff Quantity Volume, q, Calculation

2-Year 24-Hour rain event, SUNY-Purchase $P := 3.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00327\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 3.017\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.029\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.013$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 6.512\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S2 Peak Runoff Quantity Volume, q, Calculation

5-Year 24-Hour rain event, SUNY-Purchase $P := 4.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00327\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 4.015\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.025\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.01$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 8.664\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S2 Peak Runoff Quantity Volume, q, Calculation

10-Year 24-Hour rain event, SUNY-Purchase $P := 5.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00327\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 5.013\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.023\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.008$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 10.819\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S2 Peak Runoff Quantity Volume, q, Calculation

50-Year 24-Hour rain event, SUNY-Purchase $P := 6.75\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00327\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 6.511\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.02\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.006$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 14.052\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S2 Peak Runoff Quantity Volume, q, Calculation

100-Year 24-Hour rain event, SUNY-Purchase $P := 7.5\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00327\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 7.261\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.019\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.005$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 15.67\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S3 Lot N1 Peak Runoff Quantity Volume, q, Calculation

1-Year 24-Hour rain event, SUNY-Purchase $P := 2.80\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00460\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 2.569\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.031\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.015$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 7.8\ cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S3 Peak Runoff Quantity Volume, q, Calculation

2-Year 24-Hour rain event, SUNY-Purchase $P := 3.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00460\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 3.017\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.029\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.013$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 9.161\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S3 Peak Runoff Quantity Volume, q, Calculation

5-Year 24-Hour rain event, SUNY-Purchase $P := 4.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00460\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 4.015\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.025\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.01$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 12.188\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S3 Peak Runoff Quantity Volume, q, Calculation

10-Year 24-Hour rain event, SUNY-Purchase $P := 5.25\,in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\,\frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00460\,mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\,in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\,in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 5.013\,in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\,ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.023\,hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\,ft$

Average velocity, V $V := 2.78\,\frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\,hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\,hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.008$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 15.219\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S3 Peak Runoff Quantity Volume, q, Calculation

50-Year 24-Hour rain event, SUNY-Purchase $P := 6.75\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00460\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{(P - I_a)^2}{(P - I_a) + S} \qquad \boxed{Q = 6.511\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot (n \cdot L_1)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.02\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.006$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 19.768\,cfs$

SUNY-Purchase Green Infrastructure Installation project

Lot S3 Peak Runoff Quantity Volume, q, Calculation

100-Year 24-Hour rain event, SUNY-Purchase $P := 7.5\ in$

Runoff curve number $CN := 98$

Parking lot slope, s $s := 0.018\ \frac{ft}{ft}$

Mannings roughness coefficient, n $n := 0.011$

Lot Area $A_m := .00460\ mi^2$

Potential maximum retention after runoff begins,S

$$S := \frac{1000}{CN} - 10 \qquad \boxed{S = 0.204\ in}$$

Initial abstraction, Ia

$$I_a := 0.2 \cdot S \qquad \boxed{I_a = 0.041\ in}$$

Runoff, Q

$$Q := \frac{\left(P - I_a\right)^2}{\left(P - I_a\right) + S} \qquad \boxed{Q = 7.261\ in}$$

Time of Concentration, Tc

Sheet Flow

Sheet glow length $L_1 := 150\ ft$

$$T_1 := \frac{0.007 \cdot \left(n \cdot L_1\right)^{0.8}}{P^{0.5} \cdot s^{0.4}} \qquad \boxed{T_1 = 0.019\ hr}$$

Shallow concentrated Flow

Shallow concentrated flow length $L_2 := 400\ ft$

Average velocity, V $V := 2.78\ \frac{ft}{sec}$ (Figure 3.1)

$$T_2 := \frac{L_2}{3600 \cdot V} \qquad \boxed{T_2 = 0.04\ hr}$$

Time of concentration must be greater than 0.1 hr, therefore:

$T_c := 0.1\ hr$

Rainfall distribution type is III

$\frac{I_a}{P} = 0.005$

Using Exhibit 4-III and limiting factors:

Unit peak discharge $q_u := 660\,csm/in$

Peak Discharge Rate

Pond and swamp adjument factor $F_p := 1.0$

$q_p := q_u \cdot A_m \cdot Q \cdot F_p$

$q_p = 22.043\,cfs$

Exhibit 14: Cultural Resource Sensitivity Mapping

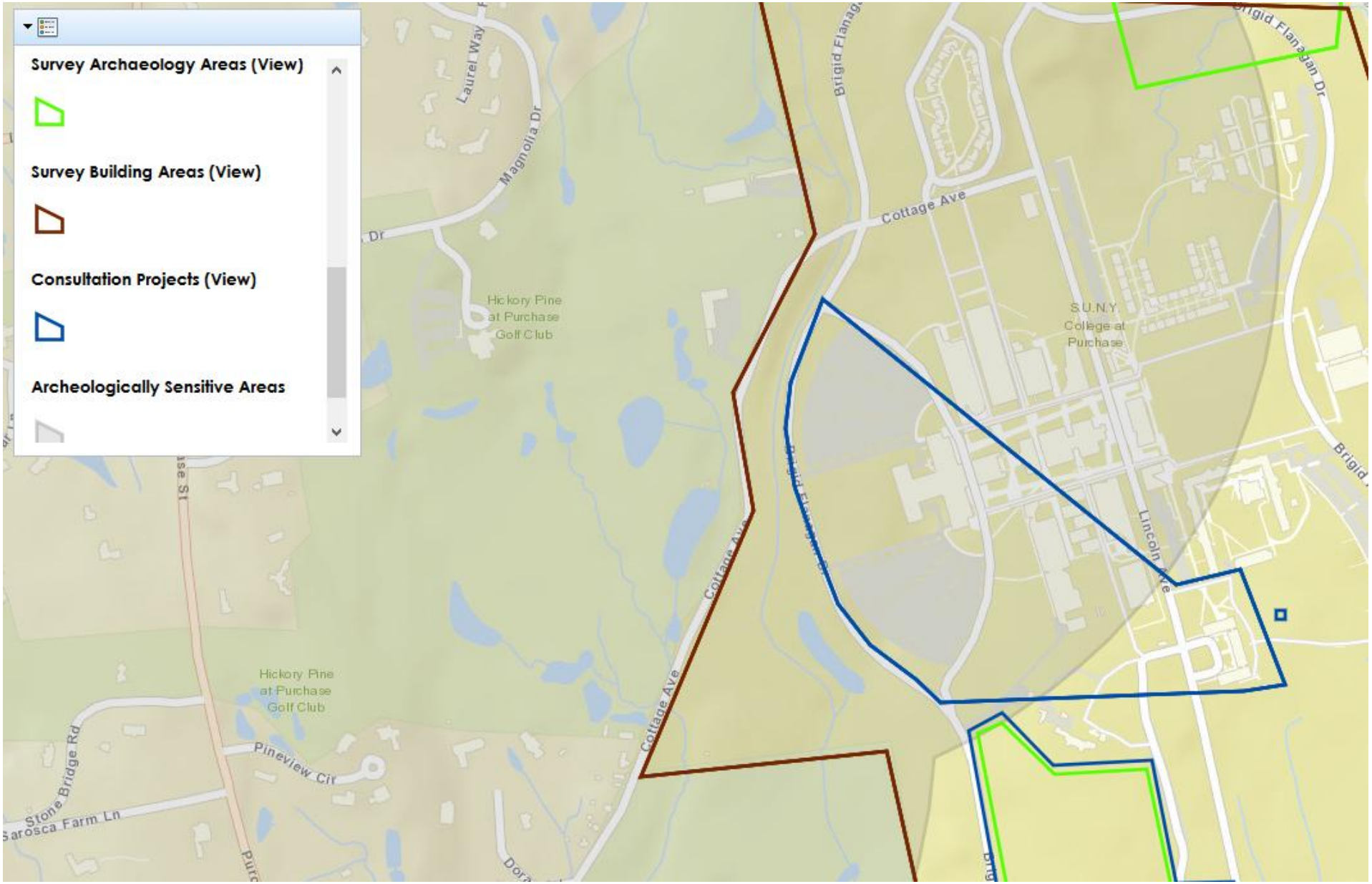
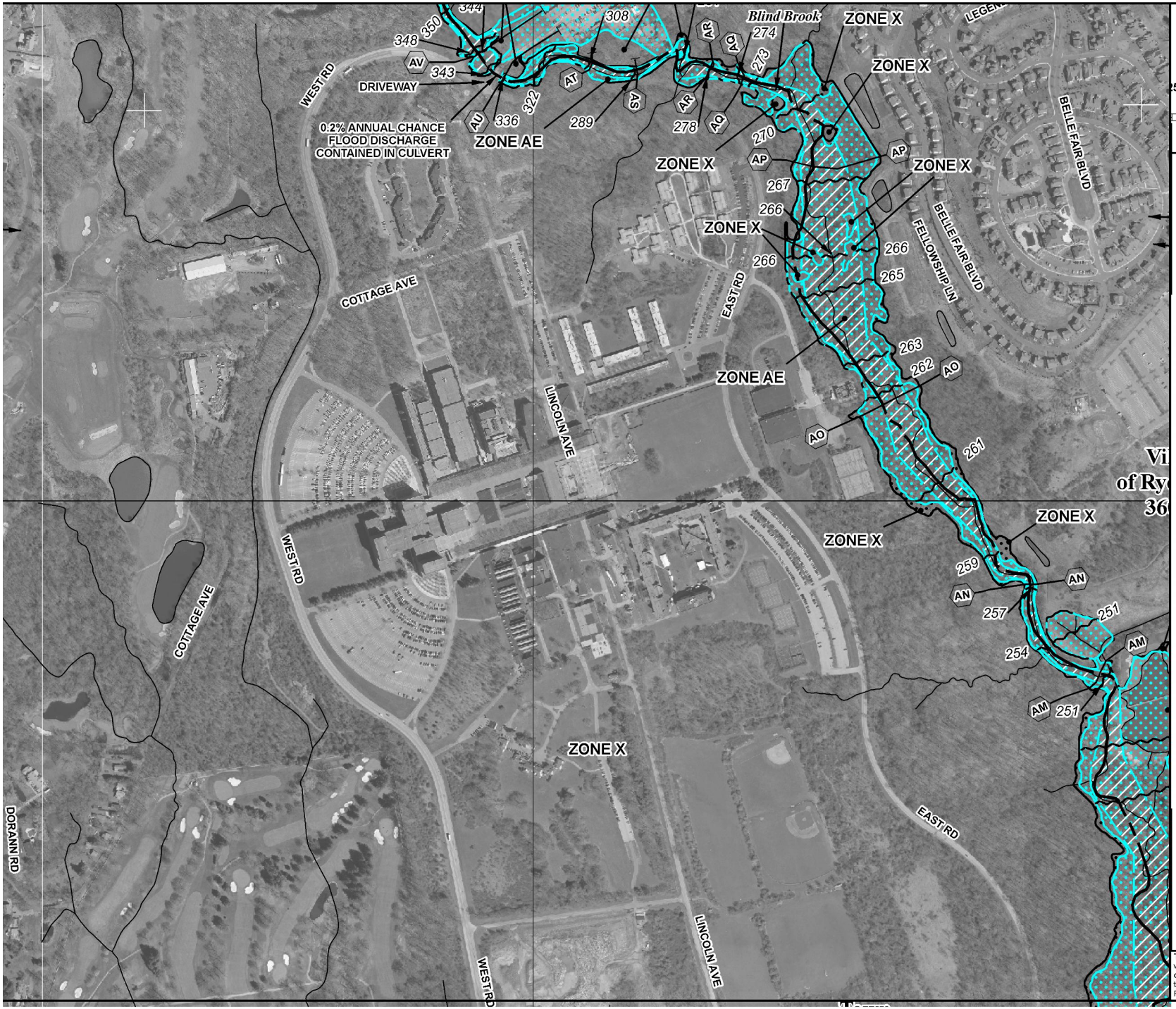

Survey Archaeology Areas (View)
Survey Building Areas (View)
Consultation Projects (View)
Archeologically Sensitive Areas
Laurel Way
Magnolia Dr
Hickory Pine at Purchase Golf Club
Brigid Flanagan Dr
Cottage Ave
S.U.N.Y. College at Purchase
Lincoln Ave
Hickory Pine at Purchase Golf Club
Stone Bridge Rd
Pineview Cir
Sarosca Farm Ln

Exhibit 15: Flood Plain Mapping



MAP SCALE 1" = 500'

250 0 500 1000 F

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0287F

FIRM

FLOOD INSURANCE RATE MAP

for WESTCHESTER COUNTY, NEW YOR
(ALL JURISDICTIONS)

CONTAINS:

COMMUNITY	NUMBER
HARRISON, TOWN OF	360912
RYE BROOK, VILLAGE OF	360930

PANEL 287 OF 426
MAP SUFFIX: F
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

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

MAP NUMBE
36119C028

EFFECTIVE DA
SEPTEMBER 28, 20

Federal Emergency Management Agen

This is an official copy of a portion of the above referenced flood m was extracted using F-MIT On-Line. This map does not reflect ch or amendments which may have been made subsequent to the d title block. For the latest product information about National Floo Program flood maps check the FEMA Flood Map Store at www.m